

**Project Specifications
For**

***SAMUEL MAHELONA
MEMORIAL HOSPITAL***

***Behavioral Health New Patient
Facility***

Construction Documents/Bid Set

Honolulu, Hawaii
Project No. 221093-01

27 February 2026



TABLE OF CONTENTS

SPECIFICATIONS

BID FORM

DIVISION	01	GENERAL REQUIREMENTS
01010		Summary of Work
01250		Contract Modifications
01290		Payment Procedures
01310		Project Management and Coordination
01320		Construction Progress Documentation
01330		Submittal Procedures
01361		Sustainable Design Requirements
01420		References
01450		Quality Control
01500		Temporary Facilities and Controls
01524		Construction and Demolition Waste Management Requirements
01570		Soil Erosion Control
01580		Indoor Air Quality Management Requirements
01595		Project Cleaning
01600		Product Requirements
01630		Product Options and Substitutions
01770		Closeout Procedures
01785		Project Record Documents
DIVISION	02	SITE WORK
02070		Selective Demolition
02100		Site Preparation
02300		Earthwork
02302		Trenching, Excavation, and Backfilling for Utilities
02510		Water Distribution System
02520		Paving, Roadway and Miscellaneous Work
02530		Sanitary Sewerage
02630		Storm Drainage
02740		Asphalt Concrete Paving
02750		Portland Cement Concrete Paving
02760		Pavement Marking and Signage
02810		Irrigation System
02826		Metal Security Fencing
02900		Planting
DIVISION	03	CONCRETE
03300		Cast-In-Place Concrete
03305		Underslab Vapor and Termite Barrier
03715		Concrete Sealer

February 27, 2026

DIVISION	04	MASONRY
04400		Adhered Simulated Stone Veneer
04810		Unit Masonry Assemblies
DIVISION	05	METALS
05120		Structural Steel
05140		Decorative Aluminum Screens
05310		Steel Deck
05400		Cold-Formed Metal Framing
05500		Metal Fabrications
DIVISION	06	WOOD AND PLASTICS
06070		Wood Treatment
06100		Rough Carpentry
06160		Exterior Gypsum Sheathing
06200		Finish Carpentry
06412		Architectural Casework
06605		Fiberglass Reinforced Wall Panels
06615		Simulated Stone Countertops
06620		Solid Surface Countertops
DIVISION	07	THERMAL AND MOISTURE PROTECTION
07130		Elastomeric Sheet Membrane Waterproofing
07200		Building Insulation
07241		Direct Applied Exterior Finish System
07270		Penetration Firestopping
07410		Standing Seam Metal Roof
07464		Aluminum Composite Panels
07540		TPO Membrane
07600		Flashing and Sheet Metal
07910		Exterior Wall Joint Sealants
07920		Sealants
DIVISION	08	DOORS AND WINDOWS
08110		Steel Doors & Frames
08210		Wood Doors
08305		Access Doors
08340		Behavioral Health Doors and Frames
08460		Automatic Entrance Doors
08520		Glazed Aluminum Systems
08565		Behavioral Health Windows
08710		Finish Hardware
08800		Glazing
DIVISION	09	FINISHES
09250		Gypsum Board Assemblies
09310		Ceramic Tile

February 27, 2026

09340	Tile Waterproofing
09510	Suspended Acoustical Ceilings
09513	Suspended Metal Soffit/Ceiling Panels
09575	Security Ceiling Assemblies
09622	Vinyl Sports Flooring
09651	Resilient Tile Flooring
09652	Resilient Sheet Flooring
09681	Carpet Tile
09720	Wall Covering
09779	Safety Padding
09841	Acoustical Wall Panels
09842	Acoustical Ceiling Treatment
09900	Painting
09905	High Performance Wall Coating

DIVISION 10 SPECIALTIES

10200	Metal Louvers
10240	Aluminum Vision Barrier Walls
10265	Impact-Resistant Wall Protection
10515	Plastic Laminate Lockers
10520	Fire Extinguishers and Cabinets
10800	Toilet Accessories

DIVISION 11 EQUIPMENT – NOT USED

DIVISION 12 FURNISHINGS

12485	Recessed Walk-off Mat
12494	Roller Shades

DIVISION 13 SPECIAL CONSTRUCTION - NOT USED

DIVISION 14 CONVEYING SYSTEMS - NOT USED

DIVISION 15 MECHANICAL

15072	Vibration Isolation and Seismic Control Measures
15400	Plumbing
15410	Plumbing Fixtures
15500	Fire Protection Systems
15600	Air Conditioning and Ventilation
15811	Duct Silencers
15910	Direct Digital Control Systems
15992	Commissioning of HVAC Systems

DIVISION 16 ELECTRICAL

16000	General Electrical Requirements
16050	Basic Materials and Methods
16053	Arch Flash and Coordination Study
16301	Underground Electrical Work

February 27, 2026

16500	Lighting
16700	Telecommunications
16721	Fire Alarm
16810	Audio Visual Systems
16813	Audio Visual Control Systems
16819	Audio Visual Systems Performance Verification

DIVISION	18	SECURITY ELECTRONICS
18050		Common Work Results for Electronic Security
18330		Video Surveillance System.
18320		Access Control System
18553		Identification for Electronic Security

Appendix

SMMH Behavioral Health Equipment List

END OF TABLE OF CONTENTS

BID FORM

FOR

FURNISHING LABOR, MATERIALS, EQUIPMENT AND OTHER TOOLS

REQUIRED FOR

SAMUEL MAHELONA MEMORIAL HOSPITAL

BEHAVIORAL HEALTH
NEW PATIENT FACILITY
RFP NO.

TAX MAP KEY: 4-6-014:113

KAPA`A, KAUAI, HAWAII

FOR THE
HAWAII HEALTH SYSTEMS CORPORATION
STATE OF HAWAII

After carefully examining the bid documents identified above, the Offeror proposes to furnish at its own expenses all necessary labor, materials, tools and equipment to complete the work according to the true intent and meaning of the drawings and specifications, all for the Lump Sum Base Bid of:

DOLLARS (\$ _____)

(Bid Breakdown shall be submitted in bid by Specification Division No.)

Submitted By:

Signature / Printed Name_____
Date_____
Title_____
(Name of Business) is a: ☐ Sole Proprietor☐ Partnership ☐ Corporation ☐ Joint Venture Other (Specify) _____

Business Address: _____

Business Phone Number: _____

E-mail address: _____

Federal TAX ID #: _____

Hawaii GET Lic ID #: _____

State of Incorporation is: (Specify) _____.

The exact legal name of the business under which the contract, if awarded, shall be executed is:___

RECEIPT OF ADDENDA

Receipt of the following addenda issued by the HHSC is acknowledged by the date(s) of receipt indicated below:

Addendum No. 1 _____

Addendum No. 4 _____

Addendum No. 2 _____

Addendum No. 5 _____

Addendum No. 3 _____

Addendum No. 6 _____

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

BID BREAKDOWN**Project: SMMH Behavioral Health New Patient Facility****Company Name:****By:**

	Bid	Subs	Remarks/Comments
Division 00			
Division 01 - General Requirements			
Division 02 - Sitework			
Division 03 - Concrete			
Division 04 - Masonry			
Division 05 - Metals			
Division 06 - Wood and Plastics			
Division 07 - Thermal and Moisture Protection			
Division 08 - Doors and Windows			
Division 09 - Finishes			
Division 10 - Specialties			
Division 11 - Equipment	Not Used		
Division 12 - Furnishings			
Division 13 - Special Construction	Not Used		
Division 14 - Conveying Systems	Not Used		
Division 15 - Mechanical			
Division 16 - Electrical			
Division 18 – Security Electronics			
Total Cost of Work			
Permit Fee			
Performance Bond			
Liability Insurance			
General Excise Tax			
Markup			
TOTAL BID			

Change Order OH & Profit (%)

VE/Cost Saving Suggestion

Details:

SECTION 01010 – SUMMARY OF WORK

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. General description of the Project.
 - 2. General requirements for the Project.
- B. Related Sections:
 - 1. Division 01 Sections.

1.02 PROJECT/WORK SUMMARY

- A. Project Summary: The Work consists of but is not limited to the following:
 - 1. Demolition summary is as specified in Section 02110 – REMOVAL OF STRUCTURES AND OBSTRUCTIONS
 - 2. New construction as indicated on the drawings.
- B. Contract Documents:
 - 1. List of Documents: All of the following documents apply to the Contract.
 - a. Drawings:
 - i. Bound hardcopy set of G70 and their consultants bound therein.
 - b. Project Manual:
 - i. Bound hardcopy set of “Project Manual” of G70 and their Consultants bound therein.
 - c. Other: As included in listing of Contract between Owner and Contractor.
 - d. Available Informative Documents, Reports and Data, not part of the Contract Documents can be made available by Owner as requested.
 - 2. Data Availability:
 - a. Availability: All documents which impact the Project are available from the Owner.
 - b. Contractor Responsibility: Full review of all Contract requirements is Contractor’s responsibility.

1.03 OWNER FURNISHED PRODUCTS

- A. Owner Furnished Contractor Installed (OFCI)
 - 1. Products furnished to the site and paid for by Owner. Installation and final connection are by Contractor.

2. Owner's Responsibilities:
 - a. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to Contractor. Require vendor to indicate on shop drawings necessary blocking for attachment.
 - b. Arrange and pay for product delivery to site.
 - c. On delivery, inspect products jointly with Contractor.
 - d. Submit claims for transportation damage. Replace damaged, defective or deficient items.
 - e. Arrange for manufacturers' warranties, inspections and service.
3. Contractor's Responsibilities:
 - a. Designate required submittal date for shop drawings, product data and samples.
 - b. Designate required delivery date for each product.
 - c. Review Owner-reviewed shop drawings, product data, and samples.
 - d. Receive and unload products at site. Inspect products jointly with Owner.
 - e. Handle, store and protect products from loss and damage.
 - f. Coordinate installation and protect installed and finished products.
 - g. Repair or replace items damaged after receipt.
 - h. Remove packing debris from site.

1.04 CONTRACT DOCUMENTS

- A. Contract Documents Language: Imperative language is intended. Except as otherwise indicated, written requirements are to be executed by the Contractor.
- B. Related Provisions: The following applies to all Work specified and is to be provided to all Entities; whether directly or indirectly involved in the Work.
 1. Conditions of the Contract.
 2. Contract Drawings.
 3. Division 01 Specification Sections.
 4. As applicable to each Entity, the appropriate Specification Section(s) and related Specification Section(s) of other Installers.
 5. As applicable to each Entity, modifications to the Contract, if any.

1.05 QUALITY ASSURANCE

- A. Standards of Quality: The highest quality of work is to be provided as necessary to comply with all of following.

February 27, 2026

1. Contract requirements: unless in conflict with Code or other Authority requirements, then such requirements take precedence, but conflicting requirements are to be resolved in accordance with Architect's directives.
 2. Code or other applicable Authority requirements, e.g. codes, laws, and other mandates of Authorities having impact of law such as those of ADA.
 3. Applicable Industry Standards, whether specified or not, and which are generally and currently accepted in the Industry as standard for grade of work indicated.
- B. Completeness of the Work: It is the purpose of the Contract Documents to reasonably and professionally convey the quality, extent, and intent of the Work required so that the complete scope of Work can be interpreted there from. The industry does not require that the descriptions be neither highly detailed nor totally complete. It is the intent of the Contract Documents that the Work provided be complete. Provide the necessary work normally provided for the quality of work indicated to ensure that Work is complete.
- C. Deviations from Contract Requirements:
1. General: Inform Architect of deviations from Contract requirements. Work with all entities that will be affected by such a deviation to assure that proper coordination can be accomplished, that new products, if any, which are anticipated to be incorporated can be properly interfaced with the work, are compatible with the interfacing work, and that such work conforms to the intent of the Contract Documents.
 2. Directives from Authorities: Where Authorities direct a change in the work from that originally required by the Contract Documents, do not proceed with such work until securing the Architects consensus that such requirements are in conformance with the intent of the Contract Documents as originally reviewed with the Authorities.
- D. Electronic Files:
1. Basis of Contract: Where electronic files are approved for use on Project, an original hardcopy set in possession of Architect to remain as standard basis of Contract. If Contractor desires, a Third Party may be assigned to hold a Contract representative hardcopy of the Contract Set involved; otherwise Architect's designated set to be representative Contract Set.
 2. Verification: Prior to signing any agreements of Contract, Contractor to verify that work based on electronic files is consistent with original hardcopies.
 3. Conflicts: If any, to be determined by the original hardcopies and not by any information derived from electronic files.
 4. Use of Electronic Data as Basis of Contract: Data may be used, when hardcopies derived from electronic files are signed between Contracting Parties showing their recognition that such derived electronic information can be used in lieu of the designated document(s) in the base representative Contract Set.

1.06 REGULATIONS

- A. General: Comply with all laws, ordinances, rules, and regulations, by any governmental authority, which in any manner apply to or affect those employed in the Work, the materials used in the Work, and the conduct of the Work. Contractor shall also comply with all such orders and decrees of bodies or tribunals having any jurisdiction or authority over the Work and which are or have the effect of law.
- B. Americans with Disabilities Act (ADA):
 - 1. Requirement: All person and entities providing work for this Project is required to be knowledgeable of the requirements of the American Disabilities Act as it affects their portion of the Work. Do not install work not in compliance with ADA.
 - 2. Notification: Prior to any purchase of materials, fabrication, and installation of any work not complying with ADA requirements, notify Architect and secure design direction resolving non-complying features.
 - 3. Design Intent: ADA dimensions indicated and required are either minimums or maximums and are to be adjusted for actual built tolerances so that required dimensions are not violated, e.g. sloping floors, etc. Comply with following.
 - a. Finish to Finish Dimensions: Required dimensions are clearances from finished surfaces.
 - b. "Minimum" Dimensions: The required dimension to be "not less than" that required from the required adjacent finished surface(s) to the ADA component.
 - c. "Maximum" Dimensions. The required dimension to be "not greater than" that required from the required adjacent finished surface(s) to the ADA component.
 - 4. Authority Directives:
 - a. Notification: During the course of the Work, where Authorities may direct changes in the Work, Architect is to be notified prior to the purchase of any materials, prior to the fabrication of any materials, prior to use of any labor, and prior to execution of any work. Do not proceed with the work without the Architect's approval.
 - b. Intent: To avoid conflicts between prior Authority directives and those provided in the field.

1.07 OWNER'S RESTRICTIONS

- A. Owner's Operations: Work is to be scheduled around the Owner's ongoing operations. Prior to the start of the Work, meet with Owner, and clearly define conditions under which the Work is to be performed relative to the Owner's operations including, but not necessarily limited to, the following: regardless of what may be indicated in the Contract requirements prior to signing the Contract for the Work.
 - 1. Times allowed for operations, including high noise generating operations.
 - 2. Sequence, timing, and extent of areas to be made available to Contractor to complete the required work.

February 27, 2026

3. Limits placed on use of each work area.
 4. Methods of moving material and equipment around, within, to and from staging and delivery areas to each work area.
 5. Degree and duration in which equipment and materials may be left in place at locations in public areas.
 6. Available parking.
 7. Available services, such as for power and water.
 8. Available facilities, such as restrooms.
 9. Available staging areas.
 10. Conditions under which Owner's available facilities and services are provided.
 11. Limitations on generation of noise.
 12. Security required.
 13. Safety precautions and amount of protections required.
 14. Degree of cleanliness and orderliness expected in Work areas.
 15. Special activities of Owner occurring during course of Work and which could impact Work of this Contract.
 16. Verification of any work to be done by Tenants in Owner leased spaces, if any, impacting Work of this Contract.
 17. Verify salvageable work required by Owner.
 18. Other Owner requirements.
- B. Personnel Conduct:
1. Smoking and Controlled Substance Restrictions: Use of tobacco products, alcoholic beverages, and other controlled substances within the on Owner's property is not permitted.
 2. Radios: No radios are allowed on Project site.
 3. CB Devices: May be used, but will be limited to Project use, be used primarily on Project Site or its immediate area, and not be on same wave.
- C. Owner-Contractor Responsibility: In order to avoid any potential conflicts with the Owner and besides the initial pre-work verification of the Owner's intentions, the Contractor and Owner to set up an ongoing procedure to continuously liaison with each other to verify ongoing, anticipated, and potential future Owner operations that may have negative impacts on the Project and to arbitrate in advance of such impacts, methods to ensure that the Project is without any Owner-Contractor conflicts.

1.08 FUNDING REQUIREMENTS AND CONTRACT EXECUTION

- A. The Project is funded in part by State of Hawai'i appropriations that lapse on June 30, 2026.
- B. In order to preserve funding, the Owner intends to:

February 27, 2026

1. Award and execute the Construction Contract prior to June 30, 2026.
2. Defer issuance of the Notice to Proceed until all required governmental approvals have been obtained.
- C. Contractor acknowledges that Contract execution will occur prior to issuance of Notice to Proceed.
- D. Contract execution shall not authorize commencement of construction activities.

1.09 REGULATORY APPROVALS

- A. The Project requires the following approvals prior to commencement of construction:
 1. Environmental Impact Statement (EIS) approval
 2. Kauai County Special District Use Permit approval
 3. HRS 6E compliance approval from SHPD
 4. Building Permit issuance
- B. Construction activities shall not commence until all required approvals have been secured and the Notice to Proceed has been issued.
- C. Owner anticipates that issuance of Notice to Proceed may occur approximately ten (10) months following bid date. This duration is an estimate only and is subject to regulatory processes.

1.10 ARCHAEOLOGICAL MONITORING REQUIREMENTS

- A. This Project is subject to the requirements of HRS Chapter 6E. The Owner is in the process of obtaining a State Historic Preservation Division (SHPD) approved Archaeological Monitoring Plan (AMP). Contractor acknowledges that archaeological monitoring of ground disturbing activities will be required.
- B. The Owner has retained, or will retain, a SHPD-qualified archaeologist to perform monitoring in accordance with the approved AMP. The archaeologist is not under the direction or control of the Contractor.
- C. Archaeological monitoring of ground disturbing activities, , including reasonable coordination and localized suspension of work for inspection and documentation, is an anticipated condition of the Work. Contractor shall include in its Lump Sum Bid all costs associated with scheduling, coordination, access, reasonable standby, and sequencing necessary to accommodate monitoring activities as typically required under HRS Chapter 6E.
- D. Ground disturbing activities include, but are not limited to:
 1. Clearing and grubbing
 2. Grading
 3. Excavation and trenching
 4. Foundation construction
 5. Utility installation

February 27, 2026

6. Post holes and landscaping excavation
7. Any subsurface disturbance regardless of depth
- E. Contractor shall provide a minimum of five (5) working days advance written notice to the Owner prior to commencement of any ground disturbing activity requiring monitoring and shall coordinate daily operations to allow for monitor availability.
- F. No ground disturbing activity subject to monitoring shall proceed without the archaeological monitor present when required by the approved AMP.
- G. Contractor shall provide safe access to all work areas and shall cooperate fully with monitoring activities. Temporary suspension of localized work to allow inspection, documentation, or evaluation by the archaeologist shall be considered incidental to the Work.
- H. In the event cultural materials or human remains (iwi kūpuna) are encountered:
 1. Immediately cease work in the immediate area of discovery.
 2. Secure and protect the discovery area.
 3. Notify the Owner immediately.
 4. Do not resume work in the affected area until written authorization is provided by the Owner following consultation with SHPD.
- I. Except for written suspension of the entire Project issued by the Owner, compliance with this Article shall not be grounds for additional compensation. Requests for time extension shall be evaluated in accordance with the General Conditions.

1.11 NOTICE TO PROCEED

- A. Contract Time shall commence upon issuance of a written Notice to Proceed.
- B. No mobilization, procurement, fabrication, or on-site construction activities shall begin prior to issuance of Notice to Proceed unless expressly authorized in writing by the Owner.
- C. Delay between Contract execution and Notice to Proceed resulting from regulatory approvals shall not constitute grounds for delay damages, unless otherwise provided in the Contract Documents.

1.12 PRECONSTRUCTION PERIOD

- A. During the period between Contract execution and Notice to Proceed:
 1. Contractor may be required to submit administrative documents including bonds, insurance certificates, and required certifications.
 2. No construction schedule shall be required until Notice to Proceed is issued.
 3. No storage of materials on site is permitted.
- B. Contractor shall maintain bid pricing in accordance with requirements stated in Division 00 and the Agreement.

PART 2 - PRODUCTS – (Not Used)

PART 3 - EXECUTION

3.02 CONTRACTOR'S USE OF SITE

- A. General: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project. Nothing within these Contract Documents shall be interpreted as granting to the Contractor exclusive use and occupancy of the Project Site.
- B. Work Hours: Unless otherwise defined by Contract, work hours to be as follows.
 - 1. Typical Work Week: Monday through Friday, 7:00am to 6:00pm with Owner acceptable noise levels limited to hours between 9:00am to 5:00pm; no noise is allowed before 9:00am or after 5:00pm.
 - 2. Night work: As approved by Owner, Environmental Assessment, Community Ordinances, special permits. If there is a conflict between any of the entities, comply with whichever is more stringent.
 - 3. Weekend Work:
 - a. Saturday: 7:00am to 6:00pm with Owner acceptable noise levels limited to hours between 10:00am to 5:00pm; no noise is allowed before 10:00am or after 5:00pm.
 - b. Sunday: Not permitted.
 - 4. Noise Levels, Definition:
 - a. General: Comply with least noise-producing requirement as established by Owner and Authorities. Contractor to clearly verify and understand all noise level limitations established by Owner and Authorities and include such impact into his proposal; prior to signing Contract for the Work.
 - b. On Owner's Property: Except where Authority requirements are more stringent, Owner to determine what are acceptable noise levels.
 - c. Impact on Community: Secure State of Hawaii "Community Noise Permit." Comply strictly with State of Hawaii requirements.
- C. Site security: The contractor shall be responsible for maintaining a secure site at all times. Any breaches of security, or unusual occurrences shall be immediately reported to the Owner's designated representative.

END OF SECTION

SECTION 01250 – CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Documents and Sections:
 - 1. General Conditions of the Owner-Contractor Agreement.
 - 2. Section 01290 – PAYMENT PROCEDURES
 - 3. Section 01310 – CONSTRUCTION PROGRESS DOCUMENTATION

1.02 DEFINITIONS

- A. Entity: As used herein, to mean each legal entity under contract for the work indicated in the Change Order, whether directly or indirectly, including but not limited to, the Contractor and each Subcontractor, Supplier, Manufacturer, and Fabricator.
- B. Primary Document: Document that integrates and summarizes primary information from related set or group of more detailed documents. A submittal may consist of a group or hierarchy of primary documents, with master (overall) Primary Document(s) from Contractor, which integrates and organizes all other organized information in a specific submittal document set. These documents may be any of the “submittal types” required herein; where such a document is used to integrate and summarize a more detailed set of documents.
- C. Supporting Documents: Document(s) of significant detail as necessary to fully describe work or portions of work in Change Order; which is generally more detailed for specific information than what is in a related primary document.

1.03 SUBMITTALS

- A. Work Changes Proposal and Contractor Initiated Proposal: For each proposal, submit to following.
 - 1. Primary Document: From Contractor, submit, on a form acceptable to the Architect, proposal description with spreadsheets.
 - 2. Supporting Documents: From each involved Entity, submit specific proposal descriptions with spreadsheets related to each Entity's work.
 - 3. Project Schedule: From Contractor, submit description of impact to Project Schedule, if any.
- B. Payment for Approved Change Orders: For each completed change order, submit the following:
 - 1. Primary Document: Submit as part of Contractor's “Application for Payment”; on AIA forms G702 and G703 or forms acceptable to the Architect in

accordance with Conditions of the Contract.

2. Supporting Documents: From Contractor, each Subcontractor, and each Supplier, submit following.
 - a. Spreadsheets.
 - b. Time Sheets.
 - c. Invoices.

1.04 QUALITY ASSURANCE

A. General Submittal Format:

1. Submittal Organization: Submit as follows.
 - a. Sets: Integrate individual documents into sets.
 - b. Identifications: In addition to other required identifications, each related Change Order document and each related document page to be printed with following.
 - i. Change Order Number.
 - ii. Page number.
 - iii. Date.
 - c. Change Order Number: Use Architect's approved number.
 - d. Descriptions: Standardize information between different document type submittals to ensure that similar information is readily identified; or devise other methods for relating similar information. Simply identifying a RFI number shall be unacceptable as per the contract requirements all RFI's shall be accompanied with a no cost solution to provide the owner with a completed project,
2. Document Types: Refer to "Definitions" paragraphs herein.
3. Acceptance: Format and level of detail to be acceptable to Owner. Revise information, if requested, by Owner.

B. Specific Submittal Types: Comply with following when requested for specific submittals.

1. General: Information to be detailed and itemized in clear and standard accounting format; acceptable to Owner and Architect.
2. Spreadsheet: In addition to other required data, include direct costs, indirect costs, overhead, profit, and G.E.T. Direct costs to include labor, materials, equipment; relate to specific subcontracts, where applicable. Itemization to include measuring units used for costed item, associated quantities, production rates, man hours, and equipment hours.
3. Time Sheets: Submit following from each entity, for all employees and equipment used for work under each approved Change Order.
 - a. Primary Document: Document incorporating employee records and equipment records.
 - b. Supporting Documents:

February 27, 2026

- i. Employee Payroll Records: Include employee names, dates when work performed, and related tasks performed on specific dates; with accounting cost codes, and associated cost accounting.
 - ii. Equipment Records: Include equipment used, operator, dates of use, tasks performed on specific dates; with accounting cost codes, and associated cost accounting.
- 4. Invoices: From each entity, material invoices to be on letterhead, with invoice numbers, dates, itemized materials list descriptions, accounting cost codes and associated cost accounting. Invoiced work to show work specific to each Change Order.
- C. Lien Waivers: Submit releases of each Entity, indicating that each work has been paid for. Releases for Change Order work should be specific to Change Order; not general to or include other work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 MINOR CHANGES IN THE WORK

- A. Architect will issue through the Owner supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time.
 - 1. Form for Minor Changes in the Work: AIA Document G710, "Architect's Supplemental Instructions."
 - 2. If Contractor determines that an Architect's Supplemental Instruction involves adjustments to the Contract Sum or Contract Time, the Contractor shall provide written notice to the Architect and Construction Manager within 7 calendar days of receipt of the instructions.

3.02 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time on AIA Document G709, "Work Changes Proposal Request".
 - 1. If necessary, the Architect along with the description will include supplemental or revised Drawings and Specifications identified with a Bulletin number and date in the revision block on the drawing or the upper right corner of the revised specifications. (Example:  Bulletin #1 – 01/01/2019).
 - a. The revisions on the Drawings will be clouded with a corresponding delta and number near the cloud.
 - b. The revisions in the Specifications will be reflected as follows:
 - i. Revised text will be in bold/italicized text.
 - ii. Added text will be in bold text

iii. Deleted text with have a strike-through

2. Work Change Proposal Requests issued by are not instructions either to stop work in progress or to execute the proposed change.
 3. Within time specified in Work Changes Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Maintain detailed itemized records of work performed on a time and materials basis, including labor, materials, equipment and miscellaneous costs. Provide complete information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.
 - b. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - c. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - d. Include costs of labor and supervision directly attributable to the change.
 - e. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - f. Proposal Form: Use Contractors own form acceptable to the Architect.
- B. Contractor-Initiated Change Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect. Notify Owner within 48 hours of identifying the condition that initiates a change request. The Owner will not approve any additional compensation to the contractor or schedule adjustments for changed conditions where the contractor proceeds without prior written authorization.
1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 4. Include costs of labor and supervision directly attributable to the change.
 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 6. Comply with requirements in Section 01630 – PRODUCT OPTIONS AND SUBSTITUTIONS if the proposed change requires substitution of one product or system for product or system specified.

7. Proposal Request Form: Use Contractors own form acceptable to the Architect.

C. Approval or Rejection of Proposals

1. When initiated by the Owner or Architect through a Work Changes Proposal Request:
 - a. Contractor to submit a detailed proposal in writing. Quotation will be guaranteed for period specified in Work Changes Proposal Request beginning from signing of proposal. If no period is specified, guarantee quotation for sixty (60) days from signing.
 - b. Owner reviews proposal and responds in writing in one of the following ways:
 - i. Request for additional information.
 - ii. Approve proposal to be incorporated into a Change Order.
 - iii. Rejecting the Proposal.
 - c. Contractor upon receiving approval of proposal is authorized to proceed with the Work.
 - d. If additional information is requested by Owner, respond in writing within fifteen (15) calendar days of Owner's request
2. When initiated by the Contractor:
 - a. Contractor to submit a detailed change proposal in writing.
 - b. Owner reviews proposal and responds in writing in one of the following ways:
 - i. Agrees with Contractor's cost proposal.
 - ii. Request for additional information.
 - iii. Rejecting the proposal.
 - c. If the Owner responds by agreeing to the Contractor's change proposal, a Change Order will be processed.
 - d. If additional information is requested by Owner, respond in writing within fifteen (15) calendar days of Owner's request.

3.03 CONSTRUCTION CHANGE DIRECTIVE (CCD)

- A. Construction Change Directive: Architect will issue on AIA Document G714 signed by Owner instructing Contractor to proceed with a change in the Work, prior to an agreement on adjustment in the contract sum and/or contract time, for subsequent inclusion in a Change Order.
 1. Construction Change Directive shall contain a complete description of change in the Work. It shall also designate the method to be followed to determine change in the Contract Sum or the Contract Time.
 - a. If necessary, the Architect along with the description will include supplemental or revised Drawings and Specifications identified with a CCD number and date in the revision block on the drawing or the upper

right corner of the revised specifications. (Example: CCD-1 – 1/01/2019).

- i. The revisions on the Drawings will be clouded with a corresponding delta and number near the cloud.
 - ii. The revisions in the Specifications will be reflected as follows:
 - a.) Revised text will be in bold/italicized text.
 - b.) Added text will be in bold text.
 - c.) Deleted text will have a strike-through.
2. Upon receipt of the signed Construction Change Directive, the Contractor shall proceed with the change in the Work as directed.
 - a. If the Contractor agrees with the proposed method of adjusting the Contract Sum and/or Time this method shall be used to determine the future applications for payment.
 - b. If the Contractor disagrees with the proposed method of adjusting the Contract Sum and/or Time, the Contractor must still perform the changes in the Work and the Architect shall determine the method and the amount of adjustment on the basis of reasonable expenditures and allowance for overhead and profit.
 3. By signing the Construction Change Directive, the Contractor indicates their agreement with the document including the adjustment in the Contract Sum and/or Time or the method for determine them. This agreement shall then be recorded as a Change Order.
 4. Documentation: Contractor shall maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 - a. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

3.04 CHANGE ORDER

- A. Change Order: Upon Owner's approval of Work Changes Proposal or Contractor initiated change proposals or Contractor's agreement to a Construction Change Directive the Architect will issue a Change Order for signatures of the Owner and Contractor on AIA Document G701.
 1. The Owner may choose to approve (in writing) multiple change proposals to be combined in a single Change Order
- B. Contractor's Responsibility: Upon receiving Change Order, comply with following.
 1. Promptly revise Progress Schedule to reflect any changes in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
 2. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item. Adjust Contract Sum as shown on Change Order.

END OF SECTION

SECTION 01290 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes:
 - 1. Administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Document and Sections:
 - 1. AIA A201 - General Conditions of the Contract for Construction
 - 2. Section 01250 - CONTRACT MODIFICATION PROCEDURES
 - 3. Section 01320 - CONSTRUCTION PROGRESS DOCUMENTATION
 - 4. Section 01770 – CONTRACT CLOSEOUT

1.02 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's Construction Schedule.
 - 1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
 - a. Contractor's Construction Schedule
 - b. Application for Payment forms with continuation sheets.
 - c. Submittal schedule.
 - d. Items required to be indicated as separate activities in Contractor's construction schedule.
 - 2. Submit the schedule of values to Architect through the Owner at the earliest possible date, but no later than seven (7) days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
 - 1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Name of Architect.
 - c. Architect's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 - 2. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:

- a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Design Professional related to scope of Work
 - d. Schedule of Value.
 - e. Change Orders (numbers) that affect value.
 - f. Revised Schedule of Value
 - g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
 4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
 5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.
 6. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
 7. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
 8. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.03 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.

February 27, 2026

- C. Application for Payment Forms: Use AIA Document G702 or forms acceptable to Architect and Owner for Applications for Payment. Submit forms for approval with initial submittal of schedule of values.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
 - 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 - 2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
 - 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
 - 4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
- E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
 - 1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
 - 2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
 - 3. Provide summary documentation for stored materials indicating the following:
 - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
 - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
 - c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
- F. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
 - 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
 - 1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 - 2. When an application shows completion of an item, submit conditional final or full waivers.

February 27, 2026

3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Submit each Application for Payment with the Contractor's waiver of mechanics lien for the period of construction covered by the application.
 5. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
 6. Waiver Forms: Submit executed waivers of lien on forms, acceptable to Owner.
- H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of values.
 3. Contractor's construction schedule (preliminary if not final).
 4. Products list (preliminary if not final).
 5. Schedule of unit prices.
 6. Submittal schedule (preliminary if not final).
 7. List of Contractor's staff assignments.
 8. List of Contractor's principal consultants.
 9. Copies of building permits.
 10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 11. Initial progress report.
 12. Report of preconstruction conference.
 13. Certificates of insurance and insurance policies.
 14. Performance and payment bonds.
 15. Data needed to acquire Owner's insurance.
- I. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- J. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.

February 27, 2026

2. Completion of items specified for completion after Substantial Completion.
3. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
4. Updated final statement, accounting for final changes to the Contract Sum.
5. Transmittal of required Project construction records to the Owner.
6. Removal of temporary facilities and services.
7. Removal of surplus materials, rubbish, and similar elements.
8. Written documentation from the Contractor that all punch list items have been completed.
9. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
10. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
11. Evidence that claims have been settled.
12. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01310 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General coordination procedures.
 - 2. Requests for Information (RFIs).
 - 3. Project meetings.
- B. Related Sections:
 - 1. Division 1 Sections, general.
 - 2. Section 01010 - SUMMARY OF WORK.
 - 3. Section 01290 – PAYMENT PROCEDURES
 - 4. Section 01320 – CONSTRUCTION PROGRESS DOCUMENTATION
 - 5. Section 01330 - SUBMITTAL PROCEDURES

1.02 SUBMITTALS

- A. Primary Subcontractor List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 - 1. Name, address, and telephone number of entity performing subcontract or supplying products.
 - 2. Number and title of related Specification Section(s) covered by subcontract.
 - 3. Drawing number and detail references, as appropriate, covered by subcontract.
- B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
 - 1. Post copies of list in project meeting room, in field office and by each temporary telephone. Keep list current at all times.

1.03 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of

the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's construction schedule.
 2. Preparation of the schedule of values.
 3. Installation and removal of temporary facilities and controls.
 4. Delivery and processing of submittals.
 5. Progress meetings.
 6. Preinstallation conferences.
 7. Project closeout activities.
 8. Startup and adjustment of systems.

1.04 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Misuse of the RFI Process:
1. Intent: RFI's are not to be used in an adverse and frivolous manner, e.g., as a method of enlisting the Architect's services for finding information already indicated in the Contract Documents, as a means for forwarding non-legitimate claims for increases Contract Amount or Contract Schedule that is already intended by Contract, etc.
- C. Contractor Initiation: RFI's must be submitted through the General Contractor.

- D. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Project name.
 2. Project number.
 3. Date.
 4. Name of Contractor.
 5. Name of Architect
 6. RFI number, numbered sequentially.
 7. RFI subject.
 8. Specification Section number and title and related paragraphs, as appropriate.
 9. Drawing number and detail references, as appropriate.
 10. Field dimensions and conditions, as appropriate.
 11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 12. Contractor's signature.
 13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- E. RFI Forms: Form shall be provided by the Architect.
1. Attachments shall be electronic files in Adobe Acrobat PDF format.
- F. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow 10 working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
1. The following Contractor-generated RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Architect's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.

February 27, 2026

2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
 3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 01250 - CONTRACT MODIFICATION PROCEDURES.
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.
- G. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Use software log acceptable to the Architect with not less than the following:
1. Project name.
 2. Name and address of Contractor.
 3. Name and address of Architect,
 4. RFI number including RFIs that were returned without action or withdrawn.
 5. RFI description.
 6. Date the RFI was submitted.
 7. Date Architect's response was received.
- H. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within 7 days if Contractor disagrees with response.
1. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

1.05 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.
1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner's Representative and Architect, within 3 days of the meeting.
- B. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.

February 27, 2026

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
2. Agenda: Review of the progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. Contract Documents.
 - b. Options.
 - c. Related RFIs.
 - d. Related Change Orders.
 - e. Purchases.
 - f. Deliveries.
 - g. Submittals.
 - h. Sustainable design requirements.
 - i. Review of mockups.
 - j. Possible conflicts.
 - k. Compatibility requirements.
 - l. Time schedules.
 - m. Weather limitations.
 - n. Manufacturer's written instructions.
 - o. Warranty requirements.
 - p. Compatibility of materials.
 - q. Acceptability of substrates.
 - r. Space and access limitations.
 - s. Regulations of authorities having jurisdiction.
 - t. Testing and inspecting requirements.
 - u. Installation procedures.
 - v. Coordination with other work.
 - w. Required performance results.
 - x. Protection of adjacent work.
 - y. Protection of construction and personnel.
3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.

5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- C. Progress Meetings (OAC Meetings): Conduct progress meetings at regular intervals to occur once a week.
1. Coordinate dates of meetings with preparation of payment requests.
 2. Attendees: In addition to representatives of Owner, Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Status of sustainable design documentation.
 - 5) Deliveries.
 - 6) Off-site fabrication.
 - 7) Access.
 - 8) Site utilization.
 - 9) Temporary facilities and controls.
 - 10) Progress cleaning.
 - 11) Quality and work standards.
 - 12) Status of correction of deficient items.
 - 13) Field observations.
 - 14) Status of RFIs.

February 27, 2026

- 15) Status of proposal requests.
 - 16) Pending changes.
 - 17) Status of Change Orders.
 - 18) Pending claims and disputes.
 - 19) Documentation of information for payment requests.
4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
- a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01320 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Submittals Schedule.
 - 2. Contractor's Construction Schedule.
 - 3. Daily construction reports
 - 4. Material location reports.
 - 5. Field condition reports.
 - 6. Construction Photographs.
- B. Related Sections include the following:
 - 1. Section 01290 - PAYMENT PROCEDURES for submitting the Schedule of Values.
 - 2. Section 01310 - PROJECT MANAGEMENT AND COORDINATION for submitting and distributing meeting and conference minutes.
 - 3. Section 01330 - SUBMITTAL PROCEDURES for administrative and procedural requirements for submittals.
 - 4. Section 01450 - QUALITY CONTROL for submitting a schedule of tests and inspections.
 - 5. Section 01770 - CLOSEOUT PROCEDURES for submitting "As-Built Schedule" as Project Record Documents at Project closeout.

1.02 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
 - 2. Predecessor Activity: An activity that precedes another activity in the network.
 - 3. Successor Activity: An activity that follows another activity in the network.
- B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of the Project.
- C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

- D. Float: The measure of leeway in starting and completing an activity.

1.03 SUBMITTALS

- A. Qualification 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 Owner/Commissioning Authorities, and other information specified.
- B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
 - 1. Submit to Architect and Owner an electronic copy of schedule, using software indicated, and labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label.
- C. Submittals Schedule: Submit three copies of the schedule. Arrange the following information in a tabular format:
 - 1. Scheduled date for first submittal.
 - 2. Specification Section number and title.
 - 3. Submittal category (action or informational).
 - 4. Name of subcontractor.
 - 5. Description of the Work covered.
 - 6. Scheduled date for Architect's final release or approval.
- D. Field Condition Reports: Submit 2 copies of report to architect and 1 copy of report to the Owner at time of discovery of differing conditions.
- E. Construction Photographs: To be reviewed at each project meeting and to be submitted in a binder and on an electronic disk with close-out documents.

1.04 QUALITY ASSURANCE

- A. Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting, with capability of producing CPM reports and diagrams within 24 hours of the Owner's request.
- B. Pre-scheduling Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to the preliminary construction schedule and Contractor's construction schedule, including, but not limited to, the following:
 - 1. Review software limitations and content and format for reports.
 - 2. Verify availability of qualified personnel needed to develop and update schedule.
 - 3. Discuss constraints, including phasing, work stages, area separations, interim milestones, and partial Owner occupancy.
 - 4. Review delivery dates for Owner-furnished products.
 - 5. Review Allowances and time required for procurement and installation.
 - 6. Review schedule for work of Owner's separate contracts.

February 27, 2026

7. Review time required for review of submittals and resubmittals.
8. Review requirements for tests and inspections by independent testing and inspecting agencies.
9. Review time required for completion and startup procedures.
10. Review and finalize list of construction activities to be included in schedule.
11. Review submittal requirements and procedures.
12. Review procedures for updating schedule.

1.05 COORDINATION

- A. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.
 1. Secure time commitments for performing critical elements of the Work from parties involved.
 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.01 SUBMITTALS SCHEDULE

- A. Preparation: Submit to the Architect and Owner a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.
 1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
 2. Initial Submittal Schedule: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.
 - a. Submittal schedule to be incorporated directly into Contractor's Construction Schedule.
 - b. Submit revised submittal schedule as required to reflect changes in current status and timing for submittals.
 4. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal Category: Action; informational.

February 27, 2026

- d. Name of subcontractor.
- e. Description of the Work covered.
- f. Scheduled date for Architect's and Construction Manager's final release or approval.
- g. Scheduled dates for purchasing.
- h. Scheduled date of fabrication.
- i. Scheduled dates for installation.
- j. Activity or event number.

2.02 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling."
- B. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Substantial Completion to date of Final Completion.
 - 1. Contract completion date can be changed, at the Owner's discretion, by submission of a schedule that shows an early completion date, as allowed by the General Conditions to the Contract.
- C. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:
 - 1. Activity Duration: Define activities so no activity is longer than fifteen days, unless specifically allowed by Architect and Owner.
 - 2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 - a. Structural components, plumbing, heating/cooling/ventilation equipment.
 - 3. Submittal Review Time: Include review and resubmittal times indicated in Section 01330 - SUBMITTAL PROCEDURES in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
 - 4. Startup and Testing Time: Include not less than seven days for startup and testing.
 - 5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
- D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule and show how the sequence of the Work is affected.
 - 1. Phasing: Arrange list of activities on schedule by phase.
 - 2. Allowances: Include a separate activity for each allowance item detailing when information is required from Architect, and when the Work for the allowance must begin so as not to affect the completion date.

February 27, 2026

3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
4. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Section 01010 - SUMMARY OF WORK. Delivery dates indicated stipulate the earliest possible delivery date.
5. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Section 01010 - SUMMARY OF WORK. Delivery dates indicated stipulate the earliest possible delivery date.
6. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.
 - d. Partial occupancy before Substantial Completion.
 - e. Use of premises restrictions.
 - f. Provisions for future construction.
 - g. Seasonal variations.
 - h. Environmental control.
- E. Milestones: Include Milestones indicated in the contract documents in schedule, including, but not limited to the following:
 1. Notice to Proceed
 2. In wall inspections by floor
 3. Overhead inspection by floor
 4. Insulation inspections by floor
 5. Pre-installation conferences for each conference in specs
 6. Building Structure Complete
 7. Building dry-in
 8. Roof Complete
 9. Drywall start
 10. Window/glazing installation start
 11. Window/glazing installation complete
 12. Exterior Envelope Mockup complete
 13. Unit mockup start
 14. Unit mockup complete
 15. Mechanical equipment start up
 16. Conditioned air available
 17. Elevators operational
 18. Site available for landscape

February 27, 2026

19. Fire Alarm Certification
 20. Commissioning Start
 21. Fire and life Safety Inspection
 22. Contractor Punch list complete
 23. Owner Punch list start
 24. Substantial Completion
 25. Final Completion
- F. Resource / staffing: If the Contractor falls materially behind on any portion of the work, the Owner reserves the right to receive a resource loaded schedule indicating required staffing levels for each activity. Show aggregate manpower requirements on a daily or weekly basis.
- G. Cost Correlation: At the head of schedule, provide a cost correlation line, indicating planned and actual costs. On the line, show dollar volume of the Work performed as of dates used for preparation of payment requests.
1. Refer to Division 1 Section "Payment Procedures" for cost reporting and payment procedures.
- H. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis to demonstrate the effect of the proposed change on the overall project schedule.
- I. Computer Software: Prepare schedules using a program that has been developed specifically to manage construction schedules.

2.03 CONTRACTORS CONSTRUCTION SCHEDULE (CPM SCHEDULE)

- A. CPM Schedule: Prepare Contractor's Construction Schedule using a computerized, cost and resource loaded, time-scaled CPM network analysis program.
1. Submit schedule to the Architect and Owner in the time frame stipulated in the General Conditions to the Contract.
 2. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meetings and payment request dates.
 3. Use "one workday" as the unit of time. Include a list of non-working days and holidays incorporated into the schedule.
 4. Failure to include any work item required for the performance of this schedule shall not excuse the Contractor from completing all work within the applicable completion dates, regardless of Architect or Owner approval of the schedule.
- B. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the preliminary network diagram, prepare a skeleton network to identify probable official paths.

February 27, 2026

1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities.
 - a. Preparation and processing of submittals.
 - b. Mobilization and demobilization.
 - c. Purchase of materials.
 - d. Delivery.
 - e. Fabrication.
 - f. Utility Interruptions.
 - 1) Power outages or any utility shut downs must be given advance notice of 30 days and must be included in the CPM schedule.
 - g. Installation.
 - h. Architect and Owner Inspections.
 - i. Work by Owner that may affect or be affected by Contractor's activities.
 - j. Testing and commissioning.
 2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Schedule start and completion dates shall be consistent with Contract milestone dates.
 3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
 4. Format: Mark the critical path: Locate the critical path near center of Network; locate paths with most float near the edges.
- C. Initial Issue of Schedule: Prepare initial network diagram from a list of straight "early start-total float" sort. Identify critical activities. Prepare Tabulated reports showing the following:
1. Contractor or subcontractor and the Work or activity.
 2. Description of activity.
 3. Principal events of activity.
 4. Immediate preceding and succeeding activities.
 5. Early and late start dates.
 6. Early and late finish dates.
 7. Activity duration in workdays.
 8. Total float or slack time.
 9. Average size of workforce.

- D. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
1. Identification of activities that have changed.
 2. Changes in early and late start dates.
 3. Changes in early and late finish dates.
 4. Changes in activity durations in workdays.
 5. Changes in the critical path.
 6. Changes in total float or slack time.
 7. Changes in cost-loading or resource-loading.
 8. Changes in the Contract Time.

2.04 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
1. List of subcontractors at Project site.
 2. List of separate contractors at Project site.
 3. Approximate count of personnel at Project site.
 4. Equipment at Project site.
 5. Material deliveries.
 6. High and low temperatures and general weather conditions, including presence of rain.
 7. Testing and inspection.
 8. Accidents.
 9. Meetings and significant decisions.
 10. Unusual events.
 11. Stoppages, delays, shortages, and losses.
 12. Meter readings and similar recordings.
 13. Emergency procedures.
 14. Orders and requests of authorities having jurisdiction.
 15. Change Orders received and implemented.
 16. Construction Change Directives received and implemented.
 17. Services connected and disconnected.
 18. Equipment or system tests and startups.
 19. Partial completions and occupancies.
 20. Substantial Completions authorized.

- B. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:
 - 1. Material stored prior to previous report and remaining in storage.
 - 2. Material stored prior to previous report and since removed from storage and installed.
 - 3. Material stored following previous report and remaining in storage.
- C. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare a detailed report. Submit with a request for information. Include a detailed description of the differing conditions and photographs illustrating the existing conditions, together with recommendations for changing the Contract Documents.
- D. Construction Photographs: Photographs to document pre-existing conditions and to regularly document construction progress.

PART 3 - EXECUTION

3.01 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Scheduling Consultant: Engage a consultant to provide planning, evaluation, and reporting using CPM scheduling.
 - 1. In-House Option: Owner may waive the requirement to retain a consultant if Contractor employs skilled personnel with experience in CPM scheduling and reporting techniques. Submit qualifications.
 - 2. Meetings: Scheduling consultant shall attend all meetings related to Project progress, alleged delays, and time impact.
- B. Float: Float is a shared resource, available to both parties as needed. The Contractor shall not sequester shared float through such strategies as (a) extending activity duration estimates to consume available float, (b) using preferential logic, or (c) using extensive crew / resource sequencing, constraints, unnecessary milestones, leads or lags on logic ties, and hammock type activities. Since Float within the Construction Schedule is jointly owned, no time extensions will be granted nor delay damages paid until a delay occurs which extends the work beyond the contract completion date. Since float within the Construction Schedule is jointly owned, it is acknowledged that Trustees-caused delays on the project may be offset by Trustees-caused time savings (i.e., critical path submittals returned in less time than allowed by the contract, approval of substitution requests and credit changes which result in a savings of time to the Contractor, etc.). In such an event, the Contractor shall not be entitled to receive a time extension or delay damages until all Trustee-caused time savings are exceeded and the contract completion date is also exceeded.

- C. Contractor's Construction Schedule Updating: At two-week intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
 - 1. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 - 2. As the Work progresses, indicate Actual Completion percentage for each activity.
- D. Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
 - 1. Post copies in Project meeting rooms and temporary field offices.
 - 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Owner to receive both paper and working electronic copy of each update.
 - 3. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

3.02 CONSTRUCTION PHOTOGRAPHS

- A. Photographic Process: Digital Imaging.
- B. Date Stamp: Unless otherwise indicated, date and time stamp each photograph as it is being taken so stamp is integral to photograph.
- C. Preconstruction Digital Photographs and Digital Video Recording: Before starting construction, take color photographs and digital video recording of Project site and affected City right-of-ways and surrounding properties and interior existing photos of affected areas from different vantage points. Show existing conditions adjacent to property.
- D. Periodic Construction Photographs: Periodic digital color photographs and digital file to be submitted in duplicate on disc and in print form at each pay request with the following views:
 - 1. Exterior views of all distinct elevations on a weekly basis. Photographs of each elevation are to be taken from the same location throughout the project.
 - 2. Interior views of all levels of major spaces on a monthly basis. Of particular interest is the process of structure, mechanical (ductwork, equipment, plumbing, and sprinkler systems), electrical, partitions and interior finishes.
 - 3. Roof: Views of all roof areas on a weekly basis during periods when work is occurring on or adjacent to the roof.
 - 4. Field Office Prints: Retain one set of prints of periodic photographs in field office at Project site, available at all times for reference. Identify photographs the same as for those submitted to Architect.

END OF SECTION

SECTION 01330 – SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Administrative and procedural requirements for submittals.
2. Administrative submittals.
3. Work related submittals.

B. Related Sections:

1. Division 1 Sections, General.
2. Section 01320 – CONSTRUCTION PROGRESS DOCUMENTATION for submittal schedule requirements
3. As required in Conditions of Contract and Specification Sections.

1.02 DEFINITIONS

A. Work Related Submittals: Are defined as submittals which are product specific, which are required for the evaluation, fabrication, and incorporation of the product into the Work, and which are commonly known as “product data”, “shop drawings”, “samples”, and “mockups”.

B. Miscellaneous Submittals: Are defined as submittals which ensure the quality of the Work after the termination of the Contract and are also submittals of additional products required by the Contract but not required for installation. These submittals include, but are not necessarily limited to, the following.

1. Contractor’s Project warranty.
2. Contractor’s specific warranties.
3. Installers’ warranties.
4. Manufacturer’s standard and required warranties.
5. Operating and Maintenance Manuals.
6. Owner’s extra stock.
7. Maintenance tools and spare parts.

C. Submission Time: The indicated time for any submissions is not to mean “the last day when such submissions are to be mailed out”, but shall mean “the last day such submissions are to be received” by the addressee and that such submissions are due no later than 12 noon of the due date, unless otherwise acceptable to the Architect.

1.03 SUBMITTALS, GENERAL

A. Requirements: Refer to the Conditions of the Contract and all respective specification sections for complete submittal requirements. Electronic Submittals

preferred, except finish materials-samples shall be hardcopy. Where finish is as specified request electronic submittal first as most will not require hardcopy.

B. Number of Submittals Required:

1. Electronic: Adobe PDF file, unlocked and compressed to be less than 10 MB total file size. Architect to establish File Transfer Protocol (FTP) site and instructions for uploading and response.
2. To the greatest extent possibly make submittal in electronics format indicated above. If submittals cannot be made electronically comply with the following:
 - a. Hardcopy: Submit four (4) sets where not otherwise indicated and additional sets as the Contractor requires for his Work.

C. Requirements for Each Submittal Set: Each set consists of the following.

1. Letter of Transmittal: Include following minimum information.
 - a. Contractor's Submittal Number.
 - b. Architect's Project name and Project number.
 - c. Contractor's name, address, phone number, and Project number.
 - d. Date of Issue.
 - e. Names of Transmitter and to whom submittal transmitted to.
 - f. Names of Subcontractor, Manufacturer, and Supplier.
 - g. Purpose of transmittal.
 - h. Distribution record.
 - i. Specification Section related to.
 - j. Complete list of enclosures, including number of pages for each listed enclosure, descriptions, number of each enclosure transmitted, and dates of enclosures.
 - k. Contractor's unequivocal certification stating that the information complies with the requirements of the Specific Project Contract Documents. No variation of language is acceptable.
 - l. Signature of Transmitter in script and print.
2. Enclosures: Complete submittal enclosures with each enclosure identified as follows.
 - a. Identify each sheet/page with Architect's Project number, submittal date as indicated on transmittal, and submittal number.
 - b. Staple submittals together wherever possible, except where review would be hindered by bound copies. Do not submit loose sets. Temporarily bind each set for transmittal.
3. Letter of Transmittal/ Contractors Stamp: shall not include
 - a. Statements in any form relieving, diminishing and/or transferring Contractors requirements to the project scope and contract requirements.
 - b. Requirements for Architect and/or its consultant to provide more than a summary confirmation review for basic scope requirements.

- c. Submittal items that are not per project scope shall be submitted prior per the substitution request process.
- 4. Preference for Electronic Submittals/Shop Drawings:
 - a. Architect prefers where possible electronic submittals. Process shall include the establishment of a project File transfer Protocol site that will be used for the transfer of submittals. Due to the size and complexity of submittals emails shall not be used for submission.
 - b. Finish and/or product color samples shall not be submitted via electronic submittal unless previously approved.
 - c. Electronic submittals shall be composed into one Adobe PDF file with CSI section number and explanation, such as: **08800-01-glazing.pdf**.
- 5. Packaging: No matter what form of packaging each submittal is distributed in, e.g. envelope, box, crate, etc., each such packaging shall be properly identified with each addressee's company's name, address, and to whom specifically the package should be received by.

1.04 WORK RELATED SUBMITTALS

- A. General Requirement: Submit comprehensive and Project specific data.
- B. Product Data: When submission required by individual sections, in addition to other required data, submit all manufacturer's published information of required products including, but not limited to, general data, specifications, installation instructions, testing information, standard drawings and cut sheets, and color charts. Highlight mark all Project related data, when printed data on any page is not specific to Project required products. Write and draw *in* applicable information as indicated by printed or pictorial information when required to properly indicate compliance with requirements of Contract Documents.
 - 1. Submit Product Data in the following format:
 - a. PDF electronic file.
- C. Shop Drawings: When submission required by individual sections in addition to other required data, submit technical drawings with Project specific information of level and detail necessary to properly fabricate and erect work in accordance with Contract requirements, including proper coordination with other related work. Unless otherwise indicated, comply with following.
 - 1. Identification on Each Sheet: Include not less than following.
 - a. Architect's name and Architect's Project number.
 - b. Contractor's name.
 - c. Subcontractor's name.
 - d. Supplier's name.
 - e. Manufacturer name.
 - f. Detailer's Initial.
 - g. Date of Issue.

- h. Space for revision date/description.
- 2. Referencing Details: Identify details by reference to sheet and detail numbers shown on Contract Documents. Where details shown are not on Contract Documents, they should be referenced to larger sections which can be clearly identified with work on Contract Documents.
- 3. Dimensions: Distinguish field dimensions from those of the Contract Documents.
- 4. Minimum Sheet Size for Drawings: 18" x 24".
- 5. Drawing Types: Unless otherwise indicated, Drawings to include plans, elevations, sections, and details of the Work. Show with related work.
- 6. Scale of Drawings: Provide a scale of a size not less than scale used on similar drawings on Contract Documents.
- 7. Submit Shop Drawings in the following format:
 - a. PDF electronic file.
- D. Samples: When submission is required by individual sections, submit actual physical samples of the Work. Where not otherwise indicated, and required, comply with following.
 - 1. Identical to Work: Samples to be identical, including for finish, as products required for the Work.
 - 2. Flat/Thin or Sheet Type Samples: Approximately 8-1/2" x 11" x thickness of material, or as otherwise acceptable to Architect.
 - 3. Running Samples: Profile by not less than 11-1/2" length.
 - 4. Color/Pattern Selection Process:
 - a. Process: Initial accurate (photo-like accuracy) color/pattern (not texture) charts may be submitted, followed by Architect selections from chart, followed by another submittal of actual samples of selections, followed by Architect's final selections, followed by final submittal of actual final samples.
 - b. Inaccurate Color Charts: Where color charts are submitted and Architect determines from comparison of actual samples that charts are not accurate enough in his estimation, the Architect reserves the right to request a single set of actual samples for each inaccurate chart of the full range of colors and patterns available; which shall be provided with no additional cost to the Owner.
 - 5. Texture: Submit the actual sample.
 - 6. Variation of Color/Texture: Where color and texture varies, provide not less than 5 samples indicating the full range of color/texture variation.
- E. Quality Control Submittals:
 - 1. Items listed in specification sections under "Quality Control Submittals" Paragraph.
 - 2. Number of copies: Same number indicated in "Product Data" Paragraph above.

3. Design data for Architect and Owner's Agent knowledge, as Contract Administrator for Owner. Information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.
 4. Test reports for Architect's and Owner's Agent knowledge, as Contract Administrator for Owner. Information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.
 5. Certificates:
 - a. By manufacturer, installation/application subcontractor, or Contractor in quantities specified by Product Data.
 - b. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
 - c. Certificates may be recent or previous test results on material or Product,, but must be acceptable to Architect.
 - d. From manufacturers for each product indicating materials supplied or installed are asbestos free.
 6. Manufacturers instructions for Architect's and Owner's Agents knowledge, as Contract Administrator for Owner.
 - a. Printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to Architect/Engineer and Owner's Agent for delivery in quantities specified for Product Data.
 - b. Indicate special procedures, perimeter conditions requiring special attention and special environmental criteria required for application or installation.
 7. Manufacturer's field reports for Architect and Owner's Agent benefit, as Contract Administrator for Owner.
 - a. Submit report in duplicate within 30 days of observation for information.
 - b. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.
- F. Mockups: Except as otherwise specified, comply with following.
1. General: Not less than 4' x 8' minimum, constructed as independent samples (not part of Work); unless otherwise specified or acceptable to Architect.
 2. Supporting Structure: For independent mockups, provide an appropriate supporting structure, e.g. wood framing and plywood, that is capable of being moved without damage to mockup and that provides a suitable base for the attachment of the required mocked up materials.

1.05 MISCELLANEOUS SUBMITTALS

February 27, 2026

- A. General: Types as specified herein and referred to elsewhere in Contract Documents.
- B. Owner's Extra Stock and Maintenance Tools and Spare Parts:
 - 1. Packaging: Package in heavy-duty boxes in sizes that are capable of being hand carried by two persons maximum. Heavy and easily damaged materials, e.g. tile and stone, are to be placed in wooden crates or containers. Materials that are easily damaged, such as tile, stone, etc. are to be packaged with polystyrene spacers or other materials to protect it from breakage.
 - 2. Contents: Each package to contain one material type; unless otherwise acceptable to Architect.
 - 3. Labeling: Fully label each package. Laser printed or similar quality readable printed labels to indicate product name, other descriptive product information, manufacturer name/address, and supplier name/address.

1.06 QUALITY ASSURANCE

- A. Coordination: In addition to other factors impacting timing of submissions sent to Architect, submittals are required to be successfully reviewed by Architect, prior to any purchase and fabrication of required Project products, unless otherwise acceptable to Architect.
- B. Identified Project Data: Submittals to be clearly identified for all Project specific requirements. Materials not properly identified may be returned for resubmittal.
- C. Responsibility: Where submittals are required to be signed, provide signatures of those who can legally bind the legal entity to the certifications or other requirements made in the submittals. Signatures to be scripted, typed, and include typed title of person, unless otherwise acceptable to Architect. Provide notarization when required or requested by Architect. It is up to the legal entity to assure that submittals provided by them have been signed by responsible persons; it is not the responsibility of the Architect to verify the signatures and therefore acceptance by the Architect of any signature submittals is not recognition by the Architect that such signatures are appropriate.
- D. Contractor's Review: Contractor is to fully review submittals prior to submission to Architect. Where review is not accomplished, even when stamped with review stamp, as evidenced by obvious data not marked for noncompliance, such submittals will be rejected.
- E. Architect's Review:
 - 1. Contractor's Responsibility: From time to time, the Architect may include review information that is the Contractor's responsibility. Such review information is provided solely to assist the Contractor as part of the review process. The Architect makes no claim to the accuracy of information provided and makes no claim to the Contractor's responsibility as defined by the Conditions of the Contract. The Contractor is solely responsible for all construction means, methods, techniques, sequences and procedures, and therefore shall be responsible for determining the accuracy of such information provided by the Architect and for its use in the Work.

February 27, 2026

2. Review of Component vs. Complete Assembly: Architect's review of single component of a larger assembly does not constitute his approval of the entire assembly, unless otherwise indicated.

PART 2 - PRODUCTS

2.01 AVAILABLE PRODUCTS

- A. Intent: For each required Project product, unless specifically indicated, it is intended that the full range of characteristics, e.g. components, materials, colors, patterns, textures, finishes, be made available that is standard for the indicated quality of product required; for selection by the Architect and provided at no additional cost to the Owner for the Project.
- B. Submittals: Submit features to be selected by Architect.

PART 3 - EXECUTION

3.01 CONTRACTOR'S RESPONSIBILITIES – GENERAL

- A. Routing:
 1. General: Submit all required submittals to Architect, unless otherwise indicated.
 - a. Electronic submittals submit via E-mail and for large submittals submit via project FTP site.
 2. Owner's Extra Stock and Maintenance Tools and Spare Parts: Deliver to Owner's designated onsite locations.
- B. Substantiating Data: Submit substantiating data as requested by the Architect.
- C. Prior to Review: Verify field measurements and construction constraints.
- D. Review: Review all submittals prior to submission to Architect, including for coordination with field requirements. Indicate review by action stamp and signature.
- E. Deviations: Indicate significant deviations from Contract Requirements.
- F. Not to be Used for Work: Do not allow use of any submittal for fabrication and installation of Work for which successful review by Architect has not been completed as evidenced by Architect's signature action mark.
- G. Completeness and Piecemeal Submittals: Do not submit submittals that are not complete.
- H. Time of Submission:
 1. General: Submit submittals as soon as possible. Times for submission indicated herein are absolute minimums and Architect, Owner, and Consultant cannot guarantee that review can be accomplished within times indicated as their times are not strictly dedicated to this Project and have no control over the types and sizes of the submittals which also affect review time.

2. The Contractor is solely responsible for properly sequencing submittals for proper work progress. However, Architect and Owner shall with reasonable promptness review all submissions required for their review and return them to the Contractor so as not to impede the progress of the Work.

3.02 CONTRACTOR'S RESPONSIBILITIES - WORK RELATED SUBMITTALS

- A. Time of Submission: Submit not less than ten (10) working days before dates reviewed submittals will be needed; fifteen (15) working days where Architect's Consultant required to review submittal. Review period shall commence on the Architect's receipt of the submittal.
- B. Returned for Incorporation: Pay for costs to return samples, mockups, and any other items to Contractor that may be required for Architect's review and are indicated for incorporation into the Work, if successfully reviewed by Architect.

3.03 CONTRACTOR'S RESPONSIBILITIES - MISCELLANEOUS SUBMITTALS

- A. Miscellaneous Submittals: As required in the respective Specification Sections.
- B. Other Required Submittals: As required by the Contract Documents or as otherwise required by the schedule of the Work.

3.04 ARCHITECT'S RESPONSIBILITIES

- A. Review: Review Contractor's submission with reasonable promptness. Indicate review by action mark. Return to Contractor.
- B. Review For:
 1. Completed of submittal.
 2. Review Contractor's review comments and marks for impact on design concept review.
 3. Review of compliance with design concept.

3.05 DISTRIBUTION FOR SUCCESSFULLY REVIEWED SUBMITTALS

- A. Shop Drawings and Product Data: Distribute successfully reviewed shop drawings and product data as follows.
 1. Contactor's file.
 2. Job site file.
 3. Record document's file.
 4. Subcontractor.
 5. Supplier.
 6. Fabricator.
- B. Samples: Job site file and as otherwise directed by the Architect.
- C. Mockups: Retain mockups at job site in protected storage areas for duration of Contract Period and protect from damage. Except for model rooms, remove and dispose of mockups in legal manner at end of Contract Period. Before removing

February 27, 2026

from site, verify with Architect whether such mockups are required to be retained for a longer period.

3.06 REQUIREMENTS FOR UNSUCCESSFUL REVIEW & RESUBMISSION

- A. Format: Resubmit number. Indicate on letter of transmittal that submittal is a "RESUBMISSION" and indicate reference to previous submittal by number and date.
- B. Product Data and Samples: Resubmit with all required enclosures and either or both substantiating and additional data/samples as requested by the Architect.
- C. Shop Drawings: Resubmit revised Shop Drawings which are properly clouded, identified, and dated.
- D. Mockups: Adjust as directed by Architect, until successful review by Architect is achieved.

END OF SECTION

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01361 – SUSTAINABLE DESIGN REQUIREMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section includes general requirements and procedures for compliance with certain United States Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED) prerequisites and credits needed for Project to achieve the targeted LEED Silver level certification under the LEED for Building Design and Construction (BD+C): Healthcare version 4/4.1 (v4/4.1) as administered by USGBC and the Green Building Certification Incorporated (GBCI).
 - 1. General Contractor is required to provide this section to every subcontractor.
 - 2. General Contractor and subcontractors have essential roles in the credits related to products and procedures used for construction. Credits outlined in this section relate to the products and procedures used for construction, which are the responsibility of the Contractor to implement and document. The full cooperation of the Contractor and subcontractors is essential to achieving final certification.
 - 3. Some LEED prerequisites and credits needed to obtain LEED certification depend on product selections and may not be specifically identified as LEED requirements. Compliance with requirements needed to obtain LEED prerequisites and credits may be used as one criterion to evaluate substitution requests and comparable product requests. This includes products that comply with material ingredient disclosures, have EPDs, or meet emissions and content testing requirements.
 - 4. Some LEED prerequisites and credits needed to obtain the indicated LEED certification depend on other aspects of Project design that are not part of the Work of the Contract.
 - 5. The Contractor shall keep at least one copy of the LEED Reference Guide for Building Design and Construction v4/4.1 and supplemental addenda, at the project site at all times.
 - 6. A copy of the LEED Project Scorecard is attached at the end of this Section for information only.

1.03 DEFINITIONS

- A. EA: Energy and Atmosphere.
- B. ID: Innovation in Design.
- C. IEQ: Indoor Environmental Quality.
- D. LEED: Leadership in Energy & Environmental Design.
- E. LT: Location and Transportation.
- F. MR: Materials and Resources.
- G. RP: Regional Priority.
- H. SS: Sustainable Sites.
- I. WE: Water Efficiency.
- J. USGBC: United States Green Building Council
- K. GBCI: Green Building Certification Institute
- L. Alternative Daily Cover (ADC): Material other than earthen material placed on the surface of the active face of a municipal solid waste landfill at the end of each operating day to control vectors, fires, odors, blowing litter, and scavenging. Generally, these materials must be processed so they do not allow gaps in the exposed landfill face.
- M. Base Building: Materials and products that make up the building or are permanently and semi-permanently installed in the project (e.g., flooring, case-work, wall coverings).
- N. Bio-based Materials: Commercial or industrial products (other than food or feed) that are composed in whole, or in significant part, of biological products, renewable agricultural materials (including plant, animal, and marine materials), or forestry materials. For the purposes of LEED, this excludes leather and other animal hides.
- O. Building Exterior: A structure's primary and secondary weatherproofing system, including waterproofing membranes and air- and water-resistant barrier materials, and all building elements outside that system.
- P. Building Interior: Everything inside a structure's weatherproofing membrane.
- Q. Carbon Offset: A unit of carbon dioxide equivalent that is reduced, avoided, or sequestered to compensate for emissions occurring elsewhere.
- R. CDPH Standard Method v1.2-2017: California Department of Public Health (CDPH) Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, v. 1.2-2017, for the emissions testing and requirements of products and materials.
- S. Chain-of-Custody (COC): A procedure that tracks a product from the point of harvest or extraction to its end use, including all successive stage of processing, transformation, manufacturing, and distribution.

- T. Chain-of-Custody Certificates: Certificates signed by manufacturers certifying that wood used to make products was obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship." Certificates shall include evidence that manufacturer is certified for chain of custody by an FSC- accredited certification body. Chain-of-Custody applies to fabricators of wood related products who must demonstrate compliance with FSC COC requirements.
- U. Clean Waste: Nonhazardous materials left over from construction and demolition. Clean waste excludes lead and asbestos.
- V. Commingled Waste: Building waste streams that are combined on the project site and hauled away for sorting into recyclable streams. Also known as single-stream recycling.
- W. Commissioning (Cx): The process of verifying and documenting that a building and all of its systems and assemblies are planned, designed, installed, tested, operated, and maintained to meet the owner's project requirements.
- X. Commissioning Authority (CxA): The individual designated to organize, lead, and review the completion of commissioning process activities. The CxA facilitates communication among the owner, designer, and contractor to ensure that complex systems are installed and function in accordance with the owner's project requirements.
- Y. Composite Wood and Agrifiber: Products made of wood particles and/or plant material pressed and bonded with adhesive or resin such as particleboard, medium density fiberboard (MDF), plywood, wheatboard, strawboard, panel substrates, and door cores.
- Z. Cradle-to-Gate Assessment: Analysis of a product's partial life cycle, from resource extraction (cradle) to the factory gate (before it is transported for distribution and sale). It omits the use and the disposal phases of the product.
- AA. Corporate Sustainability Report: A third-party verified report that outlines the environmental impacts of extraction operations and activities associated with the manufacturer's product and the product's supply chain.
- BB. Environmental Product Declaration (EPD): An independently verified report based on life-cycle assessment studies that have been conducted according to a set of common rules for each product category and peer-reviewed.
 - 1. Product-Specific Declaration: A product with a publicly available, critically reviewed life-cycle assessment conforming to ISO 14044 that has at least a cradle to gate scope.
 - 2. Industry-Wide (Generic) EPD: Products with third-party certification (Type III), including external verification, in which the manufacturer is explicitly recognized as a participant by the program operator. EPD must conform to ISO 14025, 14040, 14044, and EN 15804 or ISO 21930 and have at least a cradle to gate scope.
 - 3. Product-Specific Type III EPD: A product with a third-party certification,

February 27, 2026

including external verification, in which the manufacturer is explicitly recognized as a participant by the program operator. EPD must conform to ISO 14025, 14040, 14044, and EN 15804 or ISO 21930 and have at least a cradle to gate scope.

- CC. Extended Producer Responsibility (EPR): Measures undertaken by the maker of a product to accept its own and sometimes other manufacturers' products as post-consumer waste at the end of the products' useful life. Producers recover and recycle the materials for use in new products of the same type. To count toward credit compliance, a program must be widely available. For carpet, extended producer responsibility must be consistent with NSF/ANSI 140–2007. Also known as closed-loop program or product take-back.
- DD. Health Product Declaration Open Standard (HPD): An open standard for reporting product ingredients and their associated health hazards.
- EE. Indoor Air Quality (IAQ) Management Plan: Plan developed by the Contractor to promote the well-being of construction workers and building occupants by minimizing indoor air quality problems associated with construction and renovation. Plan must meet or exceed all applicable recommended control measures of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) "IAQ Guidelines for Occupied Buildings Under Construction, 2nd Edition, 2007, ANSI/SMACNA 008-2008, Chapter 3."
- FF. Land-Clearing Debris and Soil: Materials that are natural (e.g., rock, soil, stone, vegetation). Materials that are man-made (e.g., concrete, brick, cement) are considered construction waste even if they were on site.
- GG. Leadership Extraction Practices: Products that meet at least one of the responsible extraction criteria, which include: extended producer responsibility; bio-based materials; FSC wood products; materials reuse; recycled content; and other USGBC approved programs.
- HH. Life-Cycle Assessment: an evaluation of the environmental effects of a product from cradle to grave, as defined by ISO 14040–2006 and ISO 14044–2006.
- II. Life-Cycle Inventory: a database that defines the environmental effects (inputs and outputs) for each step in a material's or assembly's life cycle. The database is specific to countries and regions within countries.
- JJ. Location Valuation Factor: Multiplier; Products and materials that are extracted, manufactured, and purchased within 100 miles of the project. For a product to qualify for the location valuation factor, it must meet two conditions: all extraction, manufacture, and purchase (including distribution) of the product and its materials must occur within that radius, and the product (or portion of an assembled product) must meet at least one of the sustainable criteria (e.g., FSC certification, recycled content).
- KK. Material Cost: The dollar value of materials being provided to the site, after Contractor mark-ups, including transportation costs, taxes, fees, and shop labor, but excluding field equipment and field labor costs.

February 27, 2026

LL. Materials Reuse: Reuse includes salvaged, refurbished, or reused products.

MM. Multi-Attribute Optimization: Third party certified products that demonstrate impact reduction below industry average in at least three of the following categories: global warming potential; stratospheric ozone depletion; acidification; eutrophication; tropospheric ozone formation and nonrenewable energy resource depletion.

NN. Product (Permanently Installed Building Product): An item that arrives on the project site either as a finished element ready for installation or as a component to another item assembled on-site. The product unit is defined by the functional requirement for use in the project; this includes the physical components and services needed to serve the intended function of the permanently installed building product. In addition, similar products within a specification, each contributes as a separate product.

OO. Rapidly Renewable Materials: Materials made from agricultural products that are typically harvested within a ten-year or shorter cycle.

PP. Recycled Content: Defined in accordance with the International Organization of Standards document ISO 14021 – Environmental labels and declarations – Self-declared environmental claims (Type II environmental labeling).

1. Postconsumer Recycled Content: Waste generated by households or commercial, industrial and institutional facilities in their role as end users of a product that can no longer be used for its intended purpose.
2. Preconsumer Recycled Content: Matter diverted from the waste stream during the manufacturing process, determined as the percentage of material, by weight. Examples include planer shavings, sawdust, bagasse, walnut shells, culls, trimmed materials, overissue publications, and obsolete inventories. The designation excludes rework, regrind, or scrap materials capable of being reclaimed within the same process that generated them (ISO 14021). Formerly known as postindustrial content.

QQ. Volatile Organic Compound (VOC): Chemicals that are released into the air from numerous materials- some of them natural, human-made, plant-based, and from animals, including people. Prolonged exposure to high concentrations of some VOCs has been linked to a wide range of chronic health problems such as asthma, chronic obstructive pulmonary disease, and cancer. Short-term exposure to VOC's can also cause acute reactions, such as eye, nose, and throat irritation. Some VOC's are present in the natural environment; however, higher concentrations of VOC's are typically found indoors, where reduced air ventilation and numerous sources of VOC's may exist.

RR. Waste Diversion: a management activity that disposes of waste through methods other than incineration or landfilling. Examples include reuse and recycling.

SS. Additional definitions are listed in "LEED Certification Glossary" found at www.usgbc.org/glossary.

1.04 MEETINGS

- A. Conduct a LEED Construction kick-off meeting
- B. Conduct a LEED Construction subcontractor kick-off meeting
- C. Contractor shall schedule and conduct LEED coordination meetings. At the Owners discretion, the LEED coordination meetings may be combined with other Project meetings. Meeting attendees shall include:
 - 1. Contractor's Project Manager
 - 2. Contractor's LEED Coordinator
 - 3. LEED Project Administrator
 - 4. All other attendees designated by the Owner
 - 5. Sub-Contractor Representatives as appropriate to stage of work
- D. LEED coordination meetings shall be held at least once a month
- E. LEED certification goals and issues shall be discussed at kick-off and all LEED coordination meetings

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Work of this project includes completed building and application for LEED certification. Work is not complete until Owner has accepted GBCI/USGBC's final review of LEED certification.
- B. Provide materials, product and cost data, procedures necessary to obtain LEED construction prerequisites and credits required in this Section. Other Sections may specify requirements that contribute to LEED construction prerequisites and credits. Refer to other sections for additional materials and procedures necessary to obtain LEED construction prerequisites and credits.
- C. Respond to questions and requests from Owner's Representative, building Owner, and GBCI regarding LEED prerequisites and credits that are the responsibility of the Contractor, that depend on product selection or product qualities, or that depend on Contractor's procedures until GBCI has made its determination on the project's LEED certification application.

1.06 ACTION SUBMITTALS

- A. Within 30 days of Notice to Proceed submit the following plans to the LEED Project Administrator and Owner/Owner's Representative for review:
 - 1. Construction LEED Action Plan.
 - a. Construction LEED Action Plan must be an electronic file that includes the following:
 - 1) Overview of the submittal review process, including information on the online submittal tracking system to be used.

February 27, 2026

- 2) Organizational chart identifying responsible parties for all LEED related coordination and documentation.
 - 3) Plan for how LEED required information will be conveyed to all subcontractors.
 - 4) Corrective action process for subcontractors with outstanding or noncompliant LEED submittals.
 - 5) Schedule for LEED coordination meetings.
2. Prerequisite MRp2, Construction and Demolition Waste Management Planning: Construction Waste Management Plan complying with 01524 Construction Waste Management Requirements.
 - a. Construction and Demolition Waste Management Plan must be an electronic file that includes the following:
 - 1) Establish waste diversion goals for the project by identifying at least five materials (both structural and nonstructural) targeted for diversion. Approximate a percentage of the overall project waste that these materials represent.
 - 2) Specify whether materials will be separated or commingled and describe the diversion strategies planned for the project. Describe where the material will be taken and how the recycling facility will process the material.
 - 3) Strategy for the safe removal and disposal of hazardous materials must also be included. Hazardous materials must be tracked separately and not be included in the project's total waste.
 - 4) Alternative daily cover (ADC) does not qualify as material diverted from disposal. Land-clearing debris is not considered construction, demolition, or renovation waste that can contribute to waste diversion. These shall not be included in the diverted waste total.
 - 5) Must account for all materials, including land-clearing debris, materials to be used for ADC, and other materials not contributing to diversion but not included in the diverted waste total.
 3. Credit EQc3, Construction Indoor Air Quality (IAQ) Management Plan complying with 01580 Construction Indoor Air Quality Management.
 - a. Construction IAQ Plan must be an electronic file that includes/addresses the following:
 - 1) For the construction and preoccupancy phases of the building.
 - 2) During construction, meet or exceed all applicable recom-

mended control measures of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, 2nd edition, 2007, ANSI/SMACNA 008-2008, Chapter 3.

- 3) Protect absorptive materials stored on-site and installed from moisture damage.
 - 4) Do not operate permanently installed air-handling equipment during construction unless filtration media with a minimum efficiency reporting value (MERV) of 8, as determined by ASHRAE 52.2-2007, with errata (or equivalent filtration media class of F5 or higher, as defined by CEN Standard EN 779-2002, Particulate Air Filters for General Ventilation, Determination of the Filtration Performance), are installed at each return air grille and return or transfer duct inlet opening such that there is no bypass around the filtration media.
 - 5) Immediately before occupancy, replace all filtration media with the final design filtration media, installed in accordance with the manufacturer's recommendations.
 - 6) Prohibit the use of tobacco products inside the building and within 25 feet of the building entrance during construction.
4. Credit EQc4, Indoor Air Quality (IAQ) Assessment complying with 01580 Construction Indoor Air Quality Management.
 - a. IAQ Assessment Plan must be an electronic file that includes/addresses the following:
 - 1) Identify which IAQ assessment compliance option will be used. Option 1, Flush-out or Option 2, Air Testing.
 - 2) Detailed approach for credit achievement (if Option 1 selected), flush-out plan and time/duration in construction schedule or the date, schedule and plan for IAQ testing using protocols consistent with the acceptable ASTM and U.S. EPA methods, or ISO methods, for all occupied spaces.
 5. Credit EQc2, Low Emitting Materials and Credit MRc2, Building Product Disclosure and Optimization (BPDO)- Environmental Product Declarations (EPDs).
 - a. Materials Plan must be an electronic file that include the following:
 - 1) Identify which low emitting compliance option will be used. Option 1, Product Category Calculations: Achieve the threshold level of compliance with emissions and content standards for the number of product categories chosen, or Option 2, Budget Calculation Method: If some products do not meet the criteria, project teams may use the budget calculation method.

- 2) Identify all applicable materials and products that comply with the low emitting emissions and content requirements for each category.
- 3) Identify which BPDO compliance option (or if both) will be used. Option 1, Environmental Product Declaration: Use at least 20 different permanently installed products sourced from at least five different manufacturers that meet one of the disclosure criteria below:
 - i. Life-cycle assessment and environmental product declarations.
 - a. Products with a publicly available, critically reviewed life-cycle assessment conforming to ISO 14044 that have at least a cradle to gate scope are valued as one whole product for the purposes of credit achievement calculation.
 - b. Product-specific Type III EPD -- Internally Reviewed. Products with an internally critically reviewed LCA in accordance with ISO 14071. Products with product-specific internal EPDs which conform to ISO 14025, and EN 15804 or ISO 21930 and have at least a cradle to gate scope are valued as one whole product for the purposes of credit achievement calculation.
 - c. Industry-wide Type III EPD -- Products with third-party certification (Type III), including external verification, in which the manufacturer is explicitly recognized as a participant by the program operator. Products with industry-wide EPDs, which conform to ISO 14025, and EN 15804 or ISO 21930 and have at least a cradle to gate scope are valued as one whole product for the purposes of credit achievement calculation.
 - ii. Environmental Product Declarations which conform to ISO 14025 and EN 15804 or ISO 21930 and have at least a cradle to gate scope.
 - a. Product-specific Type III EPD -- Products with third-party certification (Type III), including external verification and external critical review are valued as 1.5 products for the purposes of credit achievement calculation.

- 4) Option 2, Multi-Attribute Optimization: Use products that have an embodied carbon optimization report or action plan separate from the LCA or EPD. Reports shall comply with one of the criteria below for 10% by cost of the total value of permanently installed products in the project or use at least 10 permanently installed products sourced from at least three different manufacturers. Products will be valued as below.

Report Type	Reference Document(s) for the Optimization Report	Report Verification	Valuation
Embodied Carbon/LCA Action Plan	Product-specific LCA or product-specific Type III EPD	Prepared by the manufacturer and signed by company executive	½ product or 50% cost
Reductions in Embodied Carbon: <10% reduction in GWP relative to baseline	Baseline: Product-specific LCA, Product-specific Type III EPD, or Industry-wide Type III EPD	Comparative analysis is verified by an independent third party	1 product or 100% cost
Reductions in Embodied Carbon: 10%+ reduction in GWP relative to baseline	Optimized: Product-specific LCA or product-specific Type III EPD		1.5 products or 150% cost
Reductions in Embodied Carbon: 20%+ reduction in GWP and 5%+ reduction in two additional impact categories, relative to baseline	Baseline: Product-specific LCA, Product-specific Type III EPD Optimized: Product-specific LCA or product-specific Type III EPD		2% products or 200% cost

- 5) Identify products that comply with selected option.
 - 6) For credit achievement calculation, products sourced (extracted, manufactured, purchased) within 100 miles of the project site are valued at twice their base contributing cost (or number of products), up to a maximum of 200% of cost or 2 products.
- B. On a monthly basis, submit the following progress documentation to the LEED Project Administrator and Owner/Owner's Representative for review:
1. Prerequisite SSp1, Construction Activity Pollution Prevention.
 - a. Annotated progress photographs or inspection reports taken during construction showing implemented Construction Pollution Prevention measures.
 2. Credit EQc2, Low Emitting Materials.
 - a. Low Emitting Materials Calculator (USGBC provided) tracking compliant categories, materials, products and progress towards credit goal.

February 27, 2026

3. Credit EQc3, Construction Indoor Air Quality (IAQ) Management Plan.
 - a. Annotated progress photographs indicating each IAQ measure depicted and its general location.
 4. Credit MRc2, Building Product Disclosure and Optimization (BPDO)- Environmental Product Declarations (EPDs).
 - a. BPDO Calculator (USGBC provided) tracking compliant materials and products that have been purchased or installed, and progress towards credit goal.
 5. Credit MRc5, Construction and Demolition Waste Management.
 - a. Construction and Demolition Waste Calculator (USGBC provided) tracking overall waste generated, diversion rate, and progress towards credit goal.
- C. LEED Documentation Submittals: Submit the following for each applicable LEED construction prerequisite or credit:
1. General, Integrated LEED Submittal: Project submittals must include LEED product data highlighted documentation supporting the LEED compliance/sustainability claims.
 2. General, Separate LEED Submittals: LEED submittals must be separated from project submittals. A preliminary LEED Submittal includes LEED product data with all available highlighted documentation.
 3. Precertification Worksheet (USGBC provided) for LEED construction prerequisites and credits.
 4. Credit LTc8, Green Vehicles: Provide cut sheets of electric (or alternative fuel) vehicle charging station. Electric vehicle manufacturer data sheets to confirm a Level 2 charging capacity (208 – 240 volts) or greater, compliance with the relevant regional or local standard for electrical connectors, such as SAE Surface Vehicle Recommended Practice J1772, SAE Electric Vehicle Conductive Charge Coupler or IEC 62196 of the International Electrotechnical Commission for projects outside the U.S, and ability to be networked or internet addressable and be capable of participating in a demand-response program or time-of-use pricing to encourage off-peak charging.
 5. Prerequisite SSp1, Construction Activity Pollution Prevention:
 - a. Stormwater Pollution Prevention plan (SWPPP).
 - b. A minimum of 18 date-stamped photos which show the implemented measures and any corrective actions taken OR monthly inspection reports.
 6. Credit SSc5, Heat Island Reduction:

February 27, 2026

- a. High-Reflectance Roof: Product data for roofing materials indicating tested Solar Reflectance Index value (SRI) of at least 82 (initial) and 64 (3-year aged) for low sloped roofs ($\leq 2:12$) or 39 (initial) and 32 (3-year aged) or greater than for steep sloped roofs ($>2:12$).
 - b. Non-Roof Measures: Product data for any shade with architectural devices or structures or paving material that have at minimum 0.28 (3-year aged) Solar Reflectance (SR) value. If 3-year aged value information is not available, use materials with an initial SR of at least 0.33 at installation.
7. Prerequisite WEp1 and Credit WEc1, Outdoor Water Use Reduction: Summary of all product data collected for all landscape and irrigation materials that have been purchased and installed.
 8. Prerequisite WEp2 and Credit WEc2, Indoor Water Use Reduction: Summary of all product data collected for all plumbing fixtures that have been purchased and installed.
 - a. Provide product cut sheets for fixtures to confirm WATER SENSE (WS) certification. Applicable fixtures include showerheads (WS), toilets (WS), urinals (WS), and private faucets (WS).
 - b. Provide product cut sheets for appliances to confirm ENERGY STAR or performance equivalent. Applicable appliances include residential clothes washers, commercial clothes washers, residential dishwashers, pre-rinse spray valves and ice machines.
 - c. Provide product information for process water usage to confirm:
 - 1) Heat rejection and cooling has no once-through cooling with potable water for any equipment or appliances that reject heat.
 - 2) Cooling towers and evaporative condensers has equipment with: make-up water meters, conductivity controllers and overflow alarms and efficient drift eliminators that reduce drift to maximum of 0.002% of recirculated water volume for counter-flow towers and 0.005% of recirculated water floor for cross-flow towers.
 9. Prerequisite WEp3 and Credit WEc4, Water Metering: Product data for permanent meters used to track water subsystems as applicable to the project.
 10. Prerequisite EAp3, Building-Level Energy Metering: Product data for meters, sensors, and data collection system used to provide continuous metering of building energy-consumption performance.
 11. Prerequisite EAp1, Fundamental Commissioning: Summary of all product data collected for all building energy systems materials and equipment that have been purchased and installed. Comply with Section 01810 Commissioning.
 12. Prerequisite EAp4, Fundamental Refrigerant Management: Summary of

February 27, 2026

all product data collected for all refrigerant equipment that has been purchased and installed.

13. Prerequisite MRp2, Construction and Demolition Waste Planning and Credit MRc5, Construction and Demolition Waste Management:
 - a. Complete Construction and Demolition Waste Calculator (USGBC provided).
 - b. Itemized waste hauling certificates/receipts for all waste removed from the Project site and documentation of recycling recovery rate for off-site sorting facilities (if waste is commingled).
 - c. Final waste report must be as an electronic file that includes the following:
 - 1) Total construction and demolition waste produced by the project.
 - 2) Types of waste material and quantity of each material.
 - 3) Total waste diverted and diversion rate (percentage)
 - 4) Must address ADC and other materials that are included in the calculation even if they do not count toward diversion.
 - 5) Units may be by weight or volume but must be consistent throughout.
14. Credit MRc2, Building Product Disclosure and Optimization – Environmental Product Declarations
 - a. Option 1, Environmental Product Declaration (EPD):
 - 1) Provide manufacturers building product disclosure
 - 2) EPD and LCA reports or compliant summary documents for 100% of products contributing towards credit
 - b. Option 2, Embodied Carbon/LCA Optimization:
 - 1) Provide manufacturers building product disclosure
 - 2) Documentation of compliance with USGBC- approved program
 - c. Completed BPDO Calculator (USGBC provided).
15. Credit MRc6, PBT Source Reduction- Lead, Cadmium and Copper
 - a. Provide manufacturer's product data for roofing and flashing demonstrating products do not contain lead as specified in **Section 07**
 - b. Provide manufacturer's product data for interior and exterior paints demonstrating products do not contain lead and intentionally added cadmium as specified in Section 09900 – PAINTING.

February 27, 2026

16. Credit IEQ 2, Low Emitting Materials: Product data, indicating VOC content and emissions testing documents showing compliance with requirements for low-emitting materials, for the following materials:

a. Adhesives, Sealants, Paints, Coatings, Flooring, Ceilings, Walls, Thermal, and Acoustic Insulation:

1) VOC Emissions Evaluation: Provide manufacturers General Emissions Evaluation verification in accordance with California Department of Public Health (CDPH) Standard Method v1.2–2017 or equivalent verification method. Acceptable third party verified labels confirming CDPH compliance include but are not limited to FloorScore, Green Label Plus, SCS Indoor Advantage Gold, and UL Greenguard Gold.

b. Wet-Applied Products:

1) In addition to meeting the general requirements for VOC emissions (above), on-site wet-applied products must meet the following requirements, as applicable. Disclosure of VOC content must be made by the manufacturer. Any testing must follow the test method specified in the applicable regulation.

All paints and coating wet-applied on site must meet the applicable VOC limits of the California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, or the South Coast Air Quality Management District (SCAQMD) Rule 1113, effective February 2016.

All adhesives and sealants wet-applied on site must meet the applicable chemical content requirements of SCAQMD Rule 1168, October 2017, Adhesive and Sealant Applications, as analyzed by the methods specified in Rule 1168. The provisions of SCAQMD Rule 1168 do not apply to adhesives and sealants subject to state or federal consumer product VOC regulations.

2) If the applicable regulation requires subtraction of exempt compounds, any content of intentionally added exempt compounds larger than 1% weight by mass (total exempt compounds) must be disclosed.

3) If a product cannot reasonably be tested as specified above, testing of VOC content must comply with ASTM D2369-10; ISO 11890, part 1; ASTM D6886-03; or ISO 11890-2.

4) For projects in North America, methylene chloride and perchloroethylene may not be intentionally added in paints, coatings, adhesives, or sealants

c. Composite Wood Products:

- 1) Provide manufacturers verification or documentation confirming product meets one of the following:
 - 1) Certified as ultra-low-emitting formaldehyde (ULEF) product under EPA Toxic Substances Control Act, Formaldehyde Emission Standards for Composite Wood Products (TSCA, Title VI), (EPA TSCA Title VI), or California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM)
 - 2) Certified as no added formaldehyde resins (NAF) product under EPA TSCA Title VI or CARB ATCM
 - 3) Wood structural panel manufactured according to PS 1-09 or PS 2-10 (or one of the standards considered by CARB to be equivalent to PS 1 or PS 2) and labeled bond classification Exposure 1 or Exterior
 - 4) Structural wood product manufactured according to ASTM D 5456 (for structural composite lumber), ANSI A190.1 (for glued laminated timber), ASTM D 5055 (for I-joists), ANSI PRG 320 (for cross-laminated timber), or PS 20-15 (for finger-jointed lumber).

d. Furniture:

- 1) Provide manufacturers documentation confirming testing in accordance with ANSI/BIFMA Standard Method M7.1-2011 R2016) and complies with ANSI/BIFMA e3-2014e or e3-2019e Furniture Sustainability Standard, Sections 7.6.1 (for half credit, by cost) OR 7.6.2 (for full credit, by cost), OR 7.6.2 AND 7.6.3 for one and a quarter credit, by cost. Laboratories that conduct the tests must be accredited under ISO/IEC 17025 for the test methods they use.

17. Credit IEQc3, Construction IAQ Management Plan:

- a. Construction Indoor Air Quality (IAQ) Management and Flush-out Plan or Air Quality Testing Plan.
- b. Product data for temporary filtration media at each return air grille verifying a MERV of 8 and narrative describing the change out procedure.
- c. Product Data for filtration media used during occupancy. At a minimum filtration must be a MERV 13, or greater, and installed to process outside air that is delivered as supply air.
- d. Construction Documentation: Date and time stamped photos documenting moisture protection methods once per month. Date and time stamped photos, three for each of the five SMACNA

measures, provided once per month. Representative photos of all SMACNA measures as detailed in the IAQ Plan.

- e. Narrative describing the Project's specific flush-out or air quality testing procedures complying with the IEQc3 and IEQc4 requirements and 01580 Construction Indoor Air Quality Management Requirements.

1.06 QUALITY ASSURANCE

- A. LEED Coordinator: Engage an experienced LEED-Accredited Professional to spend at least 50% of time on-site and coordinate LEED requirements. LEED coordinator may also serve as waste management coordinator. The designated LEED coordinator shall remain consistent from the LEED kick-off through project completion.

PART 2 - PRODUCTS

2.01 QUALITY MATERIALS, GENERAL

- A. Provide products and procedures necessary to obtain LEED credits required in this Section. Although other Sections may specify some requirements that contribute to LEED credits, the Contractor shall determine additional materials and procedures necessary to obtain LEED credits indicated.
 - 1. Exclusions: Special equipment, such as elevators, escalators, process equipment, and fire suppression systems, is excluded from the credit calculations. Also excluded are products purchased for temporary use on the project, like formwork for concrete.

2.02 BUILDING PRODUCT DISCLOSURE AND OPTIMIZATION

- A. Credit MRc2, Building Product Disclosure and Optimization, Environmental Product Declarations (EPD):
 - 1. Option 1. Provide at least 20 permanently installed products (sourced from at least five different manufacturers) which meet one of the disclosure criteria listed in 01361-1.06A.5
 - 2. Option 2. Use products that have an embodied carbon optimization report or action plan separate from the LCA or EPD. Reports shall comply with one of the criteria below for 10% by cost of the total value of permanently installed products in the project or use at least 10 permanently installed products sourced from at least three different manufacturers.
- B. Exclusions: Special equipment, such as elevators, escalators, process equipment, and fire suppression systems, is excluded from the credit calculations. Also excluded are products purchased for temporary use on the project, like formwork for concrete.

2.03 LOW-EMITTING MATERIALS

February 27, 2026

- A. Paints and coatings: At least 75% of all paints and coatings, by volume or surface area, meet the VOC emissions evaluation AND 100% meet the VOC content evaluation. To meet the 100% requirement for VOC content evaluation, a VOC budget may be used.

The paints and coatings product category includes all interior paints and coatings wet-applied on site. Exclude foamed-in place and sprayed insulation (include in Insulation category).

- B. Adhesives and sealants: At least 75% of all adhesives and sealants, by volume or surface area, meet the VOC emissions evaluation AND 100% meet the VOC content evaluation. To meet the 100% requirement for VOC content evaluation, a VOC budget may be used.

The adhesives and sealants product category includes all interior adhesives and sealants wet-applied on site.

- C. Flooring: At least 90% of all flooring, by cost or surface area, meets the VOC emissions evaluation OR inherently non-emitting sources criteria, OR salvaged and reused materials criteria.

The flooring product category includes all types of hard and soft surface flooring (carpet, ceramic, vinyl, rubber, engineered, solid wood, laminates), raised flooring, wall base, underlayments, and other floor coverings.

Exclude subflooring (include subflooring in the composite wood category, if applicable). Exclude wet-applied products applied on the floor (include in paints and coatings category).

- D. Wall panels: At least 75% of all wall panels, by cost or surface area, meet the VOC emissions evaluation, OR inherently non-emitting sources criteria, OR salvaged and reused materials criteria.

The wall panels product category includes all finish wall treatments (wall coverings, wall paneling, wall tile), surface wall structures such as gypsum or plaster, cubicle/curtain/partition walls, trim, interior and exterior doors, wall frames, interior and exterior windows, and window treatments.

Exclude cabinetry (include built-in cabinetry in the composite wood category and free-standing cabinetry in the furniture category), and vertical structural elements (include structural elements such as structural panels or structural composite wood in the composite wood category, if applicable).

- E. Ceilings: At least 90% of all ceilings, by cost or surface area, meet the VOC emissions evaluation, OR inherently non-emitting sources criteria, OR salvaged and reused materials criteria.

The ceilings product category includes all ceiling panels, ceiling tile, surface ceiling structures such as gypsum or plaster, suspended systems (including canopies and clouds), and glazed skylights.

Exclude overhead structural elements (include structural elements in the composite wood category, if applicable).

- F. Insulation: At least 75% of all insulation, by cost or surface area, meets the

February 27, 2026

VOC emissions evaluation.

The insulation product category includes all thermal and acoustic boards, batts, rolls, blankets, sound attenuation fire blankets, foamed-in place, loose-fill, blown, and sprayed insulation.

Exclude insulation for HVAC ducts and plumbing piping from the credit. Insulation for HVAC ducts may be included at the project team's discretion.

- G. Furniture: At least 75% of all furniture in the project scope of work, by cost, meets the furniture emissions evaluation, OR inherently non-emitting sources criteria, OR salvaged and reused materials criteria.

The furniture product category includes all seating, desks and tables, filing/storage, free-standing cabinetry, workspaces, and furnishing items purchased for the project.

Exclude office accessories from the credit.

- H. Composite Wood: At least 75% of all composite wood, by cost or surface area, meets the Formaldehyde emissions evaluation OR salvaged and reused materials criteria.

The composite wood product category includes all particleboard, medium density fiberboard (both medium density and thin), hardwood plywood with veneer, composite or combination core, and wood structural panels or structural wood products.

Exclude products covered in the flooring, ceiling, wall panels, or furniture material categories from this category.

PART 3 - EXECUTION

3.01 NON-SMOKING BUILDING

- A. Prerequisite IEQp2, Environmental Tobacco Smoke Control: Smoking is not permitted within the building or within 25 feet (8 m) of entrances, operable windows, or outdoor- air intakes. Install appropriate signage to communicate this to all parties on-site during construction.

3.02 ATTACHMENTS

- A. Project LEED Scorecard – Contractor assigned construction phase required credits are highlighted and denoted in scorecard.

END OF
SECTION

SECTION 01420 - REFERENCES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Use of Standards.
 - 2. Abbreviation/Acronym use and format.
 - 3. Definitions.
- B. Related Sections:
 - 1. Division 1 Sections.
 - 2. Divisions 2 – 16

1.02 STANDARDS

- A. Requirement: Each type of work provided for this Project is required to comply with recognized Industry standards (also may be referred to as “references”) that are applicable to the class of work intended by the Contract Documents. Compliance is required whether such standards are indicated or not and whether such standards are in published form or an unwritten but accepted practice in the Industry for the class of work.
- B. Use:
 - 1. General: Where a specific standard is indicated, this is to be interpreted as a method for conveying the design intent and its use expands on or clarifies the requirements and its use is not intended to limit or to negate the specific Industry standards intended to apply to the class of work to be provided.
 - 2. Conflict: Where several Industry standards apply to the Work, and where quality requirements of these applicable standards conflict for the class of work required, it is intended that the standard producing the higher quality work is to apply.

1.03 ABBREVIATIONS/ACRONYMS:

- A. General: Abbreviations and acronyms are used throughout the Contract Documents. If any abbreviation or acronym is not understood, these should be verified from the Architect.
- B. Industry Acronyms: Generally, but not necessarily, these are abbreviations or acronyms of Industry organizations, e.g. ASTM, AWI, WIC, NRCA, SMACNA, etc.
- C. Architect Created Acronyms: Where used in Contract Documents the following format is used.

1. Format: Abbreviation of one or several letters, followed by a hyphen, followed by an identification number, e.g. WD-1 for wood type number one or WPM-1 for waterproof membrane type one.
2. Number Sequence and Related Sections: Designations may be used between related specification sections where primary product is similar and therefore numbers are not necessarily sequential within a specific specification section, although the numbering will be sequential between all related sections where similar designations are used.

1.04 DEFINITIONS

- A. Related Sections: The listed specification sections under the “Related Sections” paragraphs indicate some of the primary related work which is impacted by the work of the specific specification section in which the list appears. It is not intended as a complete list (which in many cases would otherwise be enormous) but has been provided to assist the Contractor.
- B. Exposure Definitions: Unless otherwise indicated, the following definitions are to apply.
 1. Exterior Surfaces: Exposed on the outside envelope of structure or surfaces of other constructed elements and equipment which are exposed to the “outside air”. Covered or protected areas “open to the (outside) air” and not fully enclosed by walls, floors, roofs, windows, and doors, are to be considered as part of the exterior and surfaces occurring in such spaces are to be considered exterior surfaces.
 2. Interior Surfaces: Surfaces interior to the fully enclosed envelope of a structure or within the fully enclosed envelope of other constructed elements and equipment. These surfaces are not exposed to the “outside air”.
 3. Exposed: Surfaces which are exposed to view from any vantage point, which are not concealed from view due to permanent non-accessible construction or earth, and which is not defined as semi-exposed.
 4. Semi-Exposed: Surfaces not readily visible but are accessible and viewable from selected vantage points. These surfaces include those hidden by and hidden on removable or openable doors, panels, and drawers, and surfaces of undersides of shelves, counters, desks, and toe spaces, surfaces which are hidden by moveable equipment/furnishings, and other similar surfaces.
 5. Concealed: Surfaces not exposed to view from any vantage point and which is concealed by permanent non-accessible construction, earth, and equipment/furnishings. Such concealed surfaces include those surfaces permanently concealed within inaccessible wall cavities, above inaccessible ceilings, within inaccessible floor construction, within inaccessible shafts, and those buried underground in earth. Include within this definition, surfaces above otherwise semi-exposed accessible suspended acoustical ceilings and the interior portions (except ferrous metal components) of the elevator shaft which are to be considered as concealed spaces.

February 27, 2026

- C. Type: Word is defined to mean any characteristic(s) which makes a product different or unique from another product; including differences which could occur when it is the same product, e.g. products of nature such as those made from wood or stone. Characteristics include, but are not limited to, those of size, shape, profile, finish, texture, color, pattern, chemical/material composition, material performances, etc.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01450 – QUALITY CONTROL

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Quality control inspection/testing requirements.

B. Related Sections:

1. Division 1 Sections.

1.02 SUBMITTALS

A. From Testing Service:

1. Testing Service Qualifications: Submit qualifications as required herein under “Quality Assurance” paragraphs.
2. Test Reports: Laboratory to submit not less than four (4) copies of test reports to Architect. Include all information necessary to evaluate test, including following:
 - a. Date issued.
 - b. Architect’s Project Title and Number.
 - c. Testing Laboratory Name, Address, and Phone Number.
 - d. Inspector’s name and signature.
 - e. Date of each inspection and sampling.
 - f. Record of temperature and weather at time of each inspection and sampling.
 - g. Date of each test.
 - h. Identification of material/product tested with Specification Section.
 - i. Location of material/product and location of inspection or where samples taken.
 - j. Types of tests conducted.
 - k. Results of tests.
 - l. Evaluation and recommendations based on results of testing and inspections, including evaluation with respect to compliance with Contract requirements

B. Testing Schedule: Submit schedule indicating when work is scheduled to be ready for types of testing required. Update schedule if changes occur and resubmit promptly to Architect to assure that inspections/testing can be accomplished when work is ready for testing.

C. Mock Ups: Provide listing of all specified mock ups and their proposed schedule for review.

February 27, 2026

- D. Control Unit(s): Confirmation of control unit locations and elements to be constructed within.

1.03 QUALITY ASSURANCE

- A. Testing Service Qualifications:
 - 1. Meet "Recommended Requirements for Independent Laboratory Qualification", latest edition, published by American Council of Independent Laboratories.
 - 2. Meet basic requirements of ASTM E 329, "Standard of Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as Used in Construction".
 - 3. Inspection Report: Submit copies of inspection report of facilities made by Materials Reference Laboratory of National Bureau of Standards during most recent tour of inspection; with memorandum of remedies of any deficiencies reported by inspection.
 - 4. Testing Equipment:
 - a. Calibration: Calibrate at 12-month intervals maximum by devices of accuracy traceable to either the National Bureau of Standards or accepted values of natural physical constraints.
 - b. Certificate of Calibration: Submit certificate of calibration made by accredited calibration agency.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 INSPECTIONS/TESTING, GENERAL

- A. General: Comply with requirements of the General Conditions of the Contract and requirements specified herein. Use of any testing service shall in no way relieve Contractor of his obligation to perform the Work in accordance with the Contract.
- B. Testing/Inspection Agency: Where Contractor is responsible for securing services of independent Testing/Inspection Agency, such Agency to be acceptable to Owner.
- C. Testing Owner Requires: Owner reserves right to test any and all work. If testing is desired by Owner, Contractor shall cooperate and provide appropriate access to site. Where date/timing is critical to testing requirements (as determined by Testing Agency), Contractor shall not deny appropriate access to test site by the Owner and at the Owner specified date/times, for any reason. Where date/timing is not as critical to test requirements, Owner will cooperate with Contractor to extent reasonably possible.
- D. Protection and Repair: Protect work exposed by or for testing service. Upon completion of inspection, testing, and sampling, repair damaged work and restore finishes to match the adjacent finishes.

E. Contract Conforming Work:

1. Resulting from Code Required Testing/Inspection:
 - a. Owner's Responsibilities: Pay for testing and inspections by an independent Testing/Inspection Service for tests and inspections required by Special Inspections.
 - b. Contractor's Responsibilities: Comply with following:
 - 1) Except for Special Inspections, pay for and secure testing and inspections from independent Testing/Inspection Service for all other testing and inspections required by Authorities and Code.
 - 2) At no cost to Owner, Contractor to provide for costs and work required to patch any damaged work; regardless of who pays for Testing/Inspection Service.
2. Resulting from Owner Required Testing/Inspection:
 - a. Owner's Responsibilities: Owner to pay for costs of Testing/Inspection Services and costs to patch any damaged work.
 - b. Contractors Responsibilities: Patch any damaged work.

F. Nonconforming Work:

1. Resulting from Code Required Testing/Inspection:
 - a. Owner's Responsibilities: Pay for initial costs for tests and inspections by an independent Testing/Inspection Service for tests and inspections required by Special Inspections.
 - b. Contractor's Responsibilities: Comply with following.
 - 1) Except for testing and inspections required by Special Inspections, pay for all other initial testing and inspections.
 - 2) Correct defective work to meet Contract requirements.
 - 3) Pay for all subsequent testing/inspection costs, until compliance with Contract requirements is achieved as evidenced by results of testing/inspections.
2. Resulting from Owner Required Testing/Inspection:
 - a. Owner's Responsibilities: None.
 - b. Contractor's Responsibilities:
 - 1) Initial Costs: Pay for initial testing/inspection costs and other fair costs, if any, incurred by the Owner and Architect which directly resulted from the testing/inspection requirements of the nonconforming work.
 - 2) Correction of Work: Correct defective work to meet Contract requirements. Pay for all subsequent testing/inspection costs, until compliance with Contract requirements is achieved as evidenced by results of testing/inspections.

- 3) Time Impact to Work: Requests for additional time will generally not be considered when resulting from installation of defective work.

3.02 MOCKUPS

- A. Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
 2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
 3. Demonstrate the proposed range of aesthetic effects and workmanship.
 4. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
 - a. Allow five days for initial review and each re-review of each mockup.
 - b. Maintain approved mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 5. Demolish and remove mockups when directed, unless otherwise indicated.
 6. When indicated in these Specifications, some mock-ups may become part of the work provided that they meet the requirements set forth in their respective specification sections and are approved by the Architect.

3.03 LABORATORY DUTIES:

- A. Cooperation: Cooperate with Architect. Ensure that personnel are at the site at the required times for inspections and testing.
- B. Personnel: Provide qualified personnel of appropriate experience and training necessary to carry out specific assigned duties.
- C. Performance of Service: Perform required inspections, sampling, and testing of materials and methods of construction. Ascertain compliance with requirements of Contract Documents as measured by standards required by specifications, by authorities, and by recognized ASTM and other acceptable industry standards.
- D. Notifications: Promptly notify Architect of irregularities or deficiencies of the inspected or tested Work.
- E. Test Reports Submittal: Execute inspections, sampling, and testing in prompt manner and submit test reports at times as prearranged with Architect.
- F. Additional Services: Perform as required by Architect.
- G. Limitations of Authority: Testing Service is not authorized to do the following.

February 27, 2026

1. Release, revoke, alter, or enlarge on, requirements of Contract Documents.
2. Approve or accept any part of the Work.
3. Perform any duties of the Contractor.
4. Interfere in any way with the construction process, except as otherwise approved for performance of services contracted for.

3.04 CONTRACTOR'S RESPONSIBILITIES

- A. Contractor Notifications: Notify the Architect not less than five (5) working days prior to when work is ready for inspection/testing to allow for assignment of personnel and scheduling of testing service.
- B. Cooperation: Cooperate with testing service personnel. Provide appropriate access to work where inspections, sampling, and testing required. Furnish casual labor as necessary to provide access to work to be tested, to assist in obtaining and handling of samples at the site, and to otherwise facilitate the inspection and testing process.
- C. Contractor Arranged Tests: Contractor may arrange and pay for additional inspections, sampling, and testing from Owner's testing service when arranged through Architect.
- D. Non-complying Work: Where non-complying work is evidenced by a Testing Service, the Contractor at his option shall do one of following.
 1. Further Testing:
 - a. Testing Service and Methods of Testing: Secure and pay for further testing of non-complying work by another qualified testing service satisfactory to the Owner. Employ same test methods as testing service indicating noncompliance. Other test methods may be employed only when approved by Owner after review of alternate test proposals and justifications and only when previous test methods utilized can be shown to be inappropriate.
 - b. Results of Testing: Where results of testing indicates noncompliance, comply with requirements of paragraph 3.04 D.2., "Corrective Measures" as indicated. Where results indicate compliance, work with Architect in resolving problem expeditiously.
 2. Corrective Measures:
 - a. Owner's Costs Directly Attributable to Inspection/Testing Process: Pay for Owner's costs, including costs of all tests conducted, and other fair costs incurred by the Owner and the Architect.
 - b. Correction of Work: Provide all work necessary to correct defective work to comply with Contract requirements.

END OF SECTION

SECTION 01500 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 SUMMARY

- A. Requirements for temporary facilities and controls, including temporary utilities, support facilities, and security and protection facilities.
- B. Temporary utilities include but are not limited to, the following:
 - 1. Sanitary facilities, including toilets, wash facilities, and drinking water facilities.
 - 2. Lighting.
- C. Support facilities include, but are not limited to, the following:
 - 1. Storage and fabrication sheds
 - 2. Trash, refuse disposal.
 - 3. Construction aids and miscellaneous service and facilities
- D. Security and protection facilities and measures include, but are not limited to, the following:
 - 1. Environmental protection.
 - 2. Tree and plant protection.
 - 3. Barricades, warning signs, and lights.
- E. Related Sections: Refer to Divisions 2 through 16 for other temporary requirements including ventilation, humidity requirements and products in those Sections.

1.02 USE CHARGES

- A. General: Cost or use charges for temporary facilities are not chargeable to the Owner and shall be included in the Contract Price. Allow other entities to use temporary services and facilities without cost, including, but not limited to, the following:
 - 1. Other Contractors with agreements with the State working within the contract limits.
 - 2. Occupants of Project.
 - 3. Testing agencies.
 - 4. Owner's Representative and personnel of authorities having jurisdiction.
- B. Water Service: Use water from Owner's facilities existing water system without metering and without payment of use charges.
- C. Electric Power Service: Use electric power from Owner's existing system without metering and without payment of use charges.
- D. Sewer Service: Use sewer service from Owner's existing system without metering and without payment of use charges.

February 27, 2026

- E. Waste Receptacle Bins: Do not use facility's waste receptacle bins

1.03 SUBMITTALS

- A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.
- B. Temporary Utility Reports: Submit reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.
- C. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- D. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage.
 - 1. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.
 - 2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
 - 3. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
- E. Landfill Disposal Receipts: Submit copies of receipts issued by a landfill facility. Include receipts with Contractor Daily Progress Report and part of the Construction Waste Management Plan.

1.04 QUALITY ASSURANCE

- A. Standards: Comply with IBC Chapter 33, "Safeguards During Construction", ANSI A10.6, NECA's "Temporary Electrical Facilities", and NFPA 241, "Construction, Alteration, and Demolition Operations".
 - 1. Trade Jurisdictions: Assigned responsibilities for installation and operation of temporary utilities are not intended to interfere with trade regulations and union jurisdictions.
 - 2. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70, "National Electrical Code".
 - a. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.05 PROJECT CONDITIONS

- A. Conditions of Use: The following conditions apply to use of temporary services and facilities by all parties engaged in the Work:

February 27, 2026

1. Keep temporary services and facilities clean and neat.
2. Relocate temporary services and facilities as required by progress of the Work.

1.06 PREPARATION AND PROTECTION

- A. Protection of Property: Continually maintain adequate protection of the Work from damage and protect all property, including but not limited to buildings, equipment, furniture, grounds, vegetation, material, utility systems located at and adjoining the job site. Repair, replace or pay the expense to repair damages resulting from Contractor's fault or negligence.
- B. Before starting work to be applied to previously erected constructions, make a thorough and complete investigation of the recipient surfaces and determine their suitability to receive required additional construction and finishes. Make any repair that is required to properly prepare surfaces and coordinate the Work to provide a suitable surface to receive following Work.
- C. Commencing work by any trade implies acceptance of existing conditions and surfaces as satisfactory for the application of subsequent work, and full responsibility for finished results and assumption of warranty obligations under the Contract.
- D. Protect existing (including interiors) work to prevent damage by vandals or the elements. Provide temporary protection. Use curtains, barricades, or other appropriate methods. Take positive measures to prevent breakage of glass and damage to plastic, aluminum and other finishes.
- E. Repairs and Replacements: Promptly replace and repair damages to the approval of the Owner's Representative. Additional time required to secure replacements and to make repairs does not justify a time extension.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. General: Provide new materials. Undamaged, previously used materials in serviceable condition may be used if approved by Architect. Provide materials suitable for use intended.

2.02 TEMPORARY FACILITIES

- A. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
 1. Store combustible materials apart from building.
- B. Barriers and Enclosures:
 1. Barricades: Provide and maintain barriers and warning signs as required to prevent public entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations. Barricades shall be finished per Owner's design and apply signage and/or graphics as directed/provided by Owner.

HAWAII HEALTH SYSTEMS CORPORATION – KAUAI DIVISION

Samuel Mahelona Memorial Hospital
Behavioral Health New Patient Facility
Project No. 221093-01

Temporary Facilities and Controls
01500 - 3

February 27, 2026

- a. Meets the requirements for ICRA and ASTM E-84 rating on all components of the system.
- b. Full height, solid, material to limit sound transmission
- c. Basis of Design:
 - 1) STARC Systems Inc, LiteBarrier
2. Provide temporary partitions and ceilings as required to separate work areas from Owner occupied areas, to prevent penetration of dust and moisture into Owner occupied areas, to prevent damage to existing areas and equipment.
3. Pedestrian Walkways: Pedestrian walkways adjacent to fence to be protected when required by Authorities.
4. Safety Signage: Provide signage as required for the safety and notification of the Public.
5. Removal: Remove from site when no longer necessary and when acceptable to Architect.

2.03 EQUIPMENT

- A. Self Contained Combination Toilet and Urinal Units: Single occupant units of chemical, aerated recirculation, or combustion type; vented; fully enclosed with a glass fiber reinforced polyester shell or similar nonabsorbent material. One quarter of, or at least one unit(s) shall contain a handwash sink with potable water storage.
- B. Electrical Outlets: Properly configured, NEMA polarized outlets to prevent insertion of 110 to 120 V plugs into higher voltage outlets; equipped with ground fault circuit interrupters, reset button, and pilot light.
- C. Power Distribution System Circuits: Where permitted and overhead and exposed for surveillance, wiring circuits, not exceeding 125 V ac, 20 A rating, and lighting circuits may be nonmetallic sheathed cable.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.02 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary services.

February 27, 2026

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Storm and Sewer Drainage: If sewers are available, provide temporary connections to remove effluent that can be discharged lawfully. If storm drains are not available or cannot be used, provide drainage ditches, dry wells, stabilization ponds, and similar facilities. If neither sewers nor drainage facilities can be lawfully used for discharge of effluent, provide containers to remove and dispose of effluent off site in a lawful manner.
 1. Filter out excessive soil, construction debris, chemicals, oils, and similar contaminants that might clog sewers, storm drains or pollute waterways before discharge.
 2. Connect temporary sewers, if used as directed by sewer department officials.
 3. Maintain temporary sewers and drainage facilities in a clean, sanitary condition. After heavy use, restore normal conditions promptly.
 4. Provide temporary filter beds, settlement tanks, separators, and similar devices to purify effluent to levels acceptable to authorities having jurisdiction.
- C. Water Service for Construction Site: Water Service: A temporary tap into the facility's existing water system is allowed, subject to the following conditions:
 1. Comply with the Department of Health's and County water provider's requirements when tapping into the existing water system.
 2. Reasonable amounts of water will be available without charge.
 3. Should the Contractor at any time fail to comply with any or all of the above conditions, the Owner may terminate the use of water. The Contractor shall remove the hookup within 48 hours of notification of such termination.
- D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water fixtures. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.
 1. Disposable Supplies: Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Maintain adequate supply. Provide covered waste containers for disposal of used material.
 2. Wash Facilities: Install wash facilities supplied with potable water at convenient locations for personnel who handle materials that require wash up. Dispose of drainage properly. Supply cleaning compounds appropriate for each type of material handled.
 3. Locate toilets and drinking water fixtures so personnel need not walk more than 2 stories vertically or 200-feet horizontally to facilities.
- E. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or

February 27, 2026

elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.

1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.
- F. Electric Power Service: Use of Owners facilities electrical power services will be permitted as long as equipment is maintained in a condition acceptable to the Owner and so long as the power demand does not exceed existing system capabilities or interfere with the facilities operations.
- G. Electric Distribution: Provide receptacle outlets adequate for connection of power tools and equipment. Protect wiring, in conduits or other, measures when exposed to possible damage or traffic areas.
- H. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations and traffic conditions.
- I. Telephone Service: Provide a portable wireless telephone with voice-mail or messaging service for superintendent's use in making and receiving telephone calls when at the construction site.

3.03 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
1. Locate Storage sheds, sanitary facilities, and other temporary construction and support facilities for easy access or where shown on Contract Drawings or as directed by the Owners Representative.
 2. Maintain support facilities until near Substantial Completion. Remove before Substantial Completion.
- B. Temporary Sign(s):
1. Provide and install temporary signs as listed. Sign designs are attached to Part 3 of this Section:
 - a. Warning Sign
 2. Install signs where directed by the Owner's Representative or where indicated to inform public and persons seeking entrance to the Project. Do not permit installation of unauthorized signs.
 3. Provide temporary signs to provide directional information to constructional personnel and visitors.
 4. Construct signs with durable materials, properly supported or mounted, and visible.
- C. Trash, Refuse Disposal: Coordinate the disposal of trash and refuse with the requirements of Section 01595 – PROJECT CLEANING.
1. Department of Health – Illegal Dumping Notice. See attachment to Part 3 of this section.
 - a. This Notice to be printed out on 8.5x11" paper.

February 27, 2026

- b. This Notice to be posted at the job site field office and/or in locations visible to all contractors, subcontractors, suppliers, vendors, etc. throughout the duration of the project.
2. Illegal Dumping of solid waste could subject the Contractor to fines and could lead to felony prosecution in accordance with Chapter 342H, HRS. For more information, see the following web site:
<http://www.hawaii.gov/health/environmental/waste/sw/pdf/Illdump.pdf>
3. Provide waste collection containers in sizes adequate to handle waste from construction operations. Containerize and clearly label hazardous, dangerous, or unsanitary waste materials separately from other waste.
4. Do not burn debris or waste materials on the project site.
5. Do not bury debris or waste material on the project site unless specifically allowed elsewhere in these specifications as backfill material.
6. Haul unusable debris and waste material to an appropriate off site dump area.
 - a. Water down debris and waste materials during loading operations or provide other measures to prevent dust or other airborne contaminants.
 - b. Vacuum, wet mop, or damp sweep when cleaning rubbish and fines which can become airborne from floors or other paved areas. Do not dry sweep.
 - c. Use enclosed chutes or containers to conveying debris from above the ground floor level.
7. 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.
- D. Existing Elevator Use: Use of Owner's existing elevators will be permitted, provided elevators are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore elevators to condition existing before initial use, including replacing worn cables, guide shoes, and similar items of limited life.
 1. Do not load elevators beyond their rated weight capacity.
 2. Provide protective coverings, barriers, devices, signs, or other procedures to protect elevator car and entrance doors and frame. If, despite such protection, elevators become damaged, engage elevator Installer to restore damaged work so no evidence remains of correction work. Return items that cannot be refinished in field to the shop, make required repairs and refinish entire unit, or provide new units as required.
- E. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.
 1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become

damaged, restore damaged areas so no evidence remains of correction work.

3.04 ENVIRONMENTAL CONTROLS

- A. General: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
- B. Dust Control:
 - 1. Prevent dust from becoming airborne at all times including non working hours, weekends and holidays in conformance with the State Department of Health, Administrative Rules, Title 11, Chapter 60.1 Air Pollution Control.
 - 2. Contractor is responsible for and shall determine the method of dust control. Subject to the Contractor's choice, the use of water or environmentally friendly chemicals may be used over surfaces that create airborne dust.
 - 3. Contractor is responsible for all damage claims due to their negligence to control dust.
- C. Noise Control
 - 1. Keep noise within acceptable levels at all times in conformance with the State Department of Health, Administrative Rules, Title 11, Chapter 46 Community Noise Control. Obtain and pay for the Community Noise Permit when construction equipment or other devices emit noise at levels exceeding the allowable limits.
 - 2. Ensure mufflers and other devices are provided on equipment, internal combustion engines and compressors to reduce loud disruptive noise levels and maintain equipment to reduce noise to acceptable levels.
 - 3. Unless specified elsewhere, do not start construction equipment that meet allowable noise limits prior to 6:45 A.M. or equipment exceeding allowable noise levels prior to 7:00 A.M.
- D. Odor Control
 - 1. Implement odor control and elimination measures prior to and during the application of the roofing, waterproofing and painting materials. Control/elimination measures shall be field tested at off-hours and consists of the following measures:
 - a. Sealing of air intakes with activated carbon filters. Install filters in accordance with requirements and recommendations of the filter manufacturer. Seal filters at joints and against building exterior walls to prevent leakage of unfiltered air where required due to size of intake opening. Provide track system to secure filters.
 - b. Protection of Contractor personnel and occupants of the structure and surrounding buildings as necessary to comply with requirements of OSHA, NIOSH and/or governing local authority.

February 27, 2026

2. When disposing of all refuse or unused materials, observe all EPA, OSHA or local disposal requirements.

3.05 BARRICADES AND ENCLOSURES

- A. Barricades: Provide complete construction fencing with dust screening around the building site. Contractor will be responsible in maintaining the fence and gates and will be required to remove the fencing around the site prior to turnover.
 1. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Provide Owner's Representative with 2 sets of keys.
 2. Maintain temporary construction barricade(s) throughout the duration of the Work, assume frequent repairs due to strong wind exposure. During the course of the project, the Owner's Representative may require additional barricades be provided for the safety of the public. Contractor shall erect the additional barricade(s) at its own expense.
- B. Temporary Enclosures:
 1. Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
 2. Where cooling is needed and permanent enclosure is not complete, provide insulated temporary enclosures. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
- C. Opening Protection
 1. Vertical Openings: Close openings with plywood or similar materials.
 2. Horizontal Openings: Close openings in floor or roof decks and horizontal surfaces with load bearing, wood framed construction.

3.06 TEMPORARY FIRE PROTECTION

- A. Store combustible materials in containers in fire safe locations.
- B. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways, and other access routes for firefighting. Prohibit smoking in hazardous fire exposure areas.
- C. Supervise welding operations, combustion type temporary heating units, and similar sources of fire ignition.
- D. Develop and supervise an overall fire prevention and first aid fire protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

3.07 OPERATION, TERMINATION, AND REMOVAL

- A. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage caused by heat and similar elements.
- B. Termination and Removal: Remove each temporary facility when need for its service has ended, or when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are the property of Contractor. The Department reserves the right to take possession of Project identification signs.

3.08 ATTACHMENTS

- A. Department of Health – Illegal Dumping Notice

END OF SECTION

**DEPARTMENT OF HEALTH
ILLEGAL DUMPING NOTICE**

The law requires you to dispose solid waste only at recycling or disposal facilities permitted by the Department of Health.

“Solid waste” includes municipal refuse, construction and demolition waste, household waste, tires, car batteries, derelict vehicles, green wastes, furniture, and appliances.

**Illegal dumping of solid waste
or allowing illegal disposal of solid waste on your property even if contractual or other
arrangements are made could subject you to fines from \$10,000 to \$25,000 per occurrence
and could lead to felony prosecution
in accordance with Chapter 342H, HRS.**

**Contact the Department of Health,
Solid Waste Section at 586-4226
to report illegal dumping activities
or if you have further questions.**

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01524 – CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Salvaging nonhazardous construction waste.
 - 2. Recycling nonhazardous construction waste.
 - 3. Disposing of nonhazardous construction waste.

1.02 DEFINITIONS

- A. Alternative Daily Cover (ADC): Material other than earthen material placed on the surface of the active face of a municipal solid waste landfill at the end of each operating day to control vectors, fires, odors, blowing litter, and scavenging. Generally, these materials must be processed so they do not allow gaps in the exposed landfill face.
- B. Clean Waste: Nonhazardous materials left over from construction and demolition. Clean waste excludes lead and asbestos.
- C. Commingled Waste: Building waste streams that are combined on the project site and hauled away for sorting into recyclable streams. Also known as single-stream recycling.
- D. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- E. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- F. Extended Producer Responsibility: Closed-loop program, aka product take-back, are measures undertaken by a producer to accept its own and sometimes other manufacturers' products as post-consumer waste at the end of the product's useful life to recover and recycle the materials for use in new products of the same type.
- G. Land-Clearing Debris and Soil: Materials that are natural (e.g., rock, soil, stone, vegetation). Materials that are man-made (e.g., concrete, brick, cement) are considered construction waste even if they were on site.
- H. Material Reuse: Reuse includes salvaged, refurbished, or reused products.
- I. Material Stream: A material flow coming from a jobsite into markets for building materials including a specific material category that is diverted in a specific way or a mixture of several material categories that are diverted in a specific way.

February 27, 2026

- J. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- K. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- L. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.
- M. Waste Diversion: A management activity that disposes of waste through methods other than incineration or landfilling. Examples include reuse and recycling.

1.03 PERFORMANCE REQUIREMENTS

- A. General: Develop a Construction and Demolition Waste Management Plan (CWMP) for recycling and/or salvaging nonhazardous construction and demolition materials. Calculations can be by weight or volume but must be consistent throughout. Exclude excavated soil, land-clearing debris, and alternative daily cover (ADC). Include wood waste converted to fuel (biofuel) in the calculations; other types of waste-to-energy are not considered diversion for this credit.

The Construction and Demolition Waste Management Plan must result in end-of-Project diversion rates of at least 50% (minimum allowable) of total construction and demolition material generated by the Work with a minimum of three separate material streams. Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials. See Section 1.07, Construction and Demolition Waste Management Plan.

1.04 ACTION SUBMITTALS

- A. Construction and Demolition Waste Management Plan: Submit plan within 30 days of date established for the Notice to Proceed.

1.05 INFORMATIONAL SUBMITTALS

- A. Submit on a monthly basis the following to the LEED Project Administrator and Owner/Owner's Representative for review:
 - 1. Construction and Demolition Waste Progress Report including:
 - a. Material category.
 - b. General point of waste.
 - c. Total quantity of waste in tons/cubic yards.
 - d. Quantity of waste salvaged, both estimated and actual in tons/cubic yards.
 - e. Quantity of waste recycled, both estimated and actual in tons/cubic yards.
 - f. Total quantity of waste recovered (salvaged plus recycled) in tons/cubic yards.
 - g. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.
 - h. Location and name of haulers and facilities or landfills receiving waste.

February 27, 2026

- i. For commingled materials, provide the annual reporting rate for that facility.
 2. Construction and Demolition Waste Calculator (USGBC provided) tracking overall waste generated, diversion rate, and progress towards credit goal.
 3. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
 4. Commingled waste: Submit documentation of recycling rates for commingled facilities (if applicable).
 5. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether the organization is tax exempt (if applicable).
 6. Record of Extended Producer Responsibility Program: Indicate receipt and acceptance of materials from the manufacturer participating in the program (if applicable).
 7. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether the organization is tax exempt (if applicable).
 8. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices (if applicable).
- B. LEED Submittal to be submitted for LEED preliminary and final construction review:
1. Construction and Demolition Waste Management Plan
 2. Construction and Demolition Waste Calculator (USGBC provided): Complete the Construction and Demolition Waste Calculator, tabulating total waste material, quantities diverted and number of material streams diverted, and statement signed by the General Contractor that requirements for the credit have been met.
 3. Waste hauling tickets and recycling receipts showing the total waste material, quantities diverted, number of material streams diverted, and the hauler or facility.

1.06 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

February 27, 2026

- B. Waste Management Conference: Conduct conference at Project site to comply with requirements in Section 01310 – PROJECT MANAGEMENT AND COORDINATION. Review methods and procedures related to waste management including, but not limited to, the following:
1. Review and discuss Construction and Demolition Waste Management Plan
 2. Review requirements for documenting quantities of each type of waste and its disposal
 3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
 4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
 5. Review waste management requirements for each trade.
 6. Review LEED credit requirements in LEED v4 Reference Guide for Building Design and Construction, Healthcare, Prerequisite MRp2 and Credit MRc5: Construction and Demolition Waste Management

1.07 CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT PLAN

- A. General: Develop a Construction and Demolition Waste Management Plan according to **ASTM E 1609** and requirements in this Section. Plan shall include the following. Indicate quantities by weight or volume but use consistent units of measurement throughout plan.
1. Establish waste diversion goals for the project by identifying at least five materials (both structural and nonstructural) targeted for diversion. Approximate a percentage of the overall project waste that these materials represent.
 2. Specify whether materials will be separated or commingled and describe the diversion strategies planned for the project. Describe where the material will be taken and how the recycling facility will process the material.
 3. Strategy for the safe removal and disposal of hazardous materials must also be included. Hazardous materials must be tracked separately and not be included in the project's total waste.
 4. Alternative daily cover (ADC) does not qualify as material diverted from disposal. Land-clearing debris is not considered construction, demolition, or renovation waste that can contribute to waste diversion. These shall not be included in the diverted waste total.

February 27, 2026

5. Must account for all materials, including land-clearing debris, materials to be used for ADC, and other materials not contributing to diversion but not included in the diverted waste total.
6. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
7. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
8. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
9. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
10. Extended Producer Responsibility: Include list of manufacturers that may accept materials as part of a take-back program.
11. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
12. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 PLAN IMPLEMENTATION

- A. General: Implement approved Construction and Demolition Waste Management Plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement plan during the entire duration of the Contract.
 1. Comply with operation, termination, and removal requirements in Section 01500 "Temporary Facilities and Controls."
- B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan. Coordinator shall be present at Project site full time for duration of Project.
- C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.

February 27, 2026

1. Distribute Construction and Demolition Waste Management Plan to everyone concerned within three days of submittal return.
 2. Distribute Construction and Demolition Waste Management Plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
 2. Comply with Section 01500 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.02 RECYCLING CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall be shared equally by Owner and Contractor.
- C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.
- D. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.
1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
 - a. Inspect containers and bins for contamination and remove contaminated materials if found.
 2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
 4. Store components off the ground and protect from the weather.
 5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor.

3.03 RECYCLING CONSTRUCTION WASTE

- A. Packaging:
1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
 2. Polystyrene Packaging: Separate and bag materials.
 3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down

- pallets into component wood pieces and comply with requirements for recycling wood.
- 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B. Commingled Waste Recycling:
 - 1. If utilizing comingled waste strategy, the General Contractor shall select a facility that meets ONE of the following:
 - a. Facility has an average diversion rate and is regulated by the local or state authority and must exclude alternative daily cover (ADC). This system must be a closed system; shipping waste to another municipality to manage, thus burdening another system, does not count as diverting the waste.
 - b. The waste-sorting facility shall provide a waste diversion percentage specific to the project's waste based on measurement of each component waste material. Visual inspection is not an acceptable method of evaluation for documenting this percentage.
- C. Source Separated Waste Recycling:
 - 1. If utilizing a source separation waste strategy, the Construction Waste Management Plan shall include a list of anticipated types and quantities of waste materials generated from the Project site and proposed siting locations (including map) for waste/recycling containers. The plan shall identify materials to be recycled, re-used or salvaged. It shall include efforts at source reduction, material handling procedures and collection of weight and hauling destination information.
 - 2. Source Reduction: List processes that minimize waste such as working with suppliers to take back or buy back substandard, rejected or unused items and to deliver supplies using returnable pallets and containers. Also include procedures to minimize breakage, mishandling, contamination, and other factors that reduce job site waste.
 - 3. Material Handling Procedures: List means by which source separated waste materials will be protected from contamination, and the means for recycling them consistent with requirements for acceptance by designated facilities
 - 4. Implement recycling program that includes separate collection of waste materials of following types as applicable to Project:
 - a. Asphalt.
 - b. Land clearing debris.
 - c. Soil.
 - d. Trees and shrubs.
 - e. Concrete and concrete blocks.
 - f. Brick and masonry materials.
 - g. Wood.
 - h. Cardboard and paper packaging materials.
 - i. Plastics.
 - j. Ferrous metal.
 - k. Non-ferrous metals (e.g. copper, aluminum, etc.).
 - l. Glass.
 - m. Food and beverage containers.
 - n. Electrical fixtures and wires.
 - o. Other (where applicable)

February 27, 2026

- D. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.

3.04 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
 - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.
- C. Disposal: Remove waste materials from Owner's property and legally dispose of them.

END OF SECTION

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01570 – SOIL EROSION CONTROL

PART 1 -GENERAL

1.01 RELATED DOCUMENTS

A. Related Work Described Elsewhere:

1. Section 02100 - SITE PREPARATION
2. Section 02300 - EARTHWORK
3. Erosion Control Plan
4. NPDES Notice of General Permit Coverage (NGPC) for the Project

1.02 DESCRIPTION

- A. Work under this section consists of furnishing all labor, materials and equipment required to complete the approved Erosion Control Plan per Federal, State and County Code requirements and as shown in the Drawings, the temporary control measures as required by these Specifications, or as ordered by the Owner's Representative during the life of the Contract to control dust and water pollution. Control of dust and water pollution shall be through the use of silt fences, filter socks, stabilized construction entrance/exit, dust fences, watering, snake bags and/or other erosion control devices or methods.
- B. Temporary erosion and siltation control measures as described herein shall be applied to any erodible material within this project, including local material sources, stockpiles and work areas.
- C. The Contractor shall be responsible for removing all silt and debris resulting from his work and deposited in drainage facilities, roadways, neighboring lands, and other areas.
- D. All costs incurred in complying with the provisions of this Section shall be borne by the Contractor.

1.03 SUBMITTALS

- A. Best Management Practice (BMP) Plan: The Contractor shall provide a letter indicating conformance to the Erosion Control Plan as shown in the Drawings or provide a written, site-specific BMP plan describing activities to minimize water pollution and soil erosion into County and State waters and/or drainage systems. The BMP plan shall conform to the requirements of the "Interim Construction Best Management Practices (BMP's) for Sediment and Erosions Control for the County of Kauai", and the "National Pollutant Discharge Elimination System Permit" as part of HAR Chapter 11-55, and inclusive of all references.

PART 2 -PRODUCTS

2.01 MATERIALS

- A. Following are standard traditionally provided approaches, contractor to provide at a minimum these along with additional facilities to comply with standards and codes. Runoff to adjacent properties shall be strictly prohibited and controlled.
1. Silt fences shall be constructed with an ultraviolet (UV) resistant geotechnical filter fabric, stapled or secured to wood or metal posts embedded into the ground.
 2. Snake bags shall be constructed with a UV resistant geotechnical filter fabric filled with gravel.
 3. Filter socks shall be constructed with a UV resistant geotechnical filter fabric, filled with an Environmental Protection Agency (EPA) or State Department of Health (DOH) acceptable compost material.
 4. Dust fence shall be 12-feet high with galvanized pipe posts and tension wires. The dust fence cloth shall be a UV resistant fabric, hunter green in color.
 5. Stabilized construction entrance/exit shall be constructed with 1-inch to 3-inch course aggregate, 12-inches minimum thickness over a geotechnical filter fabric.
 6. Mulches may be bagasse, hay, straw, fiber mats, netting, wood cellulose, bark, wood chips, or other suitable material acceptable to the Owner's Representative and shall be reasonably clean and free of noxious weed and deleterious materials.

Mulch shall be specially processed fiber containing no growth or germination inhibiting factors. It shall be such that after addition and agitation in the hydraulic equipment with seed, fertilizer, water and other additives not detrimental to plant growth, the fibers will form a homogeneous slurry. When hydraulically sprayed on the soil, the fibers shall form a blotter-like ground cover which readily absorbs water and allows infiltration to the underlying soil. In every application, complete coverage of the soil shall be attained. Mulch shall be applied at the minimum rate of 1,500 pounds per acre.
- B. Slope drains may be constructed of pipe, fiber mats, rubble, Portland cement concrete, bituminous concrete, plastic sheets, or other material acceptable to the Owner's Representative.
- C. Grass shall be a quick growing species (such as rye grass, Italian rye grass, or cereal grasses) suitable to the area and which provide a temporary cover that does not later compete with the permanent cover.
1. The grass shall be obtained by digging up luxuriant growths from areas that are free of seeds, roots, plants, and grasses that are foreign to the specified

grass. The grass will not be acceptable unless it is planted and watered within 24 hours after being dug out from its original growing position.

2. Seed for hydro-mulching, unless otherwise specified, shall be Bermuda (Cynodon Dactylon) except giant varieties, certified, meeting the following requirements:

Pure Seed	95% minimum
Crop Seed	1% maximum
Weed	0.5% maximum
Inert Material	5% maximum
Germination	85% minimum

The seeds shall be applied at the rate of 100 pounds per acre (minimum) and within twelve (12) months of the date of the certified germination test.

D. Fertilizer

1. Fertilizer and soil conditioners shall be a standard commercial grade acceptable to the Owner's Representative.
2. The Contractor shall be responsible to determine the proper fertilizer required in the hydro-mulch mix for the existing soil condition. He shall be responsible to decide the quantity and the analysis and ratio to insure sufficient nutrients for the sustained growth of the grass.

PART 3 -EXECUTION

- 3.01 The Contractor shall install all erosion control measures shown in the Drawings, including stabilized construction entrance/exit , silt fences and dust fences, before any clearing, grubbing or earth moving work is initiated. The erosion control measures may be modified as necessary to adjust to field conditions that develop as the construction work progresses.
- 3.02 Except for specified erosion control measures shown in the Drawings, the Contractor shall determine additional erosion control measures to use as the construction work progresses. Such measures may involve scheduling of the construction activities to minimize the erosion potential, the construction of temporary berms, dikes, dams, sediment basins, and slope drains, and the use of temporary mulches, mats, and grassing, or the construction and use of other control devices or methods as necessary to control erosion.
- 3.03 All erosion control measures shall be checked, maintained, cleaned and repaired throughout the duration of the construction period. As a minimum, erosion control measures should be checked weekly in dry periods and within twenty-four hours after any rainfall of 0.5 inches or greater within a 24-hour period. During prolonged rainfall, the erosion control measures should be checked daily. If heavy rains are projected, all erosion control measures should be inspected immediately and reinforced as necessary.

- 3.04 The maximum surface area of earth material exposed by clearing, grubbing, borrow and fill operations at any time is 1.5 acres. The Owner's Representative has the authority to limit the surface area exposed by clearing and grubbing and to limit the surface area exposed by excavation, borrow and fill operations. The Owner's Representative may also direct the Contractor to provide immediate, permanent, or temporary pollution control measures to prevent contamination of drainage channels and pipes, roads, neighboring lands, and other areas.
- 3.05 The Contractor shall limit the surface area exposed by grubbing, stripping of topsoil, and grading to that which is necessary for to perform the next operation and which is within his capability and progress in keeping the finish grading, mulching, grassing, and other such pollution control measures current.
- 3.06 The Contractor shall conduct his operations so that excavation, embankment and imported materials shall be dampened with water on a continual basis to prevent dust problems. The Contractor shall limit the amount of water sprayed for dust control to ensure that the water evaporates or infiltrates with no runoff.
- 3.07 The Contractor shall, at the end of each work operation in any one day, shape the earthwork in such a manner as to control and direct the runoff of rainwater to minimize the erosion of soils. He shall construct earth berms along the top edges of embankments or along any critical area within the project, such as along the property line with adjacent properties, streams, and water channels, to intercept any runoff. Temporary slope drains shall be provided to carry runoff from the top of cuts and fills. Temporary facilities for controlled discharges shall be provided for runoff impounded, directed, or controlled by project activities or by any erosion control measure employed.
- 3.08 Cut and fill slopes shall be shaped, topsoiled and planted, if necessary or shown on the Drawings, as the work progresses. Whenever major earthwork is suspended or halted and the slope is bared, the exposed surfaces shall be hydro-mulch seeded or protected as directed by the Owner's Representative at the Contractor's expense.
- 3.09 Construction of berms, cofferdams, or other such construction in or near the vicinity of waterways, or other bodies of water shall be of approved materials.
- 3.10 Damages caused by the erosion of soils and the pollution of downstream areas shall be the responsibility of the Contractor and all costs for repairing, correcting, replacing, and cleaning such damaged or polluted facilities shall be borne by the Contractor.
- 3.11 Grassing for erosion control of erodible areas can be undertaken by sprigging, matting or hydro-mulch seeding.

A. Sprigging or Matting

- 1. Ground Preparation: Prior to planting, the areas to be grassed shall be cleared of all unwanted plants (including their root systems), stones over three (3) inches in diameter, papers, trash and debris.

If the existing soil in the areas to be grassed is suitable for use as topsoil, the soil shall be scarified to a depth of six (6) inches from the finished surface, and worked until it is of a uniform and loose texture.

February 27, 2026

Areas unsuitable for planting shall be finished with a 4-inch layer of topsoil, spread and graded to conform to the finish grade shown on the Drawings.

2. Planting: Planting shall be by sprigging, matting, or other methods at the option of the Contractor. If planting is by sprigging or matting, the surface shall be rolled with a suitable lawn roller after planting has been completed.
3. Water shall be applied within the same day of planting in such quantities as to moisten the soil to the depth of the planted grass. Additional application shall be made so that the planted areas are continually kept damp to the grass depth and until the commencement of plant establishment work.
4. Fertilizer shall be applied at not less than the rate of 300 pounds per acre, 23 to 30 days after the grass has been planted.

B. Hydro-Mulch Seeding

1. The Contractor shall begin hydro-mulch seeding operations after the areas prepared or designated for seeding have been approved by the Owner's Representative. Approval shall include inspection of slopes to insure provision has been made for the collection and disposal of surface water to protect planted areas from erosion. Approval shall not relieve the Contractor of his responsibility to restore any damage to the slope or planted areas not yet accepted by the State.
2. The hydro-mulch equipment shall be capable of mixing all the necessary ingredients to a uniform mixture and of applying the slurry to provide uniform coverage. Seed, fertilizer, and mulch mix shall be applied in one operation by approved hydraulic equipment.
3. Areas inaccessible to hydro-mulching application shall be seeded, fertilized and mulched by hand methods.
4. Water shall be applied immediately following mulching in such quantities as to moisten the soil and mulch. Watering shall be continued in such manner, quantity, and frequency to insure proper germination and growth and shall be done in a way that will prevent erosion and will not cause damage to the planted areas.

END OF SECTION

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01580 – INDOOR AIR QUALITY MANAGEMENT REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements governing protection of indoor air quality (IAQ), absorbent materials, and mechanical system from contamination during demolition and construction, and building flush out or baseline indoor air quality testing prior to Owner occupancy.

1.02 REFERENCES

- A. ASHRAE Standard 52.2-2007-Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size
- B. CEN Standard EN 779-2002- Particulate Air Filters for General Ventilation, Determination of the Filtration Performance
- C. SMACNA- IAQ Guidelines for Occupied Buildings under Construction; 2nd Edition, 2007, ANSI/SMACNA 008-2008 (Chapter 3)
- D. U.S. EPA Compendium of Methods for the Determination of Air Pollutants in Indoor Air
- E. U.S. EPA Compendium of Methods for the Determination of Inorganic Compounds in Ambient Air
- F. ASTM D5197-09e1 Standard Test Method for Determination of Formaldehyde and Other Carbonyl Compounds in Air (Active Sampler Methodology)
- G. ASTM D5149-02(2008) Standard Test Method for Ozone in the Atmosphere: Continuous Measurement by Ethylene Chemiluminescence
- H. ISO 16000-3, Indoor air-Part 3: Determination of formaldehyde and other carbonyl compounds in indoor air and test chamber air—Active sampling method
- I. ISO 16000-6, Indoor air-Part 6: Determination of volatile organic compounds in indoor and test chamber air by active sampling on Tenax TA sorbent, thermal desorption and gas chromatography using MS or MS-FID
- J. ISO 4224 Ambient air—Determination of carbon monoxide—Nondispersive infrared spectrometric method
- K. ISO 7708 Air quality—Particle size fraction definitions for health-related sampling
- L. ISO 13964 Air quality—Determination of ozone in ambient air—Ultraviolet photometric method
- M. California Department of Public Health, Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources using Environmental Chambers, v1.1-2010

1.03 DEFINITIONS

- A. Absorptive Materials: Gypsum board, acoustical ceiling tile and panels, carpet and carpet tile, fabrics, fibrous insulation, and other similar products.
- B. Contaminants: Gases, vapors, regulated pollutants, airborne mold and mildew, and the like, as specified.
- C. Particulates: Dust, dirt, and other airborne solid matter.
- D. Volatile Organic Compound (VOC): Chemicals that are released into the air from numerous materials- some of them natural, humanmade, plant-based, and from animals, including people. Some VOCs are present in the natural environment; however, higher concentrations of VOCs are typically found indoors, where reduced air ventilation and numerous sources of VOCs may exist.
- E. Wet Work: Concrete, plaster, coatings, and other products that emit water vapor or volatile organic compounds during installation, drying, or curing.

1.04 SUBMITTALS

- A. Refer to Section 01361 – SUSTAINABLE DESIGN REQUIREMENTS
- B. Construction Indoor Air Quality Management Plan
 - 1. Credit EQc3, Construction Indoor Air Quality (IAQ) Management Plan: Develop and implement an IAQ management plan for the construction and preoccupancy phases of the building. The plan shall describe in detail measures specific to this project to be taken during construction to promote adequate indoor air quality upon completion. The plan must include/address the following:
 - a. During construction, meet or exceed all applicable recommended control measures of the SMACNA IAQ Guidelines for Occupied Buildings under Construction, 2nd edition, 2007, ANSI/SMACNA 008-2008, Chapter 3.
 - b. Absorptive Materials Protection: Specify procedures for protecting stored and installed absorptive materials from moisture damage.
 - c. HVAC Protection: Describe steps to protect ductwork and HVAC equipment from dust and water damage.
 - d. Filtration: Indicate whether air handlers will be operated during construction, and specify compliant filtration procedures for permanent equipment that will be used.
 - e. Source Control: Describe steps to keep sources of contaminants out of the building and have a plan to eliminate any that are introduced.
 - f. Pathway Interruption: Prevent circulation of contaminated air when cutting concrete or wood, sanding drywall, installing VOC-emitting materials, or performing other activities that affect IAQ in other work spaces.
 - g. Housekeeping: Describe plan for maintaining a clean job site, including dust control procedures.
 - h. Scheduling: Describe sequencing of construction activities to reduce air quality problems in new construction projects. For major renovations, coordinate construction activities to minimize or eliminate disruption of operations in occupied areas.

- i. Nonsmoking policy: Highlight the nonsmoking policy, prohibiting the use of tobacco products inside the building and within 25 feet, or more if required by local jurisdiction, of building entrances at all times during construction.
 2. Quality Assurance and IAQ Monitoring: Describe steps to ensure compliance by Contractor and subcontractors.
 3. Photograph Documentation – Photographs of indoor air and environmental quality measured, methods employed to protect absorptive materials from moisture damage during construction and pre-occupancy, and materials stored or installed on-site. Annotate to indicate the IAQ measure depicted and the general location of each photograph.
 4. Record of filtration media (MERV 8 or higher) and dates filters were replaced.
- C. Credit EQ 4 Indoor Air Quality (IAQ) Assessment Plan: Select one of the following two options, to be implemented after construction ends and the building has been completely cleaned. All interior finishes, such as millwork, doors, paint, carpet, acoustic tiles and movable furnishings (e.g., workstations, partitions), must be installed, and major VOC punch list items must be finished. The options cannot be combined.
1. Option 1, Path 1- Flush-out Before Occupancy or Option 1, Path 2- Flush-Out During Occupancy:
 - a. Flush-out report including the following information:
 - 1) Duration calculations. Include the capacity of all HVAC units used and indicate which are permanent and which are temporary; capacity should take into account the volume of outdoor air and temperature and humidity allowances.
 - 2) Description of flush-out procedure. Include a log of dates, hours, outdoor air delivery rates, and recorded internal temperature and relative humidity.
 - 3) If the amount of outdoor air is more than has been designed in EQ Prerequisite Minimum Indoor Air Quality Performance or more than shown on the mechanical schedules, include a narrative explaining how the additional air was provided to the building.
 - b. Option 2- Air Testing: IAQ testing report including a narrative describing the project's pre-occupancy air testing process, including:
 - 1) Test date(s), testing protocols/methods, scope, and results of each test.
 - 2) Sampling locations with respect to floor area, size, and ventilation system.
 - 3) Any corrective measures implemented or project-specific special considerations, as applicable.
- D. LEED credit form for EQc3 and Credit EQc4.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Credit Low-Emitting Materials: See Section 01361 – SUSTAINABLE DESIGN REQUIREMENTS for specific requirements – emissions testing requirements and VOC limits.
- B. Air Filters: Minimum efficiency reporting value (MERV) 8 as determined by ASHRAE 52.2-2007 with errata (or equivalent filtration media class of F5 or higher, as defined by CEN Standard EN 779-2002, Particulate Air Filters for General Ventilation, Determination of the Filtration Performance) installed at each return air grille and return or transfer duct inlet opening such that there is no bypass around the filtration media. Immediately before occupancy, replace all filtration media with the final design filtration media, installed in accordance with the manufacturer's recommendations.

PART 3 - EXECUTION

3.01 CREDIT EQc3 – CONSTRUCTION INDOOR AIR QUALITY MANAGEMENT PLAN

- A. Refer to Section 01361 – SUSTAINABLE DESIGN REQUIREMENTS
- B. Develop and implement Construction IAQ Management Plan
 - 1. Ensure that the IAQ management plan is in place before starting above-ground construction, storing materials on site, or roughing in mechanical systems.
 - 2. Take photographs of each IAQ measure for documentation.
 - 3. Identify the key players and someone responsible for implementing the plan. Ensure key players and responsible party understand the requirements of the plan.
 - 4. Include the plan requirements in contract agreements with subcontractors.
 - 5. As subcontractors are selected and deployed on site, familiarize them with the plan and how it will affect their daily activities. Hold a subcontractor's orientation meeting to review the plan requirements.
 - 6. Include construction IAQ progress check-ins as a regular item in weekly subcontractor meetings and safety meetings.
 - 7. Provide a copy of the plan on site, preferably posted in an accessible area.
 - 8. Verify that the plan is being followed by creating a checklist of major items for reference.
 - 9. Determine whether air handlers need to be used during construction. If so, consider substituting stand-alone temporary air handlers or heaters in

order to meet the HVAC protection requirement. If permanent air handlers are used during construction, record the filtration media used to meet the documentation requirements.

10. Annotate photographs to indicate each IAQ measure depicted and its general location.
 11. Provide photographs of the methods employed to protect stored and installed absorptive materials from moisture damage during construction and preoccupancy.
- B. Refer to SMACNA IAQ Guidelines for Occupied Buildings under Construction, 2nd edition, 2007, ANSI/SMACNA 008-2008, Chapter 3 for avoiding unnecessary contamination due to construction procedures.
1. HVAC Protection: Keep contaminants out of the HVAC system. Do not run permanently installed equipment if possible, or maintain proper filtration if it is used.
 - a. Protect air handling and distribution equipment, and air supply and return ducting during demolition.
 - b. Adequately cover and protect exposed air inlets and outlets, openings, grilles, ducts, plenums, as required to prevent water, moisture, and other contaminant intrusion.
 - c. Apply protection immediately after installation of equipment and ducting.
 - d. Seal all ductwork, registers, diffusers, and returns with plastic when stored on site or not in service. Seal unfinished runs of ductwork at the end of each day.
 - e. If conditioning is required during construction, use supplementary HVAC units instead of permanently installed equipment if possible.
 - f. If permanently installed HVAC system must be used during construction, install filtration to protect the return (negative pressure) side of the system. Replace these filters regularly during construction.
 - g. Ensure that air filters are correctly installed prior to starting use.
 - h. Begin construction ventilation when building is substantially enclosed.
 - i. Operate HVAC system with 100 percent outside air and with 1.5 air changes per hour, minimum.
 - j. Do not use return air ductwork for ventilation unless absolutely necessary.
 - k. Prior to using return air ductwork without intake filters clean up and remove dust and debris generated by construction activities.
 - l. Inspect duct intakes, return air grilles, and terminal units for dust.

- m. Where return air ducts shall be used for ventilation, install MERV 13 (at minimum) filters at return inlets, sealed to ducts; replace filters when they lose efficiency.
 - n. Replace all filtration media before occupancy.
 - o. Do not store materials in mechanical rooms, to reduce potential debris and contamination to mechanical systems.
 - p. Clean plenum spaces, including top sides of lay-in ceilings, outsides of ducts, tops of pipes and conduit.
 - q. Clean tops of doors and frames.
 - r. Clean mechanical and electrical rooms, including tops of pipes, ducts, and conduit, equipment, and supports.
 - s. Clean return air plenums of air handling units.
 - t. Remove air intake filters only after cleaning is complete.
 - u. Do not perform dust or dirt- producing work after starting use of return air ducts without intake filters on return air ducts.
2. Pathway Interruption: Prevent circulation of contaminated air when cutting concrete or wood, sanding drywall, installing VOC-emitting materials, or performing other activities that affect IAQ in other work spaces.
- a. Isolate areas of work to prevent contamination of other spaces, whether they are finished or not. Seal doorways, windows, or tent off areas as needed using temporary barriers, such as plastic separations. Provide walk-off mats at entryways to reduce introduced dirt and pollutants.
 - b. Depressurize the work area to allow a differential between construction areas and clean areas. Exhaust to the outdoors using 100% outdoor air, if possible.
 - c. Use dust guards and collectors on saws and other tools.
3. Source Control: Keep sources of contaminants out of the building and have a plan to eliminate any that are introduced.
- a. Use low-toxicity and low-VOC materials to the greatest extent possible.
 - b. Develop protocols for the use of any high-toxicity materials. Isolate areas where high-toxicity materials are being installed and use temporary ventilation for that area.
 - c. Prevent exhaust fumes (from idling vehicles, equipment, and fossil-fueled tools) from entering the building.
 - d. Enforce the no-smoking job site policy.

February 27, 2026

- e. Protect stored materials from moisture because absorbent materials exposed to moisture during construction can mold and degenerate long after installation. Store materials in dry conditions indoors, under cover, and off the ground or floor.
 - f. If materials are improperly exposed to moisture, replace the material and consider testing air quality before occupancy to make sure not mold contamination has occurred.
- 4. Housekeeping: Maintain a clean job site resulting in fewer IAQ contaminants to manage.
 - a. Maintain good job site housekeeping on a daily basis. Use vacuum cleaners with high-efficiency particulate filters and use sweeping compounds or wetting agents for dust control when sweeping.
 - b. Keep materials organized to improve job site safety as well as indoor air quality.
- 5. Scheduling:
 - a. Protect absorptive materials by:
 - i. Sequencing the delivery of such materials so that they are not present in the building until wet work is completed and dry.
 - ii. Delivery and storage of such materials in fully sealed moisture impermeable packaging.
 - iii. Provide sufficient ventilation for drying within reasonable time frame.
 - iv. Install absorptive-finish materials after wet-applied materials have fully cured whenever possible.
 - b. Sequence construction activities to reduce air quality problems in new construction projects. For major renovations, coordinate construction activities to minimize or eliminate disruption of operations in occupied areas.
 - c. Keep trades that affect IAQ physically isolated on site and separated from each other by the construction schedule. For example, schedule drywall finishing and carpet installation for different days or different sections of the building. Consider after-hours or weekend work if practical.
 - d. If applicable, plan adequate time to conduct a flush-out and/or perform IAQ testing before occupancy, in compliance with EQ Cr4, Indoor Air Quality Assessment.
 - e. Remove all temporary filtration media and replace them with new filters before occupancy.
 - f. Comply with the scheduling requirements of Article, "Sequence of Finish Installation" of this Section.

3.02 CREDIT EQc4 – INDOOR AIR QUALITY ASSESSMENT

- A. Refer to Section 01361 – SUSTAINABILITY DESIGN REQUIREMENTS
- B. Prior to flush-out or air testing, the building shall have interior finishes installed including, but not limited to, millwork, doors, paint, carpet, acoustic tiles and movable furnishings (e.g. workstations, partitions), and major VOC punch-list items must be finished.
- C. Complete testing and balancing of the HVAC system.
- D. Option 1, Path 1: Flush-out, Before Occupancy

After construction ends, prior to occupancy and with interior finishes and furniture installed, install new filtration and perform a building flush-out by supplying a total air volume of 14000 cu. ft. of outdoor air per sq. ft. of gross floor area while maintaining an internal temperature of at least 60 degrees F (15 degrees C) and no higher than 80 degrees F (27 degrees C) and a relative humidity no higher than 60 percent. Determine the rate of outdoor air the HVAC system can provide and calculate the duration of the flush-out with the required volume calculated.

- a. Follow the manufacturer operating procedures for each HVAC system and piece of equipment and the operating duration required for flush out.
- b. If the permanent HVAC system will be used to perform the flush-out procedure, first replace used filters.
- c. Prepare flush-out report.

E. Option 1, Path 2: During Occupancy

- 1. If occupancy is desired prior to flush-out completion, the space may be occupied following delivery of a minimum of 3500 cu. ft. of outdoor air per sq. ft. of gross floor area while maintaining an internal temperature of at least 60 degrees F (15 degrees C) and no higher than 80 degrees F (27 degrees C) and relative humidity no higher than 60 percent.
 - a. Once a space is occupied, it shall be ventilated at a minimum rate of 0.30 cubic foot per minute (cfm) per sq. ft. (1.52 L/s per sq. m of outdoor air) or the design minimum outdoor air rate determined in EQ P1, Minimum Indoor Air Quality Performance, whichever is greater.
 - b. During each day of the flush-out period, ventilation shall begin a minimum of three hours prior to occupancy and continue during occupancy.
 - c. These conditions shall be maintained until a total of 14000 cu. ft./sq. ft. of outdoor air (4270 L/sq. m. of outdoor air) has been delivered to the space.
 - d. Follow the manufacturer operating procedures for each HVAC system and piece of equipment and the operating duration required for flush out.
 - e. If the permanent HVAC system will be used to perform the flush-out procedure, first replace used filters.
 - f. Prepare flush-out report.

F. Option 2: Air Testing

February 27, 2026

1. Conduct baseline indoor air quality testing, after construction ends and prior to occupancy, and under ventilation conditions typical for occupancy, using testing protocols consistent with the current versions of ASTM standard methods, EPA compendium methods, or ISO methods, as detailed in the USGBC's LEED "Reference Guide for Building Design and Construction," version 4 (v4).
2. Prior to testing, the building shall have interior finishes installed including, but not limited to, millwork, doors, paint, carpet, acoustic tiles and movable furnishings (e.g. workstations, partitions), and major VOC punch-list items must be finished.
3. Testing must be completed by an appropriately accredited professional using current versions of ASTM or ISO methods.
4. Number of testing locations depends on size of building and number of ventilation systems, but must include all occupied spaces. If sampling is used, all space types must be represented (e.g., office and classroom). Use the following methodology to determine how many air testing locations are required:
 - a. Test at least one location per ventilation system for each occupied space type. Minimum of one test per floor. The locations selected for testing must represent worst-case zones where the highest concentrations of contaminants of concern are likely to occur.
 - b. For offices, retail, schools, hospitality, and multifamily residential projects, test areas no larger than 5,000 sq. ft. (465 sq. m.). For warehouses or large open spaces in other building types (e.g., ballrooms in hospitality, gymnasiums in schools), a limit of 50000 sq. ft. (4654 sq. m.) may be used. If there is evidence that the air in the space is well mixed and sources of contaminants of concern are uniform, project teams may test a single location in that space.
 - c. Determine whether the project includes spaces (e.g., offices, school classrooms, or multifamily residential units) that are identical in their construction, finishes, configuration, square footage, and HVAC systems. Project teams may sample identical spaces by testing one in seven. If the sampled space fails the test, all seven must be tested.
5. Perform test: Ensure that the following procedures are followed at all testing locations. If a test fails, take corrective action (e.g., clean and flush out the space) and retest. The duration of any flush-out between tests is at the discretion of the project team.
 - a. The measurement equipment must be positioned in the breathing zone, between 3 and 6 ft. (900 and 1800 mm.) above the floor.

February 27, 2026

- b. The test must occur during normal occupied hours, with the HVAC system starting at the normal start time and delivering outdoor air at the minimum rate.
- c. The gravimetric method must be used for testing.
- d. Demonstrate that the contaminant maximum concentrations listed below are not exceeded:
 - 1) Formaldehyde: 27 ppb.
 - 2) Particulates (PM10 for all buildings; PM2.5 for buildings in EPA nonattainment areas, or local equivalent): PM10- 50 micrograms/cu. m.; PM2.5- 15 micrograms/cu. m.
 - 3) Ozone (for buildings in EPA nonattainment areas): 0.075 ppm.
 - 4) Total Volatile Organic Compounds (TVOCs): 500 micrograms/cu. m.
 - 5) Target Chemicals listed in CDPH Standard Method v1.1, Table 4-1, except formaldehyde: CHPH Standard Method v1.1-2010, Allowable Concentrations, Table 4-1.
 - 6) Carbon Monoxide (CO): 9 ppm and no greater than 2 ppm above outdoor levels.

* NOTE: The target volatile organic compounds are from CDPH Standard Method v1.1, Table 4-1. The Maximum concentration limits for these target compounds are the full CREL adopted by Cal/EPA OEHHA in effect on June 2014 (<http://oehha.ca.gov/air/allrels.html>)

3.03 SEQUENCE OF FINISH INSTALLATION

- A. Sequence of Finish Installation: Project schedule shall address construction scheduling/sequencing requirements and procedures necessary to optimize Indoor Air Quality (IAQ) levels for the completed Project.
 - 1. Scheduling Contractor's Project Schedule for finish applications should allow for: Dissipation of high emissions from finishes that off-gas perceptible quantities of deleterious material during curing Separation of off-gassing effects from the installation of adsorptive materials that would act as a "sink" for storage and subsequent release of these unwanted substances into building spaces and mechanical systems after project occupancy.
 - 2. When Contractor's "Project Schedule" requires less than optimal sequencing of finish installation, related to IAQ, provide supplemental filtered "fresh air" ventilation of work areas during construction and restrict / control the use of permanent building mechanical systems prior to Owner's acceptance of building to prevent contamination of systems by construction wastes and other deleterious substances.
- B. Finish Types:
 - 1. Type 1: Materials and finishes which have a potential for short-term levels of off-gassing from chemicals inherent in their manufacturing process, or

which are applied in a form requiring vehicles or carriers for spreading which release a high level of particulate matter in the process of installation and/or curing. Type 1 Finishes include, but are not limited to the following:

- a. Adhesives, sealants, and glazing compounds, specifically those with petrochemical vehicles or carriers.
 - b. Wood preservatives, finishes, and paint.
 - c. Control and/or expansion joint fillers.
 - d. All hard finishes requiring adhesive installation.
 - e. Gypsum board and associated finish processes.
 - f. Sealants and associated filler materials.
2. Type 2: Finishes: Materials and finishes which are woven, fibrous, or porous in nature and tend to adsorb chemicals off-gassed by Type 1 finishes or may be adversely affected by particulates. These materials become "sinks" for deleterious substances, which may be released much later, or collectors of contaminants that may promote subsequent bacterial growth. Type 2 Finishes include, but are not limited to the following:
- a. Carpet and padding.
 - b. Fabric wallcovering.
 - c. Insulation exposed to the airstream.
 - d. Acoustic ceiling materials.
 - e. Fabric covered acoustic wall panels.
 - f. Upholstered furnishings.
 - g. Materials that can be categorized as both Type 1 and Type 2 materials shall be considered to be Type 1 materials.
- C. Optimal Order of Installation: Apply Type 1 interior finishes throughout the entire controlled air zone of each enclosed building or building segment and allow such finishes to completely cure according to intervals and times stated in respective finish manufacturer's printed instructions before commencing installation of any Type 2 materials in the same area.
1. Do not store any Type 2 materials in areas where installation or curing of Type 1 materials is in progress.
- D. Materials Test Data – Required for Substitutes Only:
1. All manufacturers/producers of materials listed below that are proposed for substitution on this Project are required to illustrate test data for their materials which show permanent, in-place Indoor Air Quality performance in accordance with requirements of this Specification.

February 27, 2026

2. Material Safety Data Sheets: Review MSDS's of materials to be submitted for testing as well as MSDS's for other products where specifically requested in this Project Manual and identify those classified as "Prohibited Materials".
3. Prohibited Materials: Any building materials or products that emit pollutants included on the International Agency for Research on Cancer (IARC) "List of Chemical Carcinogens", the "Carcinogen List" of the National Toxicology Program, and the "Reproductive Toxin List" of the "Catalog of Teratogenic Agents" shall have approval in writing from the Owner's Representative before that building material or product may be used on this Project. Carcinogens: Use of materials emitting carcinogens will not be permitted unless a suitable substitute is not available. Do not proceed with procurement of any carcinogen emitting product or material without prior review and written approval of the Owner's Representative.

END OF SECTION

SECTION 01595 – PROJECT CLEANING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Cleaning during construction.
2. Final Project cleaning.

B. Related Sections:

1. Division 1 Sections, general.
2. Section 01500 - CONSTRUCTION FACILITIES & TEMPORARY CONTROLS.
3. Section 01700 - CONTRACT CLOSEOUT.
4. Divisions 2 through 16 Sections.

1.02 DEFINITION

A. Clean: Unless otherwise acceptable to the Architect, a surface shall be deemed clean when the following conditions have been met at time of inspection.

1. Dust and debris removed.
2. No evidence of damage, mars, stains, or contaminants on surface.
3. Finish is in accordance with Contract requirements.

1.03 SUBMITTALS

A. Quality Assurance Submittals: Refer to "Quality Assurance" paragraphs herein.

1.04 QUALITY ASSURANCE

A. Cleaning Program: Submit a cleaning program to be submitted to all Entities that are to deliver and install work on Project Site. Indicate general and Entity specific requirements. Program to include, but not be limited to, following.

1. Extent of cleanup.
2. Frequency of cleanup.
3. Responsibilities for removal of waste materials from Site.
4. Methods for use and removal of hazardous materials.
5. Precautions for use of materials and methods which can damage Project materials.
6. Location of trash dumpsters for general use.
7. Owner specific requirements.

B. Off Site Areas:

1. General: Generally keep off Site areas, e.g., Owner's off Site areas, and adjacent Public and private property, free from debris and other waste materials which are generated by Contractor's operations.
2. Owner's Property: Immediate perimeter areas to be cleaned daily. Areas along paths where vehicles have dropped or tracked in mud, dirt, and other materials to be cleaned on regular basis, including washing of streets and other public access ways.

C. Damages:

1. Project: Cleaning methods and materials which damage-installed products are to be rectified to satisfaction of Architect. When acceptable to Architect, minor damages may be restored where evidence of restoration is not evident and where restoration does not affect long term performance and aesthetics of product; otherwise replace damaged materials with Contract complying new materials.
2. Off Site: Replace or restore damaged materials to satisfaction of affected parties.

- D. Special Requirement - Glass: Glass scratched by sharp cleaning implements, e.g. razor blades, etc., is to be considered as damage to glass products. Generally, scratched glass products are to be replaced with new Contract complying materials. Buffing out of such scratches will generally not be allowed, except for only very minor areas and only when acceptable to Architect.

PART 2 - PRODUCTS

2.01 CLEANING MATERIALS

- A. General: Use only cleaning materials recommended by the Manufacturer of the product to be cleaned. Use cleaning materials only on surfaces recommended by Cleaning Material Manufacturer. Do not use any cleaning material, including acid products for cleaning purposes where surface finish, color, and texture can be altered.

PART 3 - EXECUTION

3.01 CLEANING REQUIREMENTS, GENERAL

- A. Project Conditions: Maintain Project in orderly and clean manner at all times. Protect Project from exposure to any hazardous and unsafe conditions. Comply with requirements of the authorities and insurance.
- B. Use of Cleaning Materials: Comply in strict accordance with Cleaning Material Manufacturers instructions. Provide adequate ventilation when necessary, including during use of volatile or noxious materials. Store unused materials in proper containers. Store toxic and volatile products in secure location and in manner to prevent any unsafe conditions.

February 27, 2026

- C. Methods of Cleaning: Utilize cleaning methods which are recognized by the industry as appropriate for surfaces to be cleaned. Utilize least destructive methods to accomplish appropriate cleaning. Where methods may be destructive to material, to its finish, color, or texture, secure approval from Architect. Where cleaning materials are used, comply in strict accordance with Cleaning Material Manufacturer's requirement.
- D. Personnel: Personnel to be skilled and experienced for each type of cleaning required.
- E. Trash, Refuse Disposal: Comply with requirements specified in Section 01500 - CONSTRUCTION FACILITIES & TEMPORARY CONTROLS.

3.02 DURING CONSTRUCTION

- A. General:
 - 1. Loose Waste: Execute cleaning in an orderly and systematic manner to ensure that building, grounds, and adjacent public properties are maintained free from accumulations of waste materials and rubbish generated by the ongoing construction process.
 - 2. Deleterious Products on Work: Maintain cleanliness of installed work, whenever required, to ensure that substrates are not permanently marred or stained and to prevent deleterious products from damaging or deteriorating the installed work.
- B. Regular Cleanup: At reasonable intervals or when necessary, institute cleaning process.
- C. Collection Containers: Provide collection containers as required for proper disposal of waste resulting from their ongoing work. Owner's trash dumpsters are not to be used.
- D. Dust Producing Materials:
 - 1. General: Prevent excessive dust pollution and contamination of adjacent finishes.
 - 2. Site Soil Borne Dust: wet down dry dust. Conduct operations to prevent hazards and damages by watering procedures. Where watering procedures are not appropriate, provide temporary enclosure of operation.
- E. Dropping/Throwing: Do not drop or throw materials any distance which would create a hazard or cause dust pollution. Provide appropriate chutes, including enclosures when required.

3.03 AT TIME OF SUBSTANTIAL COMPLETION INSPECTION

- A. Work to be Inspected: All Work to be inspected to have been fully cleaned by time of inspection. Cleaning to be scheduled so that surfaces can be inspected in clean condition.
- B. Restorations: Any Work to be inspected which had been damaged, marred, or contaminated, to have been fully restored to Contract requirements at time of inspection.

February 27, 2026

- C. Concealed Spaces: Remove dust and debris from concealed spaces which are accessible.
- D. Contractor's Equipment/Materials: Remove all evidence of Contractors equipment/materials and other Work, except that which is necessary for completion of unfinished Work, if any.

3.04 AT TIME OF FINAL INSPECTION

- A. General: Comply with same procedures stated for "Substantial Completion Inspection", except for Work certified by Architect and which remained unaffected by the Contractor's ongoing operations in other areas.

END OF SECTION

SECTION 01600 – MATERIAL AND EQUIPMENT

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. General requirements for products.
- B. Related Sections:
 - 1. Division 01 Sections, general.

1.02 DEFINITIONS

- A. Manufacturer: Where not otherwise indicated within a specifications section, reference to the “manufacturer” shall refer to the primary product manufacturer of that section.

1.03 SYSTEM DESCRIPTION

- A. Performance: Each product provided shall perform to the Contract requirements under the anticipated conditions of use and installation. Performance evaluation of any product to include the performance of the product by itself and its performance relative to the total assembly for which it is a part.

1.04 SUBMITTALS:

- A. General: Refer to Division 1 requirements and individual specification sections.
- B. List of Products:
 - 1. Format: Prepare a typewritten list of the principal products in a form acceptable to the Architect. For each product, provide and organize information in columns for each of the following headings.
 - a. Related unit-of-work specification section number.
 - b. Generic names as used in contract documents or where not indicated as commonly accepted.
 - c. Proprietary name and product designation number.
 - d. Manufacturer’s name, address, phone number, Project assigned representative.
 - e. Supplier’s name, address, phone number, company representative for Project.
 - f. Installer’s name, address, phone number, primary trade of workmen, and Project assigned representative.
 - g. Projected delivery date and time span of delivery period.

February 27, 2026

2. Initial Submittal: Submit within 30 calendar days from date of commencement of the Work. Submit a list of those products that must be established early in the Contract Period. The complete list may also be submitted at the Contractor's option.
3. Completed List: Submit within 60 calendar days from date of commencement of the Work.
4. Qualifications to List: For each list submitted, provide typewritten explanations of omissions of data and explanations of why any products deviate from Contract requirements.
5. Architect's Review/Action: Review list within 15 working days. For each item, indicate one of the following written responses.
 - a. "No Reasonable Objection": Indicates that products may be incorporated into the Work subject to compliance with Contract requirements.
 - b. "Objection": Indicates that products may not be incorporated into the Work. Architect to provide qualifying explanation for rejection.
 - c. "Deferred Action": Indicates that products require further data for proper evaluation by Architect. The Contractor shall secure data as required and submit this to the Architect. Architect to act on "deferred action" items in timely manner.
6. Coordination: Incorporate delivery date and time span of delivery data for products in progress schedules. Refer to Section 01040 - Coordination.

1.05 QUALITY ASSURANCE

- A. Product Appearance:
 1. Intent: Appearance of products for any work exposed to view in final finished work is critical to Design intent of Architect.
 2. Requirement: Secure written verification of finishes, e.g., colors, patterns, textures, matching, etc., before any purchase, fabrication, and installation of any such products.
- B. Manufacturer, Supplier, Fabricator, Installer Experience: Except as otherwise indicated or acceptable to the Architect, any entity furnishing, installing, or furnishing/installing products shall not have less than three (3) years minimum current experience with the required products and services being provided. Such services and products shall have also been provided for not less than three (3) current successful projects of similar scope.
- C. Product Source Control: Maintain the original products furnished for this Project throughout the Contract Period. Do not change to other generically similar products, unless otherwise acceptable to the Architect.
- D. Stored Products: Assume full responsibility for protection and safekeeping of products stored on and off premises during Contract Period. Maintain insurance as required for full replacement value of all products as stored and in locations stored.

February 27, 2026

- E. Deviations from Contract Requirements: Refer to Section 01010 - Summary of Work.
- F. Fire Rated Assemblies: Where fire-rated assemblies are indicated, provide composite assemblies that strictly conform to each Product Manufacturer's laboratory tested assemblies that conform to the Contract requirements, comply with the applicable codes, and are acceptable to the Authorities.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. Available Manufacturers: Comparable products of other Manufacturers may be incorporated into the Work when such products comply with the following.
 - 1. Are acceptable to the Architect.
 - 2. Contract requirements do not specifically indicate "no substitution", or "provide one of the following only", or other similar language to this effect.

2.02 PRODUCTS, GENERAL

- A. Compliance with Requirements: All products provided for this Project shall comply with Contract requirements.
- B. Assembly of Products: Each interfacing product in an assembly shall be verified for its Project appropriateness relative to its use and appropriateness to any interfacing product in the assembly. Do not provide products which do not comply with this requirement and are not acceptable to the Manufacturer's of the interfacing products.
- C. Dimensional Coordination: Where dimensional tolerances indicated on Contract Drawings differ from products to be provided, notify Architect of such differences.
- D. Environmental Requirements: Maintain types of environmental conditions required for each product as recommended by the Product Manufacturer for the specific Project conditions.

2.03 SPECIAL PRODUCT REQUIREMENT:

- A. Galvanizing of Ferrous Products:
 - 1. Intent: Unless specified elsewhere, provide hot dipped galvanized ferrous products wherever any one of the following conditions exist.
 - a. Where product is exposed on an "exterior surface".
 - b. Where product is exposed or in contact with moisture retaining or transmitting substrates, e.g., exterior facing (includes interior face of) concrete and masonry structures, slabs on grade, roof insulation, roof concrete deck fill, etc.
 - c. Where product is within and located anywhere within same enclosure or room where water is contained, where high humidity is present, or where enclosure will be subjected to water spray. These enclosures

include, but are not necessarily limited to, the restrooms. Include products within cavities above "lay-in acoustical suspended ceilings".

2. Galvanizing: Provide hot dipped galvanized coatings complying with ASTM A 123, ASTM A 153, or ASTM A 153 as applicable to the product, or as otherwise acceptable to the Architect.

PART 3 - EXECUTION

3.01 DELIVERY, STORAGE, & HANDLING

- A. General: Comply with each Product Manufacturer's Project specific requirements.
- B. Delivery: Deliver products in original containers with seals unbroken and labels intact. Inspect products for damage upon arrival at site. Reseal and mark to indicate inspected material. Replace damaged materials in timely manner as not to jeopardize the Project schedule.
- C. Storage and Handling: Store and handle materials to prevent damage and deterioration. Secure from unauthorized access.
- D. Loading of Structure: Do not load any structure in any manner that can endanger the structure.

3.02 EXAMINATION

- A. Verification of Conditions: Prior to installation, verify the actual existing Project conditions under which the Work will be installed. Inform the Architect in writing of any detrimental conditions. Do not begin the Work where the detrimental conditions have not been brought into satisfactory conformance. Start of the Work indicates that the existing conditions are acceptable to ensure a successful installation.

3.03 INSTALLATION

- A. Installation, General: Comply with the Manufacturer's Project specific requirements. Do not provide any installations that would produce a quality less than indicated by the Contract requirements without acceptance by the Architect.
- B. Completeness of Assemblies: Refer to Division I - Summary of Work.
- C. Structural Stability and Compatibility of Assemblies: Each Installer and the Contractor shall review their work for structural stability and compatibility relative to the work of other Installers. Notify Architect of any concerns in writing.
- D. Tolerances: Install Work plumb, level, and true to line; without warp or wrack. Installed Work to conform to Industry acceptable tolerances for quality of Work required, except as otherwise indicated.
- E. Color, Pattern, Texture Variation:
 1. General: For each product, where any one of the following characteristics of color, pattern, and texture can vary for similar natural products or similarly

February 27, 2026

finished products, install materials in each area to assure a uniform visual appearance acceptable to the Architect.

2. Examples: Such products include, but are not limited to, certain stone materials, tile, concrete, masonry, carpet, and wall covering.
 3. Methods to Ensure Uniformity: Methods of ensuring uniformity may include utilizing materials in sequence as manufactured from same lots where singular lot may be used for single contiguous area or may require the hand selection of materials between several lots.
 4. Directional Pattern: When not otherwise indicated, for materials with specific directional pattern/texture, orient such pattern/texture as directed by Architect.
- F. Protection: It is the intent of the Contract Documents that the Work be clean, without contamination, without abnormal deterioration, without damage, and properly functioning at the time of acceptance by the Owner. Generally, conduct operations in strict conformance with each Manufacturer's recommendations and instructions applicable to the Project specific conditions and as otherwise necessary to accomplish the proper protection of the Work from all harmful causes.
- G. Defective Work: Replace defective work. Restoration may be accomplished when satisfactory to the Architect. Such work shall be done at no cost to the Owner.

END OF SECTION

SECTION 01630 – PRODUCT OPTIONS AND SUBSTITUTIONS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Requirements for substitution proposals.
 - 2. Requirements for “value engineering” proposals.
- B. Related Sections:
 - 1. Division 1 Sections, general.
 - 2. Section 01600 – MATERIALS AND EQUIPMENT.

1.02 DEFINITIONS

- A. Substitution Proposal: A proposal offered by the Contractor of a product(s) to be used in lieu of the specified product(s); which is generically similar to the specified product(s). Value Engineering proposals shall not be considered as part of the substitution review process, it is a separate process lead by the Owner and where appropriate the Architect and its designers may be asked to provide an opinion.
- B. Products: Use of words such as “products”, “materials”, “assemblies” “systems”, are to be used interchangeably and unless the proposal is specifically for only a single most basic (cannot be broken down any further) material unit or material component, the proposal shall mean and be measured in terms of all the - materials required for each use in the Project as a final in place assembly or system.
- C. Material Composition: Where word “material composition” is used, this word is to mean the actual scientific makeup of the product with percentage of each material or chemicals going in to make up the final product being evaluated. Material Safety Data Sheets are to be provided when available. Words such as “100% acrylic” or “100% urethane” or other words to that effect are not acceptable when the product is not in fact only made up of that material alone.
- D. Limitations: Where word “limitations” is used in conjunction with products being evaluated in proposals by the Architect, this word is to mean “anything” which could reduce or be less than any quality or any characteristic of the product as required for use in the Project at “any time” during its life expectancy, including its “life expectancy”; when compared to the specified product, when compared with other competitive generic products of the same type, and when compared with other competitive products that basically are designed for the same functional purpose. Examples include, but are not limited to, following.
 - 1. Incompatibility with Other Materials: Where any contacting material is deleterious to the other, e.g. electrolysis, corrosion, contamination, chemical sensitivity, bacteria or plant growth (mildew or algae growth, etc.), or any other deleterious material effects.
 - 2. Life Expectancy: Shorter life expectancy than specified materials.

February 27, 2026

3. Weatherability: Not as weatherproof as specified product, e.g., water leakage, air leakage, ultra-violet exposure, breath ability, and hydrostatic pressure effects.
4. Structural: Strength of product compared with specified material, e.g. compressive, tensile, and durometer hardness characteristics.
5. Durability: Resilience of product compared with specified material. Its ability to withstand physical abuse and movement, e.g. impact resistance, abrasion resistance, puncture resistance, and elongation.
6. Fire Resistance: Ability to resist various fire exposures.
7. Product Characteristics: Susceptibility to defects occurring due to the characteristics unique to the product, e.g., sensitivities such as those due to material composition (shelf life, curing methods, etc.), configuration, weight, size, substrate conditions, weather conditions, assembly conditions, applications methods, etc.
8. Other Characteristics: e.g., slip resistance, acoustic properties, and resistance to catastrophic events, etc.

1.03 SUBMITTALS

- A. Substitution: Submit complete, readable, and organized information, with all proposal data applicable to Project highlight marked. Information to include, but not necessarily be limited to, following.

1. Product Data:

- a. Published Data: Submit Primary Product Manufacturer's complete available published product data including, but not limited to, primary product descriptions, related product descriptions, color/pattern/texture charts, specifications, drawings, laboratory tested data, fabrication/installation instructions, and list of comparable Projects in Hawaii and other similar salt air/humid environments, such as Florida or any of the Southern States bordering the Gulf of Mexico.
- b. Comparison products:
 - i. Requirement: Submit a detailed comparison of the significant generic qualities of the proposed substitution with those of the work originally specified.
 - ii. Characteristics: List significant qualities including, but not necessarily limited to, following.
 - a). Material composition.
 - b). Sizes.
 - c). Weight/density.
 - d). Color, textures, patterns available.
 - e). Qualities critical to performances, including tests performed.
 - f). Limitations of product.
 - g). How long used in Hawaii?

- h). How long available in U.S.?
 - i). Current market share in Hawaii based upon specific material?
 - j). Current market share in U.S based upon specific material?
 - k). Current market share in Hawaii based upon all competitive materials serving same function?
 - l). Current market share in U.S based upon all competitive materials serving same function?
- iii. Format: Submit in a typewritten table format in which characteristics are compared side by side.
- 2. Samples: Submit samples. Provide additional samples or small-scale mockups, if requested, by Architect. Samples to be submitted in accordance with Section 01330 – SUBMITTAL PROCEDURES requirements.
- 3. Project Modifications: Where standard published drawings are not adequate, submit other drawings or legible to scale sketches to show each of following where applicable to Project.
 - a. Where Project dimensions would be affected, indicate with some typical examples how product affects Project dimensions.
 - b. Show custom modifications of product which are required for Project.
 - c. Show additional work required of other Installers which is not otherwise shown.
 - d. If any, penetrations are required through work, show how penetrations through work is to be accomplished, including any multiple penetrations.
- 4. Changes to Other Work: Submit a list of written changes to the work of other Installers that would be necessary to accommodate the proposal.
- 5. Cost Proposal:
 - a. During Bidding Period: Do not provide.
 - b. Post Bidding Period: Submit. Indicate the overall net change, if any, in the Contract Sum. Separately list cost of proposed Work, cost of changes to other Work, Contractor's cost, cost for Architect's time (verified from Architect) and other miscellaneous costs.
- 6. Certifications: Sign certifications indicated on form.
- 7. Substitution Proposal Form: In addition to other required data and samples, submit completed proposal form as provided by the Architect.

1.04 QUALITY ASSURANCE

- A. Objective: It is up to those making the pro prove to the Architect that the proposed products will meet the Project requirements. To the extent that the Proposer wishes to pursue the Work, the Architect reserves the right to request any information and samples necessary for him to make a decision.
- B. Quality of the Proposals: It is intended that the physical appearance and dimensions of the Project and the quality of the specified products required by

February 27, 2026

the Contract Documents be maintained, unless otherwise specifically requested by and acceptable to Architect or Owner. Generally, submit proposals that would result in installations of equivalent quality to that specified.

- C. Conditions for Consideration of a Proposal: The Contractor's proposals will be received and considered when extensive revisions to the Contract Documents are not required, when the proposed changes are in keeping with the primary intent of the Contract Documents, when the requests are timely, fully documented and properly submitted, and when one or more of the following conditions are satisfied.

1. Where the proposal is directly related to an "or equal" or "comparable product" clause or similar language in the Contract Documents.
2. Where the specified product or method cannot be provided within the Contract Time. Do not submit proposals which have resulted from the Contractor's failure to pursue the work promptly or to coordinate the various activities properly.
3. Where the specified requirements cannot receive necessary approval by a governing Authority, and the requested proposal can be approved.
4. Where a substantial advantage is offered the Owner, in terms of cost, time, energy conservation, or other considerations of merit, after deducting offsetting responsibilities the Owner may be required to bear. These additional responsibilities may include such considerations as additional compensation to the Architect for redesign and evaluation services, the increased cost of other work by the Owner or separate contractors, and similar considerations.
5. When the specified products or methods cannot be provided in a manner which is compatible with other materials of the work, and where the Contractor certifies that the substitution will overcome the incompatibility.
6. When the specified products or methods cannot be properly coordinated with other materials in the work, and where the Contractor certifies that the proposed substitution can be properly coordinated.
7. When the specified products or methods cannot receive a warranty as required by the Contract Documents and where the Contractor certifies that the proposed substitution can be given the required warranty.

- D. Factors Affecting Acceptance of Proposals:

1. Review Intent: It is intended to give all responsible proposals a fair review, however, the Architect and Owner reserves the right to deny acceptance of any proposal for any reason. Irresponsible use of proposal process may result in termination of the review process in its entirety by Architect and Owner.
2. Basis of Design:
 - a. Requirement: Where favorable consideration is given any proposed product which is different (not comparable as determined by Architect) than the specified product (basis of design); Contractor is required to secure a bid from the same Manufacturer of product in which design is based for a product it feels is comparable to the new proposed product under consideration; unless such product does not exist.

HAWAII HEALTH SYSTEMS CORPORATION – KAUAI DIVISION

Samuel Mahelona Memorial Hospital
Behavioral Health New Patient Facility
Project No. 221093-01

Product Options and Substitutions
01630-4

February 27, 2026

- b. Submittal: Submit written confirmation from Manufacturer of product for which design is based; either indicating that he has no comparable product or that it has provided a new Bid that is comparable to product under consideration. Submit confirmation and product literature of recommended product along with submittals required for proposed product.
3. During Bidding Period: Time period allotted to Architect for review of submittals is short. It is critical full documentation be received and that documentation complies strictly with requirements specified in "Documentation" paragraphs herein.
4. Post Proposal Period: No proposals will be considered, unless Owner specifically directs Architect to review Project for possible cost reductions through value engineering. Where value engineering is considered, then only the product(s) for which the Contractor is directed to look at by the Architect shall be considered by the Architect.
5. Documentation:
 - a. Intent, Information Access: Competitors should be fully aware of the advantages and disadvantages of their products and of their competitor's products. Should any knowledge be lacking, each competitor should be fully capable of accessing and securing accurate information. Where this is not possible, and unless the product is proprietary, these competitors should not offer proposals for this Project.
 - b. Quality of Information in Proposal: The Architect should be able to fully and accurately evaluate the difference between the specified product(s) and the proposed product(s) from each proposal. Do not to submit proposals with least amount of information possible without his prior knowledge, as there is no reason for the Architect to reconsider any proposal that has been "not accepted" for any reason, including one that is not adequately documented in the Architect's opinion.
 - c. Reduction of Information Provided: When acceptable to the Architect, the extent of the submittals may be reduced when approved by Architect prior to the submission of each proposal. Generally, these will be for obvious products which are and fall into generic categories very familiar to the Architect. Where the Architect agrees to reduce the amount of information to be provided, the Architect reserves the right to expand the requirement again where the Architect feels that the proposal "objective" was not achieved.
 - d. Comparison of Products: In addition to the other required submittals, the "Comparison of Products" table is a key submittal to the whole proposal and is a requisite to acceptance. This submittal is not to be deleted.
- E. As Part of Work-Related Submittals: Submission of unspecified products or methods as part of "work-related" submittals, does not constitute an acceptable or valid method for processing substitution proposals. Successfully reviewed "work related" submittals does not indicate approval of unspecified products or methods.

February 27, 2026

- F. Architect's Requirements: Verify prior to submission of any proposal, the Architect's requirements necessary to fully conform proposal to Contract requirements. Request for additional costs after acceptance of any proposals will be denied.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 PROPOSAL PROCESS

A. Proposals Offered During Bidding Period:

1. Submission: In accordance with the "Instructions to Bidders" and its supplements.
2. Acceptable Proposals: Architect to send written notification to each eligible Bidder of acceptance of the proposal with copies of the accepted proposal. Eligible Bidders may incorporate the substitutions in accordance with the accepted proposal.
3. Proposals Not Accepted: Architect to send each proposal that are not accepted back to the Bidder who originated the proposal. Architect to have mark the proposal "Not Accepted". Bidder may resubmit proposal, where specified time period allowed for review of proposals is not exceeded and where resubmission is acceptable to Architect. Refer to Architect's "Comments" for additional requirements suggested for compliance, if any.

B. Post Bidding Period Proposals:

1. Submission: As directed by Architect.
2. Acceptable Proposals:
 - a. Preliminary Acceptance: Where marked "Acceptable, Preliminary" on form, indicates that further information may be required before a decision is made. Comply with "Comments" on form and where not indicated verify additional requirements from Architect, and resubmit a complete proposal conforming to new requirements. Adjust costs if required. Use of proposed products are not allowed, until "Acceptable, Final" is marked on the proposal.
 - b. Final Acceptance: Where marked "Acceptable, Final" on form, proposals and any other attachments to become basis of Contract.
3. Proposals Not Accepted: Where marked "Not Accepted", resubmission may be allowed when Architect indicates "Resubmission Acceptable" and resubmission will be denied when Architect indicates "Resubmission Denied" on form. Where remarks are indicated under "Comments", comply with any further requests which may be indicated.

3.02 INCORPORATION

- #### A. Incorporation of Proposals: Coordinate work with other affected Installers of other Work. Comply in strict accordance with accepted proposal that should be in strict conformance Product Manufacturer's Project specific requirements.

February 27, 2026

END OF SECTION

SECTION 01720 – PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Contract Closeout Record Documents.
 - 2. Construction Photographs
- B. Related Sections:
 - 1. Division I Sections, General.
 - 2. Section 01700 – PROJECT CLOSEOUT
 - 3. Division 15 Sections.
 - 4. Division 16 Sections.
 - 5. Other Sections requiring Project Record Documents.

1.02 DEFINITION

- A. Contract Closeout Record Documents: Contractor produced documents representing an accurate record of Work provided under Contract. Documents include updated Contract Documents with support data and Operation & Maintenance Manuals.

1.03 SUBMITTALS

- A. Contract Closeout Record Documents:
 - 1. Contract Documents: Submit three (3) sets and PDF electronic files of each of following, except as otherwise indicated.
 - a. Updated Contract Drawings.
 - b. Updated Project Manual.
 - c. Other drawn and written support data for Drawings and Project Manual necessary to show record of Work.
 - 2. Operating/Maintenance Manuals: Submit three (3) sets and PDF electronic files.
 - 3. Certification: On transmittal or separate written document, certify that information provided is complete and accurate. Signature document by Contractor.
 - 4. Distribution: Architect, Owner's Representative, Owner, and Operator.
- B. Quality Assurance Submittals: Submit in accordance with "Quality Assurance" paragraphs herein.

1.04 QUALITY ASSURANCE

A. Contract Closeout Record Documents:

1. Up-to-Date Records: Maintain up-to-date documents during Contract Period. Record data not less than ten (10) working days after installation of each specific portion of Work requiring recording, except record data prior to any concealment of the Work.
2. Availability: Documents are to be made available to Architect at any time for his review. Timely recording of information and accuracy of recorded information is responsibility of Contractor; whether or not reviewed by Architect.
3. Out-of-Date Records: If in opinion of Architect, records are not being timely recorded by Contractor, Owner reserves the right to hire a professional third party service in which to input the required data. If such service is required, Contractor to cooperate with third party service as necessary for third party service to properly and in timely manner record required data. Contractor to pay for all costs associated with securing and maintaining such service for period such service is required.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 MAINTENANCE OF DOCUMENTS

- A. Storage: Store documents on or in equipment designed for filing and storage of such documents, including rack and filing cabinets. Locate Contract Documents used for Contract Closeout Record Documents in fire resistant cabinet.
- B. Handling: Maintain documents in clean, dry and undamaged condition. Use documents only as necessary to record required information. Do not use as construction set.

3.02 CONTRACT CLOSEOUT RECORD DOCUMENTS – DRAWINGS AND SPECIFICATIONS

- A. Time of Submission: Refer to Division 1 Contract Closeout.
- B. Intent: Update information shown on Contract Drawings and in Project specifications which differ from what was originally drawn or specified. Record drawn information accurately to scale. Written data to be legibly printed.
- C. Contract Drawings and Project Specifications: Keep record documents current. Legibly mark with erasable red pencils or other contrasting colored pencils when more than one color may more clearly delineate the recorded information. Where recorded to Contract Drawings, record information to same scale as drawing. Colored pencil marks to be visible on background of sheet to which marks are applied.
 1. Content: Types of items requiring marking include, but are not limited to, the following:

February 27, 2026

- a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Depths of foundations below first floor.
 - d. Locations and depths of underground utilities.
 - e. Revisions to routing of piping and conduits.
 - f. Revisions to electrical circuitry.
 - g. Actual equipment locations.
 - h. Duct size and routing.
 - i. Locations of concealed internal utilities
 - j. Changes made by Change Order or Construction Change Directive.
 - k. Changes made following Architect's written orders.
 - l. Details not on the original Contract Drawings.
 - m. Field records for variable and concealed conditions.
 - n. Record information on the Work that is shown only schematically
2. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- D. Supporting Data: Other documents may be used in lieu of Contract Documents, when complying with following.
- 1. Conditions for Acceptance:
 - a. Documents capable of more clearly showing actual installations provided.
 - b. When documents are required as drawings, drawn elements are to be in an Architect acceptable architectural scale.
 - c. Each document is referenced to Contract Documents in logical manner that documents used can be readily identified with the affected Contract Document work.
 - d. Submittal format is complied with.
 - 2. Types of Base Documents available for Use:
 - a. Product Data: May be used in place of Contract Drawings or Specifications.
 - b. Shop Drawings: May be used in place of Contract Drawings.
 - c. Other Documents: Any other documents officially used for Project and previously reviewed by Architect in submittals may be used when acceptable to Architect.
 - 3. Submittal Format:
 - a. Intent: Sequentially organize data as referenced in Contract Documents. Data may be provided in either bound or filed format as specified in paragraphs below. Each data to be indexed and clearly identified with typewritten labels.

- b. Bound Data: Provide in format similar to that required for Operations & Maintenance Manuals; except each drawing is to be neatly folded in 8-1/2" x 11" format and inserted into pocket type jackets manufactured for binder insertion.
- c. Filed Data: Provide filed data in "Bankers Box" as manufactured by Fellowes or comparable heavy-duty card board box acceptable to Architect. Each data to be filed into logical groupings in file folders and clearly identified. Drawings are to be neatly folded to fit file folder format.
- d. Marking Data: Mark Project applicable data. Utilize permanent contrasting markers. Written data to be highlight marked with transparent markers. Drawn data to be with opaque markers. Do not obscure other information.

E. "Record Documents" Labeling:

- 1. General: Stamp each page in permanent ink, words "RECORD DOCUMENTS", in bold capital letters, on bottom outside corner; unless otherwise acceptable to Architect. Do not obscure any existing information. Each page means both sides of sheet where printed matter occurs on both sides.
- 2. Drawings: Letters of stamp to be 3/4" height minimum.
- 3. Project Manual: Letters of stamp to be 1/4" height minimum.
- 4. Support Data: Letters of stamp to be 1/4" height minimum. Single stamped label may be applied when data is on single folded page or in permanently bound format such as spiral bound or paper back book type binding.

3.03 CONTRACT CLOSEOUT RECORD DOCUMENTS -
OPERATING/MAINTENANCE MANUALS

A. Format:

- 1. Binders: Assemble data in hard covered, slant ring binders with 3 rings and non-glare, see through pockets on front of each cover and on spine. Insert in spine pocket and front cover pocket project name, Owner's project identification number, summary of typical contents, and volume identification in a "volume of volumes" format.
- 2. Indexed Data: Index data. Provide identification on each index.
- 3. Data Format:
 - a. Table of Contents.
 - b. General Data.
 - i. Primary Contractor/Subcontractor List.
 - ii. Record Documents List.
 - iii. Contractor's Project Guarantee.
 - iv. Permits.
 - c. Group (Specification Section) Data.

- i. Contractor/Subcontractor List.
 - ii. Operation, Service, Maintenance Data.
 - iii. Guarantees/Warrantees.
 - iv. Permits/Certificates.
- B. Table of Contents:
 - 1. Index Related: Provide copies in each volume and at front of each volume. Indicate summary of contents in each indexed grouping.
 - 2. Group Related: For each group of indexed data, in front of group data, include table of contents specific to group.
- C. General Data:
 - 1. Primary Contractor/Subcontractor List: Submit complete listing of all primary Subcontractors and Suppliers involved with Work, including with General Contractor at top of list. Organize list in accordance with Table of Contents CSI Specification Numbers and Names. Relate each Subcontractor and Supplier to Specification Section under which work was provided. Provide each entity's company name, address, phone number, CEO, and primary person or persons involved with Project.
 - 2. Contractor's Project Guarantee: For Owner's copy submit insert original signed guarantee. For other required submittal sets include copies of signed guarantee.
 - 3. Records Documents List: Complete typed listing of Drawings and Specifications Sections used as final Record Documents for Project.
 - 4. Permits: Copies of all final signed permits required for Work.
- D. Group Data: Create a group of related data for each specific system, product, or equipment required for Record Documents. Organize each group sequentially by Specification Number. Each page of each data in group to be identified with hand written or typewritten number identifying them with "group" Specification Number. Permanently bound data may have single identification on front of page. Stapled, clipped, or similarly fixed data are not considered as "permanently bound" and are to have required identification on each page. Accurately provide three hole punched or drilled holes necessary for insertion into binders. For each group, provide following information.
 - 1. Contractor/Subcontractor List: Submit complete listing with Company name, address, phone number, CEO, and primary person or persons involved with Project. Repeat data even if listed under "General Data, Primary Contractor/Subcontractor List".
 - 2. Reviewed Submittals: For each group, submit Product Data and other written submittal data successfully reviewed by Architect during Contract Period.
 - 3. Guarantees/Warrantees: For each group, submit following.
 - a. Standard Manufacturer's Warrantees: Include when normally provided with product; whether specified or not.
 - b. Special Warrantees: Include when specified for products.

February 27, 2026

4. Operation, Service, Maintenance Data: When specified, submit required data. Where parts listings are available from Manufacturer of product, submit written data of parts listings and service company listings.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Substantial Completion procedures.
 - 2. Final completion procedures.
 - 3. Warranties.
 - 4. Repair of the Work.
- B. Related Sections:
 - 1. Section 01330 – SUBMITTAL PROCEDURES.
 - 2. Section 01595 - PROJECT CLEANING.
 - 3. Section 01720 - PROJECT RECORD DOCUMENTS

1.02 SUBMITTALS

- A. Product Data: For cleaning agents.
- B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- C. Certified List of Incomplete Items: Final submittal at Final Completion.
- D. Certificates of Release: From authorities having jurisdiction.
- E. Certificate of Insurance: For continuing coverage.

1.03 MAINTENANCE MATERIAL SUBMITTALS

- A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.04 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items (Contractors Punch List): Prepare and submit a list of items to be completed and corrected at the time of each inspection, indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 calendar days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
 - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.

February 27, 2026

2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Owner's Representative. Label with manufacturer's name and model number where applicable.
 - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Architect's signature for receipt of submittals.
 5. Submit test/adjust/balance records.
 6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 calendar days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Advise Owner of pending insurance changeover requirements.
 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 3. Complete startup and testing of systems and equipment.
 4. Perform preventive maintenance on equipment used prior to Substantial Completion.
 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
 6. Advise Owner of changeover in HVAC and other utilities.
 7. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 8. Complete final cleaning requirements, including touchup painting.
 9. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect and Owner's Representative will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

February 27, 2026

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.05 FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:
 1. Submit a final Application for Payment according to Section 01290 - PAYMENT PROCEDURES.
 2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
- B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect and Owner's Representative will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
 1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.06 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction. Use Contractors form and format acceptable to the Architect
 1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
 3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect and Owner's Representative.
 - d. Name of Contractor.

February 27, 2026

- e. Page number.
- 4. Submit list of incomplete items in the following format:
 - a. PDF electronic file. Architect will return annotated file.

1.07 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
 - 1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 - 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
 - 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
 - 4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
- C. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
 - 1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.

February 27, 2026

2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.
 - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION

DIVISION 2 – SITE CONSTRUCTION

SECTION 02070 – SELECTIVE DEMOLITION

PART 1 - GENERAL

1.01 SUMMARY

A. Work Includes:

1. Demolition of portions of concrete slabs and pavements.
2. Demolition of portions of concrete slabs and pavements for removal of designated utilities.
3. Identifying, disconnecting, capping or sealing, and removing utilities.
4. Salvage designated items.

B. Related Work Described Elsewhere

1. Section 01100 – PROJECT REQUIREMENTS
2. Section 01500 – TEMPORARY FACILITIES AND CONTROLS
3. Section 01010 – SUMMARY OF WORK
4. Section 01595 – PROJECT CLEANING
5. Section 02100 – SITE PREPARATION
6. Section 02110 – REMOVAL OF STRUCTURES AND OBSTRUCTIONS
7. Architectural Drawings and Specifications

C. The extent of selective demolition work is indicated on the Drawings.

D. It shall be the responsibility of the Contractor to examine the project site and determine the existing conditions for themselves.

E. Selective demolition work includes but is not limited to removal and subsequent disposal of all non-hazardous materials indicated or required to be removed.

F. Execute all work in an orderly and careful manner with due consideration for all items or work to remain.

G. Clearly obvious conditions requiring selective demolition, 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 therefrom.

H. All debris of any kind accumulated from the work of this Section shall be disposed of off the site, unless noted otherwise.

February 27, 2026

I. Permits , Notice, Etc.:

1. The Contractor shall procure and pay for all necessary permits or certificates the may be required in connection of this work.
2. The Contractor shall serve proper notice and consult with Owner's Representative regarding any temporary barricades that are required, or for disconnections of electrical or other utility lines in the area which may interfere with the removal work. All such lines, where necessary, shall be properly disconnected or relocated prior to commencing with demolition work.

J. Salvage items including but not limited to:

1. Light poles to be removed.

1.02 SUBMITTALS

A. Meet requirements of Section 01330 – SUBMITTAL PROCEDURES

B. Proposed Protection Measures: Submit informational report, including drawings, that indicates the measures proposed for protecting individuals and property, for dust control and for noise control. Indicate proposed locations and construction of barriers.

1. Adjacent Portions of Building: Portions of the site, including structures, adjacent to the areas to be demolished are to be kept intact. The demolition to take place in these areas is to be performed with the utmost care to avoid damage to the adjacent structures. Submit detailed special measures proposed to protect adjacent structures to remain.

C. Schedule of Demolition Activities: Indicate the following:

1. Detailed sequence of demolition work, with starting and ending dates for each activity.
2. Temporary interruption of utility services.
3. Shutoff of utility services.

D. Demolition Plans: Drawings indicating the following:

1. General site, building(s) and other features to be removed and disposed of.
2. Locations of temporary protection and means of egress for adjacent occupied areas of the building.

E. Pre-demolition Photographs: Show existing conditions of adjoining construction, including finish surfaces that might be misconstrued as damage caused by demolition operations. Submit before the Work begins.

1.03 QUALITY ASSURANCE

February 27, 2026

- A. Use adequate numbers of skilled mechanics who are thoroughly trained and experienced in the necessary crafts.
- B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. Pre-demolition Conference: Conduct conference at Project site to review methods and procedures related to building demolition including, but not limited to, the following:
 - 1. Inspect and discuss condition of construction to be demolished.
 - 2. Review and finalize demolition schedule and verify availability of demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 - 3. Review and finalize protection requirements.
 - 4. Review procedures for noise control, and dust control.
 - 5. Review items to be salvaged and returned to the owner.
 - 6. Review procedures for protection of adjacent, occupied structures or buildings.
 - 7. Review schedule of work hours and facility rules.

1.04 PROJECT CONDITIONS

- A. Existing conditions: The owner assumes no responsibility for actual condition of items to be demolished.
- B. Conditions existing at time of commencement of contract will be maintained by the owner insofar as practical.
- C. Occupancy: Building areas subject to demolition will be vacated and discontinued in use by the owner prior to start of work.
- D. Do not interfere with use of adjacent building areas. Maintain free and safe passage to and from occupied spaces.
- E. Provide accessibility around temporary structures conforming to ADAAG Section 4.1.1(4).
- F. Prevent movement or settlement of structure. Provide and place bracing or shoring and be responsible for safety and support of structure. Assume liability for such movement, settlement, damage, or injury. Cease operations and notify the Owner's Representative immediately, if safety of structure appears to be endangered. Take precautions to properly support structure. Do not resume operations until safety is restored.

- G. 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 Owner's Representative. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations, as directed by the Owner's Representative.
- H. Dust Control:
 - 1. Keep dust within acceptable levels at all times, including non-working hours, weekends and holidays as specified in Section 01500 – TEMPORARY FACILITIES AND CONTROLS.
 - 2. Mechanical dry sweeping is not permitted. Vacuuming, wet mopping, approved limited dry hand, wet or damp sweeping is acceptable.
 - 3. During loading operations, water down debris and waste materials to allay dust.
 - 4. The method of dust control and all costs incurred thereof shall be the responsibility of the Contractor.
- I. Noise Control: As specified in Section 01500 – TEMPORARY FACILITIES AND CONTROLS.
- J. Fire Safety: Fire safety during demolition shall comply with the 2006 Uniform Fire Code, as amended.

1.05 EXISTING UTILITY SERVICES

- A. Do not abandon or otherwise alter utility services or drainage lines which would impair service to existing building areas.
- B. Maintain utilities in service, protect, and reconstruct if damaged, all in-service utility pipes or conduits, except services to the structures to be dismantled. Reconstruct in-service utility pipes or conduits if damaged at no additional cost to the owner.
- C. If service must be interrupted, observe requirements of Section 01700 – EXECUTION REQUIREMENTS.
- D. Report damage, however slight, immediately. Do not repair or reconstruct any utility pipe, conduit or installation without authorization; however, except perform emergency repairs immediately.

1.06 HAZARDOUS MATERIALS

- A. In the event that asbestos, urea formaldehyde or other toxic substances are present in the existing structures, observe the applicable requirements of Hawaii Occupational Safety and Health Standards.

1.07 COORDINATION

- A. Arrange demolition schedule so as not to interfere with the owner's on-site operations and operations of adjacent occupied buildings and areas.
 - 1. At the end of each work period areas are required to be cleaned and readied for occupants. The condition of the areas shall be such that there is no interference with the typical work activities perform by the occupants and that the occupants safety is not compromised

PART 2 - PRODUCTS

2.01 SALVAGE MATERIALS

- A. Salvaged materials not indicated for reuse or salvage for the owner shall become Contractor's property. Remove from site and dispose of at Contractor's option.
- B. Items of salvageable value not indicated for reuse may be removed from structure as work progresses. Salvaged items must be transported from site as they are removed. Storage or sale of removed items on site will not be permitted.
- C. Historic items, antiques, and similar objects including, but not limited to, commemorative plaques and tablets, and other items of interest or value to the owner that may be uncovered during demolition remain the property of the owner.
 - 1. Carefully salvage in a manner to prevent damage and promptly return to the Owner.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine the conditions under which work of this section will be performed. Do not proceed until unsatisfactory conditions detrimental to timely and proper completion of the work have been corrected.
- B. Verify that utilities have been disconnected and capped before starting demolition operations.
- C. Inventory and record the condition of items to be removed and salvaged. Photograph existing conditions of structure surfaces, equipment or to surrounding properties which could be misconstrued as damage resulting from selective demolition work. File with Owner's Representative prior to starting work.
- D. Engage a professional engineer currently licensed in the owner to perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during building demolition operations.

February 27, 2026

- E. If hazardous materials were found to exist, verify that hazardous materials have been remediated before proceeding with building demolition operations.

3.02 PREPARATION

- A. Maintain exit requirements throughout construction period.
- B. Erect and maintain temporary barricades complying with the requirements of Section 01100 – PROJECT REQUIREMENTS. On completion, remove barricades and repair damaged surfaces to match adjacent surfaces.
- C. Existing Utilities: Locate, identify, disconnect, and remove indicated utilities serving portions of the building to be demolished.
 - 1. If removal, relocation, or abandonment of utility services will affect adjacent occupied areas and buildings, then provide temporary utilities that bypass the portions of the building to be demolished and that maintain continuity of service to other buildings and adjacent areas.
 - 2. Cut off pipe or conduit and cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing according to requirements of authorities having jurisdiction.
- D. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent unexpected movement or collapse of construction being demolished.
 - 1. Strengthen or add new supports when required during progress of demolition.

3.03 DEMOLITION

- A. Demolition Work: Conform to owner of Hawaii, Occupational Safety and Health Standards; Subtitle 8, Division of Occupational Safety and Health; Part 3, Construction Standards; Chapter 131.1, Demolition.
- B. Pollution controls: Provide temporary enclosures and use suitable methods to limit dust and dirt to the lowest practical level. Comply with governing regulations pertaining to environmental protection. Observe dust control measures of Section 01500 – TEMPORARY FACILITIES AND CONTROLS.
- C. Explosives: Use of explosives will not be permitted.
- D. Selective Demolition
 - 1. 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 owner. Contractor and its demolition subcontractor, as part of the bid proposal to review the demolition scope along with the new work and conduct

site visit(s) to understand the extent of the scope and provide as part of its bid proposal, to include all work to accomplish the final work.

2. Conduct demolition of designated items and components as indicated on the Drawings and site investigation(s) in an orderly and careful manner as required to accommodate new work, including that required for connection to the existing building. Protect existing supporting structural members.
3. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
4. Use the utmost care to avoid damage to the items being removed and designated for reuse including but not limited to:
5. Disconnect, remove, cap and seal designated utilities as indicated on the Drawings.
6. Use methods required to complete the Work within limitations of governing regulations.
7. Locate demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
8. Cease operations and notify Architect and Owner's Representative immediately if safety of adjacent structure appears to be endangered. Do not resume operations until safety is restored.
9. Remove contaminated, vermin infested, or dangerous materials encountered and dispose of by safe means.
10. Do not demolish, chip or penetrate any portion of existing structural members not designated for such without the expressed approval of the Architect and Engineer.
11. Repair excess demolition to match adjacent surfaces.

E. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

February 27, 2026

3.04 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove debris, rubbish, and other materials resulting from demolition operations from the site. Transport materials removed from demolished structures and legally dispose of off site.
- B. Do not allow demolished materials to accumulate on-site.
- C. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- D. Burning of removed materials from demolished structures will not be permitted on site.

3.05 CLEANUP AND REPAIR

- A. Repair damage to adjacent structure and improvements resulting from this work at no cost to the owner.
- B. Clean adjacent areas, structures and improvements of dust, dirt, and debris caused by demolition operations, as directed by Owner's Representative or governing authorities. Return adjacent areas to condition existing prior to start of work.

END OF SECTION

DIVISION 2 – SITE CONSTRUCTION

SECTION 02100 – SITE PREPARATION

PART 1 -GENERAL

1.01 DESCRIPTION

- A. The work to be performed under this section shall include clearing the premises of all obstacles and obstructions, the removal of which will be necessary for the proper reception, construction, execution and completion of the other work included in this contract.

PART 2 -MATERIALS (NOT USED)

PART 3 -EXECUTION

3.01 GENERAL

- A. Maintenance of Traffic: The Contractor shall conduct operations with minimum interference to streets, driveways, sidewalks, passageways, etc. When necessary, the Contractor shall provide and erect barriers, etc., with special attention to protection of personnel.
- B. Protection: Throughout the progress of the work, protection shall be provided for all property and equipment, and temporary barricades shall be provided as necessary. Work shall be done in accordance with the safety provisions of the Manual of Accident Prevention in Construction, published by the Associated General Contractors of America, and the State of Hawaii's Occupational Safety and Health Standards, Rules and Regulations.
- C. Fires: No burning of fires of any kind will be allowed.
- D. Reference Points: Bench marks, etc., shall be carefully maintained, but if disturbed or destroyed, shall be replaced as directed, at the Contractor's expense.
- E. Disposal: All materials resultant from operations under these specifications, unless noted otherwise, shall become the property of the Contractor and shall be removed from the site. Loads of materials shall be trimmed to prevent droppings. No materials shall be dumped on private or public property without proper authority.

3.02 EXISTING UTILITY LINES

- A. 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 Owner's Representative of such

February 27, 2026

discovery. The Owner's Representative shall then investigate and issue instructions for the preservation or disposition of the unknown line. Authorization for extra work shall be issued by the Owner's Representative only as he deems necessary.

3.03 CLEARING AND GRUBBING

- A. The Contractor shall clear the premises of all obstacles and obstructions, the removal of which will be necessary for the proper reception, construction, execution and completion of work included in this contract. The area below the natural ground, within the limits of the grading work indicated on the grading plans shall be grubbed of all stumps, roots, buried logs, decayed vegetable matter, and other objectionable materials, as is necessary for the proper reception, construction, execution, and completion of work included in this contract.
- B. The Contractor shall protect from injury and damage all surrounding (including adjacent property lines of the project site) trees, plants, etc., and shall leave all in as good as condition as at present. Any damage to existing improvement shall be repaired or replaced by the Contractor to the satisfaction of the Owner's Representative.
- C. Debris from clearing and grubbing operations shall not be placed in streams, water courses or at locations that will impede flow of the natural drainage pattern.

3.04 TOPSOIL EXCAVATION

- A. Strip topsoil from areas that are to be filled, excavated, landscaped or re-graded to such a depth that it prevents intermingling with underlying subsoil or questionable material.
- B. Cut heavy growths of grass from areas before stripping and remove with the rest of the cleared vegetative material.
- C. Topsoil shall consist of organic surficial soil found in depth of not less than 6". Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones and other objects over 2" in diameter, weeds, roots, and other objectionable material.
- D. Stockpile topsoil in storage piles in areas shown or where directed. Construct storage piles to freely drain surface water. Cover storage piles as required to prevent windblown dust. Dispose of unsuitable topsoil as specified for waste material, unless otherwise specified by owner. Excess topsoil shall be removed from the site by the Contractor unless specifically noted otherwise on the Drawings.

3.05 CLEANUP OF PREMISES

- A. Clean up and remove all debris accumulated from construction operations from time-to-time as directed. Upon completion of the construction work and before final acceptance of the contract work, remove all surplus materials, equipment, scaffoldings, etc., and leave entire job site raked clean and neat to the satisfaction of the Owner's Representative.

February 27, 2026

END OF SECTION

DIVISION 2 – SITE CONSTRUCTION

SECTION 02300 – EARTHWORK

PART 1 -GENERAL

1.01 SCOPE OF WORK

- A. This section provides for furnishing of all labor, materials and equipment necessary to perform all earthwork indicated on the drawings and specified herein.

1.02 GENERAL REQUIREMENTS

- A. All work shall be done in accordance with:
 - 1. Ordinance No. 808 to amend Chapter 22, Article 8, Kauai County Code 1987, Relating to Grading, Grubbing and Stockpiling.
 - 2. Title 11, Chapter 54 “Water Quality Standards”;
 - 3. Title 11, Chapter 55 “Water Pollution Control”;
 - 4. Title 11, Chapter 60.1 “Air Pollution Control”,
 - 5. Project Geotechnical Report (“Soils Report”)
- B. Grading shall be carried to the lines and grades as shown on the drawings or as directed by the Owner’s Representative.

1.03 SUBSURFACE SOIL INVESTIGATION

Subsurface soils investigations have been made and are available for inspection at the office of the State and are available from the owner (“Soils Report”). The information and data furnished is the product of facts gathered in investigations made at the specific locations indicated to aid in the design of the project, and no assurance is given that the conditions are necessarily typical of conditions at other locations or that such conditions remain unchanged. The Contractor shall be solely responsible for all assumptions, deductions, or conclusions he may make or derive from the subsurface information or data furnished.

1.04 PROJECT RECORD DOCUMENTS

Maintain existing utilities and accurately record location of newly encountered utilities that are to remain, re-routed utilities and new utilities by horizontal dimensions, elevations or inverts and slope gradients.

PART 2 -GENERAL

2.01 MATERIALS

- A. Material imported or excavated on the property may be utilized in the fill, provided each material conforms to the specifications herein. Roots, tree branches, and other deleterious materials missed during clearing operations shall be removed from the fill. All excavated and imported material used for fill shall conform to the recommendations in the Soils Report.
- B. Material that is spongy, subject to decay or otherwise considered unsuitable shall not be used in the compacted fill.

PART 3 -EXECUTION

3.01 CONTRACTOR'S AND SOILS ENGINEER'S RESPONSIBILITIES

- A. The Contractor shall retain their own Soils Engineer to ensure compliance and fulfill the requirements of the project and other applicable jurisdictions including any monitoring and testing performed to ensure compliance with the Soils Report, Project Drawings and these Specifications.
- B. The Owner may elect to retain the licensed Engineer signing the Soils Report in Section 102.A, as the owner's representative on the project. However, the Owner's representative roles and responsibilities shall not relieve the contractor of monitoring and inspections/testing required to comply with the requirements of the plans, specifications and Soils Report.
- C. The words "supervision", "inspection", or "control" shall mean periodic observation of the work (and the taking of soil tests as deemed necessary) by the Soils Engineer for substantial compliance with plans, specifications and design concepts.
- D. The presence of the Soils Engineer and/or the owner's representative will be for the purpose of providing observation and/or field testing. The service does not include supervision or direction of the actual work of the Contractor, his employees or agents. The Contractor should also be informed that neither the presence of the field representative nor the observation and testing shall excuse him in any way for defects discovered in his work. It is understood that the Soils Engineer will not be responsible for job or site safety on this project. Job and the site safety will be the sole responsibility of the Contractor.
- E. All clearing, site preparation or earthwork performed on the project up to the approximate finish grade or roadway subgrades shall be conducted by the Contractor under the inspection of the Soils Engineer.
- F. It is the Contractor's responsibility to prepare the ground surface to receive the fills and to place, spread, mix, moisture condition, and compact the fill in accordance with the specifications herein. The Contractor shall also remove all unsuitable and deleterious materials.

February 27, 2026

- G. It is also the Contractor's responsibility to have suitable and sufficient compaction equipment on the job site to handle the amount of fill being placed. If necessary, excavation equipment shall be shut down to allow completion of compaction. Sufficient watering apparatus will also be provided by the Contractor with due consideration for the fill material, rate of placement, and the time of year.
- H. It is the responsibility of the Soils Engineer to promptly notify both the Contractor and the Owner's Representative verbally of any failing compaction tests or lack of compliance with specifications. These items shall also be documented by the Soils Engineer.

3.02 SITE PREPARATION

- A. All vegetation and deleterious materials such as rubbish shall be cleared and disposed of off-site. This removal shall be completed prior to excavating and filling.
- B. Soil or rock materials determined as being unsuitable for placement in compacted fill shall be removed and wasted off-site. Any material incorporated as a part of the compacted fill must be approved by the Soils Engineer. Organically contaminated topsoil shall be stripped prior to actual grading.
- C. Any abandoned underground structures such as cesspools, cisterns, tunnels, septic tanks, wells, pipelines, or others not located prior to grading are to be removed and the resulting depression backfilled and compacted in accordance with these specifications.
- D. In areas to be filled and at finished subgrade elevation in cut or excavated areas should be scarified to a depth of 10 inches, moisture-conditioned to above the optimum moisture content, and compacted to a minimum of 90 percent relative compaction.
- E. Where soft or unstable conditions are encountered during these operations, the Soils Engineer shall be notified immediately so that supplemental recommendations can be made prior to the commencing of fill placement.
- F. Any cavities revealed by the subgrade inspection and/or proof-rolling shall be excavated and replaced with compacted structural fill, lean concrete, flowable fill or grout.
- G. Areas under structures, footings and foundations shall be probed for cavities under the observation of the Soils Engineer and treated as recommended in the Soils Report.
- H. When the embankment is to be constructed on an existing slope exceeding five:one (5:1) horizontal to vertical, the existing slope shall be benched by horizontal terraces into firm ground prior to fill placement. The fill shall be placed beginning in the lowest elevations.

3.03 COMPACTED FILLS

- A. Material used in the construction of the structural fills which underlie structures or pavements shall be evenly spread; moisture conditioned to at least 2 percent

- above the optimum moisture content and compacted in horizontal lifts not exceeding 8 inches in loose thickness and compacted to a minimum of 90 percent relative compaction as determined by ASTM D 1557. Non-structural fills for landscaping and general fill areas shall be moisture conditioned to above the optimum moisture and compacted to at least 90 percent relative compaction as determined by ASTM D 1557.
- B. The fill shall be placed and compacted on a horizontal plane with a sufficient gradient to prevent ponding of water in the fill. Saturation and subsequent “pumping” of the fill due to inclement weather and lack of drainage shall require scarification and recompaction of the material by the Contractor at the Contractor’s expense.
 - C. Except where the finish grade or subgrade has been attained, should the selected type of compaction equipment result in a sufficiently polished surface after compaction to prevent proper bonding of subsequently placed fill materials, shallow scarification of this surface shall be completed.
 - D. If the moisture content or dry density varies from that specified, the Contractor shall rework the fill until the specified levels of compaction and moisture content are attained. Additional fill material shall not be placed on any fill layer, which has not been properly compacted. Subsequent removal of any unacceptable layer shall be done at the Contractor’s expense.
 - E. The Contractor shall be required to obtain the above-specified levels of compaction out to the finish slope face of fill slopes. This may be achieved by overbuilding the slope and cutting back to the compacted core; or by direct compaction of the slope face with suitable equipment, or by any other procedure, which produces the required compaction.
 - 1. If a method other than overbuilding and cutting back to the compacted core is to be employed, slope tests will be made by the Soils Engineer during construction of the slopes to determine if the required compaction is being achieved.
 - 2. If the method of achieving the required slope compaction selected by the Contractor fails to produce the necessary results, the Contractor shall rework or rebuild such slopes until the required degree of compaction is obtained, at no additional cost to the owner.
 - F. Fill placed against previously graded cut or fill slopes shall be properly keyed through topsoil or loose slope material into firm material, and the transition stripped of loose material prior to fill placement. Fill shall be placed and compacted from the low side up.
 - G. All fill slopes should be planted or protected from erosion.

3.04 EXCAVATIONS

- A. Excavated on-site materials may be utilized as compacted fills as specified in Section 02100 – SITE PREPARATION, Part 3, Section 3.03 (CLEARING AND GRUBBING) and the Soils Report.

February 27, 2026

- B. Subgrade materials that are determined to be unsuitable or unsatisfactory for its intended use shall be overexcavated to such depth and width as required by the field conditions.
- C. Materials determined to be unsuitable by the Soils Engineer shall be wasted off-site.
- D. Over-excavated areas, whether due to Contractor's error or the encountering of unsuitable materials, shall be brought back up to grade with approved fill materials, uniformly compacted as required in the Soils Report.
- E. Excavation of the slopes shall be finished with all slopes cut true and straight as shown by the plans and in conformance with the Revised Ordinances of Kauai Chapter 22, as related to Grading, Soil Erosion and Sedimentation Control, and the recommendations of the Soils Report.
- F. No cut slopes shall be excavated higher or steeper than that allowed by the ordinances of the controlling governmental agencies.
- G. Overexcavation or overcutting of the slope due to the Contractor's negligence shall be corrected to the satisfaction of the Owner and Soils Engineer at the Contractor's expense.
- H. If any conditions not described in the contract documents such as perched water, seepage, lenticular or confined strata of a potentially adverse nature are encountered during grading, these conditions shall be immediately brought to the attention of the Owner's Representative, owner and the Soils Engineer so that supplementary recommendations can be made to treat these problems.

3.05 GRADING CONTROL

- A. Observation of the fill placement shall be provided by the Soils Engineer during the progress of grading.
- B. Compaction testing shall be performed in accordance with the recommendations in the Soils Report.
- C. Where failing tests occur or other field problems arise, the Contractor and the Owner's Representative will be verbally notified of such conditions followed by written communication from the Soils Engineer.

3.06 PAVEMENTS

The subgrade soils below the pavement areas shall be scarified, compacted to at least 95 percent relative compaction, proof-rolled and tested in accordance with the recommendations in the Soils Report. The base and subbase material including thickness requirements of the roadway pavement shall be as recommended in the Soils Report and as required by the Standard Specifications for Public Works Construction. The base and subbase material shall be placed and compacted as recommended in the Soils Report and as required by the "Standard Specifications for Public Works Construction."

3.07 FINISHING

February 27, 2026

The completed excavation and fill surfaces shall be true to the grade and elevation shown on the plans and shall provide a firm base. Finished surfaces shall also conform to the slopes and drainage patterns shown on the plans. Tolerances shall be 0.02 feet for the road areas and 0.10 feet for other areas.

3.08 BENCHMARKS

Protect and maintain benchmarks, monuments, and other reference points; if disturbed or destroyed, replace to original state.

3.09 UTILITY LINES

Existing utility lines indicated or locations of which are made known to the Contractor prior to excavation, and that are indicated to be retained, as well as utility lines constructed during excavation operations, shall be protected from damage during excavating and backfilling, and if damaged, shall be repaired at no additional cost to the Owner. If utility lines, that are not indicated or that the Contractor is not aware of, are encountered or damaged, the Owner's Representative shall be notified immediately.

3.10 SPECIAL CONSIDERATIONS

- A. Erosion control measures shall be provided by the Contractor during grading and prior to the completion and construction of permanent drainage controls. The Contractor shall be responsible for providing protection to graded areas against action of the elements.
- B. Upon completion of grading or temporary interruption of grading and the subsequent termination of inspection by the Soils Engineer, no further filling or excavating shall be performed without notifying the Owner's Representative and Soils Engineer in advance and ascertaining their requirements.

Care shall be taken by the Contractor during final grading to preserve any berms, interceptors, swales, drainage terraces or other devices of a permanent nature on or adjacent to the property.

END OF SECTION

DIVISION 2 – SITE CONSTRUCTION

SECTION 02302 – TRENCHING, EXCAVATION, AND BACKFILLING FOR UTILITIES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This item shall consist of trenching, excavating, and backfilling for utilities and their appurtenances complete. Except as specified otherwise herein, the work shall be in accordance with Section 02300 – EARTHWORK.

PART 2 - PRODUCTS

2.01 BACKFILL MATERIALS

- A. Backfill the trench with excavated on-site materials or imported materials as described herein below.
 - 1. Place a 6-inch thick granular bedding consisting of No. 3B fine gravel in accordance with ASTM C33, No. 67 gradation. Place S4C material for backfill and pipe cushion for water lines where the invert of the water pipe is above the 4-foot elevation, USGS Datum. Do not use S4C material in areas where the ground is wet. For the first lift from the bottom of the pipe to 12 inches above the pipe barrel, install granular material such as cushion fill, No. 3B fine gravel in accordance with ASTM C33, No. 67 gradation.
 - 2. Above the shading zone, trench backfill material should consist of approved onsite or imported soil conforming to the criteria stated previously.

PART 3 - EXECUTION

3.01 EXCAVATION

- A. Trenching:
 - 1. Trenching shall be carried to the lines and depths indicated and required for the proper installation of structures. The bottom of the trenches shall be excavated to sufficient depth for the installation of bedding material. Trenches shall be excavated to a minimum of 6 inches on either side of the piping or structures, and to such additional widths as required for proper installation and inspection. The bedding material supporting the piping shall be compacted and shaped to fit the bottom quadrant of the piping with allowance for bells and joining. Trenches shall be kept dry and clean and shall be properly protected from the entry of surface water.
- B. Unsuitable Materials

February 27, 2026

1. When unsuitable material is encountered at the trench excavation, the Contractor shall be responsible for hauling and disposing of the material.

C. Additional Excavation

1. When the subgrade material below the established trench grade is unstable, such as muck, buried debris or lava cavities, excavate below grade to such depth and width as directed by the Soils Engineer. Fill the excavated area below grade with structural fill or crushed rock cushion fill to within 6 inches of the invert grade or to the bottom of the concrete jacket or cradle.

D. Over-Excavation

1. Refill and compact any part of the trench bottom excavated below the established grade with structural fill material to within 6 inches of the pipe invert or to the bottom of the concrete jacket or cradle.
2. Trench backfill materials shall be homogenous and shall extend horizontally to the limits of trench over-excavation.
3. Contractor shall backfill and compact all over-excavated areas at his own expense.

E. Surplus Material

1. Material resulting from trench and structure excavation shall be used by the Contractor for backfilling, filling and grading to the extent required as specified elsewhere in these specifications. The Soils Engineer shall determine whether or not excavation material is suitable for use as fill. All unsuitable material shall be disposed of off-site by the Contractor.

3.02 BACKFILLING AND COMPACTING

- A. The first lift shall be backfilled by hand shoveling and tamping so that the backfill materials are in contact with the entire periphery of the pipe. Power equipment shall be of the front loader type where unloading of backfill material into the trench can be controlled so that the pipe is not damaged nor moved from its installed position. The backfill shall be compacted to a minimum of 90 percent relative compaction. For utility trenches within the pavement areas, backfill material shall be compacted to not less than 95 percent relative compaction per ASTM Designation D 1557.
- B. The work shall be performed without damage to the pipe and trench and in such a manner, that water will not be impounded.
- C. All trench backfill placed above 12 inches of the top of the pipes shall be compacted in maximum loose lift thickness of 8 inches and mechanically compacted to no less than 90 percent relative compaction unless specifically authorized in writing by the Soils Engineer. The Soils Engineer may require thinner lifts should compaction operations consistently fail to produce the specified compaction requirements. In any event, the required levels of compaction shall be obtained throughout the full depth and width of each layer of backfill.

HAWAII HEALTH SYSTEMS CORPORATION – KAUAI DIVISION

Samuel Mahelona Memorial Hospital
Behavioral Health New Patient Facility
Project No. 221093-01

Trenching, Excavation, and Backfilling for Utilities
02302-2

February 27, 2026

- D. The compaction requirement of the trench backfill within 2 feet of the finished grade in areas subjected to vehicular traffic shall be a minimum of 95 percent relative compaction.
- E. Mechanical tamper or vibratory compactor may be used in compacting each layer provided that the backfill lift thickness takes into account the size of the compaction equipment used.
 - 1. The Contractor shall be responsible for protecting the pipe or structure while placing and compacting the backfill material.
- F. Jetting shall not be permitted. All backfilling shall be under the observation of the Soils Engineer. The Contractor shall notify the Soils Engineer prior to any backfilling.

3.03 EXISTING UTILITY LINES

- A. All underground lines, which are to remain, shown on the drawings or made known to the Contractor, and are in the path of new sanitary sewer, water or storm drain lines shall be uncovered at points where they are in the path of such new piping. The sizes and invert elevations of the existing pipe and manholes shall be ascertained and any discrepancies, which would prevent the Contractor from laying lines to the established grades shall be brought to the attention of the Owner's Representative immediately and before commencing work.

3.04 RESTORATION OF EXISTING PAVEMENT AND OTHER IMPROVEMENTS

- A. All restoration work shall conform to the requirements of the jurisdictional government agencies and under these specifications. Unless specified otherwise in the proposal, restoration work shall be considered as incidental to the various related items of work.

END OF SECTION

SECTION 02510 – WATER DISTRIBUTION SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The work includes the providing of a potable water system, complete.

1.02 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract, including general and supplementary conditions and Division 01 specification sections, apply to this section.
- B. Related Work Described Elsewhere:
 - 1. Section 02100 – Site Preparation
 - 2. Section 02300 – Earthwork
 - 3. Section 02302 – Trenching, Excavation, and Backfilling for Utilities
 - 4. County of Kauai, Department of Water's Water System Standards, dated 2002, and all subsequent amendments and additions from 2008.
 - 5. Uniform Building Code, current Edition, Chapter 12 "Building Code".
 - 6. Uniform Plumbing Code, current Edition, Chapter 14 "Plumbing Code".

PART 2 - PRODUCTS

2.01 MATERIALS

- A. All materials shall be in accordance with the appropriate sections of the Department of Water's Water System Standards.
- B. Water main pipe shall be ductile iron class 53 in accordance with the Department of Water's Water System Standards.
- C. Water lateral pipe shall be type K copper in accordance with the Department of Water's Water System Standards.
- D. Detection Wire: Provide for non-metallic underground pipes except for sewer and drain pipes which run directly between manholes and/or inlets and/or headwalls or for other situations where a detection wire will not substantially facilitate detection of the pipe.
 - 1. Material: Insulated, one-piece (single strand) copper wire, No. 10 ga. (0.1019" dia.) minimum (American or Brown and Sharpe Gage).

- E. Warning and Identification Tape: Provide for both non-metallic and metallic underground pipes except for duct banks encased in concrete.
1. Polyethylene plastic tape, acid and alkali resistant, approximately 3" wide, minimum 0.003" thick, with a strength of 1500 psi lengthwise and 1250 psi crosswise, maximum elongation of 350%, color-coded as noted below, with warning and identification of service imprinted in bold black lettering continuously over the entire length of the tape. Warning and identification to read "CAUTION, BURIED [type of utility service] LINE BELOW" or similar wording. The tape color and printing shall be permanent and unaffected by moisture.
 2. Warning Tape Color Codes (Coordinate color codes with applicable sections of the specifications):

Yellow	Electric, Gas, Oil, Dangerous Materials
Orange	Telephone and Communication
Blue	Water
White	Steam
Gray	Compressed Air

PART 3 - EXECUTION

3.01 INSTALLATION

- A. All water main systems, up to and including the water meters and on-site water systems beyond the water meters, shall conform to the requirements of the County of Kauai, Department of Water's Water System Standards, Volume 1, dated 2002 and all subsequent amendments and additions.

3.02 WATER METERS

- A. Water meters shall be the size shown on the plans and shall conform to the requirements of the County of Kauai, Department of Water's Division 400, Section 402 – Approved Material List and Section 403 – Standard Details, dated 2002 and all subsequent amendments and additions.
- B. In performing all work, the Contractor shall exercise due care and caution necessary to avoid any damage to and impairment in the use of any existing utility lines. Any damage inflicted on existing lines resulting from the Contractor's operations shall be immediately repaired and restored as directed by the Owner's Representative at the Contractor's expense.

3.03 DETECTION WIRE

- A. Location: The conducting cable shall be buried directly above the center-line of the pipe at a distance of approximately 6" above the top of the pipe. The wire shall extend continuously along the entire length of pipe, from manhole to manhole. The ends of the wire shall terminate inside of each manhole at each end of the pipe, with

February 27, 2026

a minimum of 3' feet of wire, coiled, and remaining accessible in each manhole. The wire shall be insulated along its entire length.

- B. Connection: The coil of wire shall be tied to the gate valve within the manhole. If no gate valve is present, the coil of wire shall be firmly affixed to the manhole side near the manhole cover frame.
- C. Splicing: Where the wires must be joined, the ends shall be tied in a knot and a splice made which provides electrical continuity across the wires.

END OF SECTION

DIVISION 2 – SITE CONSTRUCTION

SECTION 02520 – PAVING, ROADWAY AND MISCELLANEOUS WORK

PART 1 -GENERAL

1.01 SCOPE OF WORK

- A. This section includes preparation of subgrades for road, driveways and parking areas; the furnishing and laying of the select borrow, base course, prime coat, tack coat, asphaltic concrete and/or Portland cement concrete pavements, curbs and gutter, sidewalks, paths and miscellaneous works.

PART 2 -PRODUCTS

2.01 REFERENCED SPECIFICATIONS AND STANDARDS

- A. The following specifications and standards of the issues listed below, including the amendments, addenda and errata, form a part of this specification to the extent required by the references thereto. Paragraphs concerning Measurements and Payments in the sections are not applicable.
 - 1. Hawaii Standard Specifications For Road, Bridge And Public Works Construction, State of Hawaii Department of Transportation dated 1994, and any amendments.
 - 2. Standard Specifications for Public Works Construction, the Department of Public Works, County of Kauai, September 1986, including any amendments.
 - 3. Standard Details for Public Works Construction, the Department of Public Works, County of Kauai, September 1984, including any amendments.

2.02 MATERIALS

- A. Materials, construction, and installations shall conform to the applicable sections of the Hawaii Standard Specifications For Road, Bridge And Public Works Construction, State of Hawaii Department of Transportation, dated 1994 and the Standard Specifications for Public Works Construction of the Department of Public Works, County of Kauai, September 1986, including any amendments.

PART 3 -EXECUTION

- 3.01 Construction and installations shall conform to the applicable sections of the Hawaii Standard Specifications For Road, Bridge And Public Works Construction, State of Hawaii Department of Transportation dated 1994, and the Standard Specifications for Public Works Construction, the Department of Public Works, County of Kauai, September 1986, including any amendments.

Details shall conform to the Standard Details for Public Works Construction, County of Kauai, September 1984, including any amendments, unless shown otherwise.

February 27, 2026

END OF SECTION

HAWAII HEALTH SYSTEMS CORPORATION – KAUAI DIVISION

Samuel Mahelona Memorial Hospital
Behavioral Health New Patient Facility
Project No. 221093-01

Paving, Roadway and Miscellaneous Work
02520-2

DIVISION 2 – SITE CONSTRUCTION

SECTION 02530 – SANITARY SEWER SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This item shall consist of furnishing and construction of sanitary sewer systems, complete. Trenching and backfilling are specified in Section 02302 – TRENCHING, EXCAVATION AND BACKFILLING FOR UTILITIES.

1.02 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract, including general and supplementary conditions and Division 01 specification sections, apply to this section.
- B. Related Work Described Elsewhere:
 - 1. Section 02100 – Site Preparation
 - 2. Section 02300 – Earthwork
 - 3. Section 02302 – Trenching, Excavation, and Backfilling for Utilities
 - 4. County of Kauai, Department of Public Works, Sewer Design Standards, dated June 1973, and all subsequent amendments.
 - 5. Uniform Building Code, current Edition, Chapter 12 “Building Code”.
 - 6. Uniform Plumbing Code, current Edition, Chapter 14 “Plumbing Code”.

PART 2 - PRODUCTS

2.01 APPLICABLE DOCUMENTS

The following specifications and standards of the issues listed and referred to in this section (including addenda, amendments, and errata listed) form a part of this specification to the extent required by the reference thereto.

- A. County of Kauai Plumbing Code and Uniform Plumbing Code, 2012 Edition.
- B. Sewer Design Standards of the Department of Public Works, County of Kauai, June 1973, including any amendments.
- C. Standard Details For Public Works Construction, Department of Public Works, County of Kauai, September 1984, including any amendments.
- D. The applicable provisions for the following sections of the Standard Specifications for Public Works Construction of the Department of Public Works,

February 27, 2026

County of Kauai, September 1986, and any amendments thereto shall govern the construction.

<u>SECTION</u>	<u>DESCRIPTION</u>
21	PVC Sewer Pipe and Appurtenances
23	Sewer Manholes
36	Adjustment of Existing Utility Structures to Finish
Grade	
39	Portland Cement Concrete
43	Concrete Blocks, Cradles and Jackets
48	Reinforcing Steel

2.02 MATERIALS

- A. Material for the gravity sewer line shall be polyvinyl chloride (PVC) pipe AWWA C-900, minimum DR 18.
- B. Material for the sewer cleanouts shall be cast iron and shall conform to the requirements of the Standard Specifications.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. General: Each pipe shall be carefully inspected before and after it is installed and defective pipe will be rejected. Proper facilities shall be provided for lowering sections of pipe into trenches. Pipe shall be laid with the bell or groove ends pointing up grade. Spigots shall be adjusted in bells and tongues in grooves to give a uniform space all around. Blocking or wedging between bells and spigots or tongues and grooves will not be permitted. Pipe that does not allow sufficient space for proper caulking and installation of jointing material shall be replaced by one of the proper dimensions. Open ends of pipe at the end of each day's work shall be closed temporarily with wood blocks or bulkheads.
- B. Installation of Joints:
 - 1. Bell and spigot piping shall be in accordance with the recommendations of the manufacturer of the pipe.
 - 2. Joints for PVC pipes shall have elastometric-gasket type joints compatible with AWWA C-900 pipes with the recommendations of the manufacturer of the joint material. The pipe shall not be deflected at the pipe joints.
- C. Cleanouts: Provide cleanouts where shown on the drawings and as required by Plumbing Code.

3.02 FIELD PAINTINGS

- A. After installation, all frames, covers, and exposed metals shall be thoroughly cleaned and given one coat of an approved bituminous paint.

3.03 PROTECTION OF PIPING & STRUCTURES

HAWAII HEALTH SYSTEMS CORPORATION – KAUAI DIVISION
Samuel Mahelona Memorial Hospital
Behavioral Health New Patient Facility
Project No. 221093-01

Sanitary Sewer System
02530-1

February 27, 2026

- A. All work shall be protected from damage or improper alignment. Open ends of unfinished work shall be plugged, capped, and covered to prevent the entrance of foreign materials.

3.04 BUILDING CONNECTIONS

- A. Connections shall be made up to 5 feet from the buildings. If the sewer lines are laid before the building plumbing is completed, advance risers shall be installed at the ends of the sewer lines. The risers shall be extended above finish grade and marked until connections are completed.

3.05 FINAL INSPECTION

- A. Before Final Inspection, ensure sanitary sewer lines and manholes are free from sand, silt or other obstructions.

END OF SECTION

DIVISION 2 – SITE CONSTRUCTION

SECTION 02630 – STORM DRAINAGE SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This item shall consist of furnishing and construction of storm drainage system, complete. Trenching and Backfilling are specified in Section 02302 – TRENCHING, EXCAVATION AND BACKFILLING FOR UTILITIES.

1.02 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract, including general and supplementary conditions and Division 01 specification sections, apply to this section.
- B. Related Work Described Elsewhere:
 - 1. Section 02100 – Site Preparation
 - 2. Section 02300 – Earthwork
 - 3. Section 02302 – Trenching, Excavation, and Backfilling for Utilities
 - 4. Uniform Building Code, current Edition, Chapter 12 “Building Code”.
 - 5. Uniform Plumbing Code, current Edition, Chapter 14 “Plumbing Code”.

PART 2 - PRODUCTS

2.01 APPLICABLE DOCUMENTS

The following specifications and standards of the issues listed and referred to in this section (including addenda, amendments, and errata listed) form a part of this specification to the extent required by the references thereto.

- A. Uniform Plumbing Code, 2018 Edition, and Kaua’i County Code, Chapter 14 “Plumbing Code”.
- B. Standard Details For Public Works Construction, Department of Public Works, County of Kauai, September 1984, including any amendments.
- C. The applicable provisions for the following sections of the Standard Specifications for Public Works Construction of the Department of Public Works, County of Kauai, September 1986, and any amendments thereto shall govern the construction. Sections concerning measurement and payment are not applicable.

February 27, 2026

SECTION	DESCRIPTION
24	Drain Pipes
25	Drain Manholes
26	Catch Basins and Storm Water Inlets
27	Concrete Channels
28	Subsurface Drains
39	Portland Cement Concrete
40	Concrete Structures
44	Concrete Rubble Masonry
48	Reinforcing Steel

- D. The applicable provisions from the Hawaii Standard Specifications For Road, Bridge And Public Works Construction, State of Hawaii Department of Transportation dated 1994, and any amendments.

2.02 MATERIALS

- A. Drainpipe shall be High Density Polyethylene Pipe (HDPE) unless otherwise indicated on the plans. All subdrain pipe shall be HDPE.
- B. Mortar shall be composed of one part Portland cement and two parts sand or fine aggregate by volume. Fine aggregate and sand shall conform to AASHTO Designation M 45.
- C. High Density Polyethylene Pipe (HDPE) shall conform to AASHTO M252 or M294 Type C or Type S. Fittings shall be of the same material as the pipe.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. General: Each pipe shall be carefully inspected before and after it is installed and any cracked, broken or defective pipe shall not be used. Proper equipment and facilities shall be provided for handling and positioning the pipe. Pipe shall be laid with bells or grooved ends pointing up grade. Spigots shall be centered in bells, and tongues in grooves, to permit proper jointing and to keep the interior of the pipes in proper alignment. Open ends of piping shall be kept closed and covered when work is not in progress.
- B. Installation of Joints:
1. Joint for pipe using flexible, water-tight, rubber-type gaskets: Installation of joints shall be in accordance with the recommendations of the manufacturer of the joint material, as approved by the Engineer.
- C. Cleanouts: Provide cleanouts where shown on the drawings and as required by Plumbing Code.

3.02 PROTECTION OF PIPING & STRUCTURES

February 27, 2026

- A. All work shall be protected from damage or improper alignment. Open ends of unfinished work shall be plugged, capped, and covered to prevent the entrance of foreign materials.

3.03 BUILDING CONNECTIONS

- A. Connections shall be made up to 5 feet from the buildings. If the drain lines are laid before the house plumbing is completed, advance risers shall be installed at the ends of the drain lines. The risers shall be extended above finish grade and marked until connections are completed.

3.04 FINAL INSPECTION

- A. Before Final Inspection, ensure storm drain lines and manholes are free from sand, silt or other obstructions.

END OF SECTION

SECTION 02740 – ASPHALT CONCRETE PAVING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

Related Work Described Elsewhere:

- A. Pavement striping is specified in Section 02760 – Pavement Marking and Signage.
- B. Earthwork is specified in Section 02300 – Earthwork.
- C. The work in this Section is specified in the following sections of the Department of Public Works (DPW) Standard Specifications:
 - 1. Section 29 – Subgrade
 - 2. Section 31 – Aggregate Base Course
 - 3. Section 33 – Asphalt Surface Treatment
 - 4. Section 34 – Asphalt Concrete Pavement

All references to measurement and payment shall be deleted.

1.02 DESCRIPTION

Work under this section consists of furnishing all labor, materials and equipment to complete the asphalt concrete paving as shown on the Drawings and as specified herein.

1.03 SOILS TESTING AND ANALYSES

A Soils Engineer or technician shall be present at the site to observe and direct paving operations and to take density or make visual tests as appropriate. Where low density test results are noted, the area shall be reworked by the Contractor and retested.

If the field observations and test results, in the opinion of the testing personnel or Soils Engineer indicate that the paving is not in general conformance to the intent of the Drawing and Specifications, the discrepancy shall be reported to the Contractor for corrective action with the Owner's Representative notified.

1.04 SUBMITTALS

- A. Submit manufacturer's certificates of conformance for each type of bituminous material and for the job mix formula.

- B. Submit certification that the specified herbicides were applied at the specified application rate over the entire subgrade to be paved.

PART 2 – PRODUCTS

2.01 ASPHALT CONCRETE PAVEMENT MATERIALS

Materials for asphalt concrete pavements shall be in accordance with the below-listed sections of the DPW Standard Specifications, except as amended in the plans and/or specifications herewith.

A. Base Course, 1½-inch Maximum	Section 31
B. Prime Coat for Pavement, MC30	Section 33
C. Tack Coat for Pavement, SS-1 or SS-1H	Section 33
D. Asphalt Concrete Pavement, Mix 4	Section 34

2.02 HERBICIDES

- A. Pre-Paving Vegetation Destruction: Herbicide shall be Roundup by Monsanto or accepted equivalent.
- B. Pre-Emergence Control: Herbicide shall be Treflan by Elanco Products Company or accepted equivalent.

PART 3 – EXECUTION

3.01 SURFACE PREPARATION

- A. The subgrade shall be prepared and compacted in accordance with the requirements of the DPW Standard Specifications. Soil tests shall be made at the subgrade level and the final pavement structure verified or modified as necessary.
- B. Apply pre-paving herbicide to all new pavement areas. Application shall not be made immediately after heavy rains or when rain is forecasted within the next 48 hours. The herbicide shall be applied in accordance with the manufacturer's recommended procedures and rates. Perform two herbicide applications at least three days apart.

3.02 AGGREGATE BASE COURSE

- A. The base course shall be constructed in accordance with Section 31 of the DPW Standard Specifications. Field density tests shall be made by the Soils Engineer to verify that the compaction obtained meets the Specifications.

- B. Apply pre-emergence herbicide on the prepared base for new asphalt concrete pavements in accordance with the manufacturer's recommendations.

3.03 ASPHALT CONCRETE PAVEMENT

- A. The asphalt concrete pavement shall be constructed in accordance with Section 34 of the DPW Standard Specifications.
- B. Smoothness. The finished surface of the pavement shall be true to grade and cross section, free from depressions and grainy spots, and of uniform texture. It shall not vary more than 1/8 of an inch over 10 feet.
- C. Surface Tolerance. The finished surface of the asphalt concrete pavement shall be within 0.02 feet above or below the theoretical grade.

3.04 PAVEMENT STRIPING

Pavement striping shall be as specified in Section 02760 – Pavement Marking and Signage.

END OF SECTION

SECTION 02750 – PORTLAND CEMENT CONCRETE PAVING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

Related Work Described Elsewhere:

- A. Roadway asphalt paving and subgrade preparation are specified in Section 02740 – Asphalt Concrete Paving.
- B. Pavement striping is specified in Section 02760 – Pavement Marking and Signage.
- C. Earthwork is specified in Section 02300 – Earthwork.
- D. The work in this Section is specified in the following sections of the Department of Public Works (DPW) Standard Specifications:
 - 1. Section 29 – Subgrade
 - 2. Section 30 – Select Borrow for Subbase Course
 - 3. Section 31 – Aggregate Base Course
 - 4. Section 37 – Portland Cement Concrete Pavement

All references to measurement and payment shall be deleted.

1.02 DESCRIPTION

Work under this section consists of furnishing all labor, materials and equipment to complete the Portland cement concrete paving as shown on the Drawings and as specified herein.

1.03 SOILS TESTING AND ANALYSES

A Soils Engineer or technician shall be present at the site to observe and direct paving operations and to take density or make visual tests as appropriate. Where low density test results are noted, the area shall be reworked by the Contractor and retested.

If the field observations and test results, in the opinion of the testing personnel or Soils Engineer indicate that the paving is not in general conformance to the intent of the Drawings and Specifications, the discrepancy shall be reported to the Contractor for corrective action with the Owner's Representative notified.

1.04 SUBMITTALS

- A. Submit certification that the specified herbicides were applied at the specified application rate over the entire subgrade to be paved.
- B. The contractor shall prepare a sample that is reinforced, jointed, stained, and finished as specified herein.
 - 1. The sample shall be 4 inches thick by 4 feet square.
 - 2. The sample shall be divided in equal halves by a longitudinal joint and sealed with a joint sealer as specified herein.
 - 3. The sample shall be made available for the Owner's review and acceptance.
 - 4. Additional samples may be required until the desired stain color, joint sealant appearance, and surface textures are achieved.
 - 5. Pavements shall not be constructed without the Owner's acceptance of the sample.
- C. Submit the name of the Independent testing laboratory to be employed by the Contractor to perform concrete sampling and testing. The laboratory shall be approved by the Engineer prior to commencing any concrete work. All fees for concrete sampling and testing are to be paid by the Contractor.
- D. Submit three (3) compressive strength 28-day tests for each day's pour as sampled and tested by the approved laboratory. The cost for all sampling, testing and resampling and testing shall be borne by the Contractor.
- E. Transit Mix Delivery Slips:
 - 1. Keep records showing time and place of each pour of concrete, together with transit mix delivery slips certifying contents of the pour. The Contractor shall ensure that all stamps and log data are accurate, clear and legible, including the time stamp upon leaving the yard, the time of arrival at the job site, the time at the start of the unloading, the time unloading is finished, and the time of departure from the job site.
 - 2. Deliver the records and delivery slips to the Engineer upon completion of the concrete placement work.

PART 2 – PRODUCTS

2.01 PORTLAND CEMENT CONCRETE PAVEMENT MATERIALS

Materials for Portland cement concrete pavement shall be in accordance with the below-listed sections of the DPW Standard Specifications, except as amended in the plans and/or specifications herewith.

A.	Subbase Course	Section 30
B.	Base Course, 1½-inch Maximum	Section 31
C.	Portland Cement Concrete	Section 39
D.	Joint Materials	Section 37
E.	Reinforcing Steel	Section 37
F.	Forms	Section 37

2.02 JOINT SEALANT

- A. Joint sealant shall be multi-component, polysulfide or polyurethane, elastomeric type sealant, conforming to ASTM C920.
- B. Sealant shall be self-leveling, traffic bearing, and resistant to UV reversion.
- C. Joint sealant color shall match the color of the stained concrete to the Owner's satisfaction.

2.03 HERBICIDES

- A. Pre-Paving Vegetation Destruction: Herbicide shall be Roundup by Monsanto or accepted equivalent.
- B. Pre-Emergence Control: Herbicide shall be Treflan by Elanco Products Company or accepted equivalent.

PART 3 – EXECUTION

3.01 SURFACE PREPARATION

- A. The subgrade shall be prepared and compacted in accordance with the requirements of the DPW Standard Specifications. Soil tests shall be made at the subgrade level and the final pavement structure verified or modified as necessary.
- B. Apply pre-paving herbicide to all new pavement areas. Application shall not be made immediately after heavy rains or when rain is forecasted within the next 48 hours. The herbicide shall be applied in accordance with the manufacturer's recommended procedures and rates. Perform two herbicide applications at least three days apart.

3.02 SUBBASE COURSE

The subbase course shall be constructed in accordance with Section 30 of the DPW Standard Specifications. Field density tests shall be made by the Soils Engineer to verify that the compaction obtained meets the Specifications.

3.03 AGGREGATE BASE COURSE

The base course shall be constructed in accordance with Section 31 of the DPW Standard Specifications. Field density tests shall be made by the Soils Engineer to verify that the compaction obtained meets the Specifications.

3.04 PORTLAND CEMENT CONCRETE PAVEMENT

- A. Side forms shall be placed in accordance with Section 37 of the DPW Standard Specifications. A keyed construction joint shall be provided along abutting sections of formed pavement, as indicated.
- B. Concrete placement shall be as specified in the DPW Standard Specifications. Reinforcing steel shall be installed as indicated.
- C. Curing and Protection: Curing and protection shall be as specified in the DPW Standard Specifications.

3.05 JOINTS

- A. Joint construction shall be in accordance with the DPW Standard Specifications and details, when not shown on the drawings.
- B. Joint Sealant: Joint sealant shall be applied in accordance with the manufacturer's recommendations.

3.06 FINISHING

- A. Strike-off, consolidation and tamping shall be in accordance with the DPW Standard Specifications.
- B. The top surfaces of sidewalks and other pedestrian concrete surfaces shall receive a non-slip finish.
- C. All concrete pavements shall have a uniform color and surface texture, which shall be subject to acceptance by the Owner's Representative and Architect.

3.07 PATCHING

Within 3 days after stripping formwork, fill and patch surface defects such as rock

February 27, 2026

pockets, honeycombs, cracks, and holes. The Landscape Architect will distinguish between concrete which requires replacement or repair and surface defects which requires patching. Permission to patch any area will not be construed as a waiver of the Owner's right to require complete removal of the defective work if the patching, in his opinion, does not satisfactorily restore the quality and appearance of the surface.

3.08 CLEANING

Sweep concrete pavement and wash free of stains, discolorations, dirt, and other foreign material just prior to final inspection.

END OF SECTION

DIVISION 2 – SITE CONSTRUCTION

SECTION 02760 – PAVEMENT MARKING AND SIGNAGE

PART 1 -GENERAL

1.01 RELATED DOCUMENTS

- A. The work in this Section shall be in accordance with the appropriate Sections of the Hawaii Standard Specifications For Road, Bridge And Public Works Construction, State of Hawaii Department of Transportation, dated 1994/2005, including any amendments. Paragraphs concerning Measurements and Payments in the sections are not applicable.
 - 1. These specifications shall amend Section 629 – Pavement Markers, Striping and Markings of the DOT Standard Specifications.
 - 2. These specifications shall amend Section 621 – Destination, Directional, Regulatory and Warning Signs of the DOT Standard Specifications.
 - 3. These specifications shall amend Section 755 – Pavement Marking Materials of the DOT Standard Specifications
 - 4. All references to measurement and payment shall be deleted.
- B. Related Work Described Elsewhere:
 - 1. Roadway paving is specified in Section 02740 – ASPHALT CONCRETE PAVING.
 - 2. Concrete paving is specified in Section 02750 – PORTLAND CEMENT CONCRETE PAVEMENT.

1.02 DESCRIPTION

- A. Work under this Section consists of furnishing all labor, materials and equipment to complete the roadway striping, pavement markers and signage on the Drawings and as specified herein.

1.03 SUBMITTALS

- A. Submit manufacturer's documentation(s) of compliance to the requirements listed herein, including but not limited to Certifications, Manufacturer's Product Data Sheets, and Manufacturer's Material Safety Data Sheets, for all materials herein specified.

PART 2 – PRODUCTS

2.01 TRAFFIC PAINTS

- A. Reflectorized traffic paint shall conform to the requirements of Premixed Reflectorized White and Blue Traffic Paint.
- B. Only those traffic paints which have qualified in the latest completed prequalification tests conducted by the State Department of Transportation and having a Weighed Rating (W) of at least 6.5 for reflectorized white and for reflectorized blue at the completion of the road test will be permitted for use on this project. Quick-dry paints shall not be used.
- C. The phrase "latest completed prequalification tests" shall mean either those traffic paints which have been prequalified by the State Department of Transportation at the time this Contract becomes effective or those traffic paints which have been listed by the State Department of Transportation as meeting the State Department of Transportation's prequalification tests at the time the Contractor is doing the pavement striping.
- D. The following Traffic Paints are acceptable:

Type	Brand	Stock Order Formula No.
Pre-Mixed Reflectorized, Water Borne, White Traffic Paint	Centerline Company Centerline Morton Pervo Ameritone	CL-5022 CL-6044 2683A9 6000R 022683
Pre-Mixed Reflectorized, Solvent Based, White Traffic Paint	J.E. Bauer Company J.E. Bauer Morton (Centerline) Pervo	892A9 2581A9 8036C1 5550R
Ready-Mixed, Reflectorized Water Borne, Lead-Free, Blue Traffic Paint	In accordance with Federal Spec No. TT-P-1952D	In accordance with Federal Spec No. TT-P-1952D

2.02 PAVEMENT MARKERS

- A. Markers: Rectangular, clear, highly impact resistant plastic top embossed with striated prismatic patterns on the underside. Underside is lined with a highly polished reflectorized plastic lens which is colored yellow for roadway centerlines or blue for fire hydrants. Interior of top is filled with a poured material which reinforces the impact resistant plastic top. Reflector shall meet requirements of the State Standard Specifications.

February 27, 2026

- B. Adhesive: Provide standard set type or rapid set type pavement marker adhesive compatible with roadway surface in compliance with the DOT's Hawaii Standard Specifications For Road, Bridge And Public Works Construction.
- C. Adhesive solvent: Provide manufacturer's recommended solvents to remove excess adhesive from roadway or marker.

2.03 SIGNS

- A. Signs shall conform to the requirements of the Manual on Uniform Traffic Control Devices for Streets and Highways, 2023 Edition, as amended, by the Federal Highway Administration.

2.04 SIGN POSTS

- A. Sign posts shall be square tube with anchor sleeves. Posts shall be FHWA approved for breakaway standards.

PART 3 – EXECUTION

3.01 CONSTRUCTION REQUIREMENTS

- A. Work shall conform to the requirements of Section 629.03 of the Hawaii Standard Specifications For Road, Bridge And Public Works Construction and as herein below specified.
- B. Before application of the markings, the portion of the roadway surface in the work area shall be thoroughly cleaned of all dust, dirt, curing compound, grease, oil, moisture, loose or unsound layers and any other material which would adversely affect the bond of the markings.
- C. Traffic stripes shall be of the length, width, and placement specified or to match existing. Unless otherwise specified, the Contractor shall establish control points, satisfactory to the Engineer, spaced at intervals that will insure accurate locations of the stripe.
- D. No markings shall be applied when moisture or foreign matter is present on the surface to be marked, or when wind conditions are such as to cause dust to be deposited on the prepared areas or to prevent satisfactory application of the marking.
- E. The Contractor shall apply all pavement striping before opening roadways to public traffic except that when connections to existing pavements are made or when temporary detours carry public traffic, the Contractor shall stripe the connecting pavements on the day that the roadway is open to traffic. If it is necessary to run public traffic over roadways which have not received final striping, the Contractor shall paint temporary guide dashes at the traffic stripe location on the pavement as guidance for drivers until the permanent striping can be installed.
- F. The Contractor shall install temporary guidelines and outline of legends and crosswalks with a 2-inch wide line on the day the roadway is opened to traffic, which shall be approved by the Engineer before permanent lines are installed.

- G. The Contractor shall furnish and place all warning and directional signs necessary to direct and control the traffic during the striping operations. Warning signs shall be set up before the beginning of each operation and extra signs shall be kept well ahead of the marking equipment. The freshly marked stripe shall be protected by cones or other satisfactory devices until the traffic marking is dry and will not transfer to car tires. The drying time for no pickup shall be not less than 5 minutes or more than 40 minutes. All stripes damaged by traffic, or pavement marked by traffic crossing wet marking, shall be repaired or corrected as specified below.
- H. Perform thermoplastic marking in accordance with the requirements of Section 629.03(C)(3) of the Hawaii Standard Specifications For Road, Bridge And Public Works Construction.
- I. Traffic paint shall be applied in two separate coats at a nominal film thickness of 0.015 inch. The traffic paint applicator machine shall have appropriate shields or nozzle controls which will permit sharp pavement stripe definition. The traffic paint applicator machine shall have an air stream nozzle which can direct compressed air immediately before the area of paint application for the purpose of cleaning the pavement prior to paint application.
- J. Pavement legends shall be applied with appropriate templates.
- K. No stripe shall be less than the specified width. No stripe shall exceed the specified width by more than 2 inches. The length of the 15-foot painted segment for skip stripe may vary plus or minus 1 foot and the 25-foot gap between segments may vary plus or minus 1 foot. The alignment of the stripe shall not deviate from the intended alignment by more than 1 inch on tangents and on curves up to and including 1 degree. On curves exceeding 1 degree, the alignment of the stripe shall not deviate from the intended alignment by more than 2 inches.
- L. All stripes and segments of stripes shall present a clean-cut, uniform and workmanlike appearance. All markings which fail to have a uniform, satisfactory appearance shall be corrected by the Contractor at his expense.
- M. Traffic striping which fails to meet the requirements specified herein, or is marred or damaged by traffic or from other causes, shall be corrected prior to acceptance by the State at the Contractor's expense. For all misted areas, drip and spattered paint and excess markings shall be removed to the satisfaction of the State. When it is necessary to remove paint or markings, it shall be done by means which will not damage the underlying surface of the pavement. When necessary to correct a deviation which exceeds the permissible tolerance in alignment, that portion of the stripe so affected shall be removed plus an additional 25 feet in each direction, and a new stripe then painted in accordance with these specifications.

3.02 TEST SPECIMENS

- A. The Contractor shall submit to the Owner's Representative test specimens as requested. Test markings shall be applied to a suitable plane rigid surface. The

February 27, 2026

area shall be of sufficient size to permit film thickness measurement to be made at least 1 inch from any edge.

3.03 TRAFFIC SIGNS

- A. Each sign shall be carefully installed in accordance with Section 621.03 of the Hawaii Standard Specifications For Road, Bridge And Public Works Construction at the approximate locations shown on the plans and in accordance with the mounting details indicated. Final locations shall be approved by the Owner's Representative.
- B. Sign posts shall be vertical and there shall be a minimum of 7 feet clearance to the bottom of the sign.
- C. Construction signs may be mounted on portable frames or supports.
- D. The backside of all metallic signs for parking and traffic shall be painted hunter green in color

END OF SECTION

February 27, 2026

SECTION 02810 – IRRIGATION SYSTEM

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Materials, equipment and services required to install the complete landscape irrigation system as indicated on Drawings.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02300 – EARTHWORK
- B. Section 02315 - TRENCHING
- C. Section 02900 – PLANTING
- D. Section 02906 – TREE TRANSPLANTING
- E. Section 16000 – ELECTRICAL

1.03 REFERENCES

- A. ASTM A 126 - Standard Specification for Gray Iron Castings For valves, Flanges and Fittings
- B. ASTM A 536 - Standard Specification for Ductile Iron Castings
- C. ASTM B 32 - Standard Specification for Solder Metal
- D. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings
- E. ASTM B88 - Standard Specification for Seamless Copper Water Tube
- F. ASTM B 302 - Standard Specification for Threadless Copper Pipe, Standard Sizes
- G. ASTM B 828 - Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings
- H. ASTM D 1784 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
- I. ASTM D 1785 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
- J. ASTM D 2464 - Standard Specification for Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
- K. ASTM D 2466 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40
- L. ASTM D 2564 - Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems
- M. ASTM D 3350 – Standard Specification for Polyethylene Plastic Pipe and Fittings Materials
- N. ASTM F 477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe

February 27, 2026

- O. ASTM F 714 - Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter
- P. NEMA 250 - Enclosures For Electrical Equipment
- Q. Water System Standards – Department of Water, County of Kauai; Board of Water Supply, City and County of Honolulu; Department of Water Supply, County of Maui; Department of Water Supply, County of Hawaii; Volume 1 [26].

1.04 QUALITY ASSURANCE

- A. In accord with Section 01440 – QUALITY ASSURANCE AND QUALITY CONTROL.
- B. Workman Qualifications:
 - 1. Contractor with no less than five (5) years of experience installing irrigation systems, similar to the scope and complexity of this project, with documented completion of at least (5) successful installations of commercial, computer-controlled irrigation systems.
 - 2. On-site field superintendent shall have no less than 5 yrs. of continuous experience in the installation of commercial computer-controlled irrigation systems. Supervisor shall remain on site during all specified work in progress.
- C. Tests and Inspections:
 - 1. Do not conceal any work until all required tests and inspections have been completed.
 - 2. Conduct the following tests, inspections and conference with Architect. Provide advanced notification of each according to the times indicated:
 - a. Pre-installation conference: 10 days.
 - b. System layout: 10 days.
 - c. Hydrostatic testing of pressure main line and non-pressure lateral lines installed under paving: 10 days.
 - d. Coverage tests: 10 days.
 - e. Final inspection: 10 days.
 - 3. During final inspection, provide two-way radios and sufficient personnel to provide constant communication between inspection areas and the controller.
 - 4. Hydrostatic tests:
 - a. Furnish force pump and all equipment required to perform hydrostatic testing.
 - b. Center load backfill over pipes, leaving all joints exposed until the installation has been inspected, tested, and accepted by Architect.
 - c. Except for ball valves installed upstream of control valves, all testing shall be completed prior to the installation of all other valves and valve assemblies.
 - d. Perform hydrostatic tests in presence of Architect. Maintain 150 psi pressure in the lines for a period of not less than 30 minutes with pressure

not dropping more than 5 psi. If leaks develop, remake joints and repeat tests until the entire system has proven watertight and is accepted by the Architect.

5. Coverage test:

- a. Upon completion of the sprinkler system and prior to planting of shrubs, ground cover or turf, perform a coverage test in presence of Architect to determine that irrigation coverage for all planting areas is complete and adequate.
- b. Furnish materials and perform work required to correct any inadequacies of coverage. Re-schedule and perform additional coverage test with Architect for acceptance.

6. Final Inspection:

- a. Upon completion of the entire system, schedule and conduct a final inspection of all equipment and perform a coverage test of each valve station with the Project Manager as part of the Final Approval process.
- b. During final inspection, provide two-way radio communication and sufficient personnel to provide constant communication between inspection areas and the controller.

D. Final Acceptance:

1. Prior to final approval of work, all of the following requirements shall be met:
 - a. Landscape irrigation system completed and accepted by Architect.
 - b. Coverage tests completed and accepted by Architect.
 - c. Punch list items completed and accepted by Architect.
2. Maintain irrigation system and sufficient watering schedule until all conditions of acceptance have been completed.
3. Contracted irrigation maintenance period shall begin upon Architect's Final Acceptance.

1.05 PROJECT CONDITIONS

- A. Coordinate work with underground utilities and trades responsible for other underground improvements including the location and planting of specimen trees, and other planting as applicable. Verify locations with Architect of all planting requiring excavations 48 inches in diameter and larger prior to layout of main lines.
- B. Provide temporary irrigation at all times to properly maintain existing planting where required.
- C. Existing Irrigation Systems:
 1. The existing automatic irrigation system shall be maintained in uninterrupted operation for the duration of the work.
 2. All existing irrigation valves and irrigation systems adjacent to the work shall be protected in-place and maintained in operation. Any required disconnection or interruption in existing irrigation shall be coordinated with the Architect in advance of work.

February 27, 2026

3. Water for construction site may be supplied by existing irrigation lines that are flow sensitive. Contractor shall be responsible for any damage to new or existing planting caused by not coordinating installation with the Architect or defeating the flow sensing capabilities.

1.06 PRE-INSTALLATION CONFERENCE

- A. At least two (2) weeks prior to the commencement of work, conduct a pre-installation conference with the Architect. This meeting shall include all parties responsible for installation, scheduling and testing of the finish work under this section.
- B. Review methods and procedures related to the work of this Section, including, but not necessarily limited to the following:
 1. Products and system requirements
 2. Review of required submittals
 3. Review of required details
 4. Schedule and sequencing of work
 5. Coordination with other trades and existing site conditions
 6. Forecasted weather and procedures for coping with unfavorable conditions
 7. Required inspections, reviews and procedures for approvals
- C. Record discussions of conference including all decisions, directions and agreements reached. Furnish copies of record to all parties in attendance.

1.07 SUBMITTALS

- A. In accord with Section 01300 – SUBMITTAL PROCEDURES.
- B. Documentation to substantiate required experience and workman qualifications.
 1. Provide copy of certificates for professional memberships, certifications and training.
 2. List project names, location, address, and telephone number of contact persons for information regarding completed work.
- C. List of materials:
 1. Submit a complete list of materials prior to commencing work. List of materials shall include the name of manufacturer, model number, manufacturer's product cut sheet, and description of each item intended for use in the installation
 2. Irrigation submittal shall be specific and complete. All items shall be listed, including solvent, primer, wire, wire connectors, valve boxes, check valves, and all other items needed to complete work.
 3. Although manufacturer and other information may differ, the following is a guide to the proper format for submittal:

Item	Description	Manufacturer	Model No.
1	Pop-up Sprinkler Bodies	Rain Bird	1800 Series
2	Field Satellite	Rain Bird	ESP-LXD
3	Manual Gate Valves	Nibco	T-113

4. Submit operating manuals and maintenance data of equipment.
 - a. No substitutions of materials or equipment will be allowed without prior written approval by Architect. Refer to Section 01630 - SUBSTITUTION PROCEDURES.
 - b. Any equipment or materials furnished without the prior approval of Architect may be rejected and required to be removed at Contractor's expense.
 - D. Controller charts:
 1. Provide two controller charts for each controller supplied.
 2. Controller charts shall be prepared in AutoCAD. Provide two (2) hard copy prints of controller charts and AutoCAD electronic files on disk.
 3. Controller chart to be a reduced scale drawing of the actual installed system depicting all valve stations from one field satellite or controller. Each valve's area of coverage shall be uniquely identified by a contrasting color to the other adjacent valve stations.
 4. The controller charts are to be completed and approved by Architect prior to final acceptance of the system.
- 1.08 PRODUCT HANDLING
- A. In accord with Section 01660 - PRODUCT STORAGE AND HANDLING REQUIREMENTS.
 - B. Deliver and store products and equipment in manufacturer's unopened packaging until ready for installation.
- 1.09 ADDITIONAL MATERIALS
- A. Furnish the following extra components prior to Final Approval.
 1. Three long-handled valve key each for square nut and hand wheel equipped gate valves.
- 1.10 WARRANTY
- A. Submit warranty documents in accord with Section 01770 – CLOSEOUT PROCEDURES.
 - B. Warranty the entire landscape irrigation system to give satisfactory service, including all equipment and materials for a period of one (1) year from the date of Final Acceptance.
 - C. Warranty the supplemental landscape irrigation system to give satisfactory service for a period of 6 months from the date of its acceptance by Architect.

February 27, 2026

- D. Should any problems develop within the warranty period due to inferior materials or faulty workmanship, correct problems to Architect's satisfaction at no additional cost.
- E. Any damages or re-work required of the landscape or hardscape due to repairs of the irrigation system shall be completed to Architect's satisfaction at no additional cost.
- F. Architect reserves the right to make temporary repairs, as necessary, to keep the landscape irrigation system in an operating condition. Exercising this right does not in any way relieve the contractor of any responsibilities under the terms of the warranty.
- G. Manufacturer's product warranties shall supplement but not relieve the Contractor of any liability from his contracted installation Warranty.

PART 2 - PRODUCTS

2.01 PLASTIC PIPE AND FITTINGS

- A. Potable Pipe shall be marked with Manufacturer's name, nominal pipe size, schedule or class, pressure rating in PSI, and date of extrusion.
 - 1. Non-pressure 'lateral line' pipe: Class 200, PVC plastic, ASTM D1785, Type I, Grade I with solvent welded joints. Use Schedule 40, PVC for all pipe installed under paving.
 - 2. Pressure main line pipe, sizes 2-1/2 inches and smaller: Schedule 40, PVC plastic, ASTM D 1785, Type I, Grade I, with solvent welded joints, and Christy's detectable marking tape, green color with irrigation line below warning.
 - 3. Pressure main line pipe, sizes 3 inches and larger: Schedule 40, PVC plastic, ASTM D 1785, Type I, Grade I with rubber gasketed bell and spigot connections, with Christy's detectable marking tape, green color with irrigation line below warning. Insertion marks shall be visible to show proper depth into spigot.
- B. Fittings shall bear manufacturer's name or trademark, material designation, size, and applicable I.P.S. schedule.
 - 1. Glued socket type, for pipe sizes 2-1/2 inches and smaller; Schedule 40, PVC plastic; Grade I, ASTM D 2466, Type I.
 - a. Solvent cement: ASTM D2546, for PVC pipe and fittings.
 - 2. Threaded type, for pipe sizes 2-1/2 inches and smaller; Schedule 80, PVC plastic; Grade I, ASTM D 2464, and ASTM F 437.
 - 3. Bell-end, sizes 3 inches and larger; Ductile iron, grade 65-45-12 in accord with ASTM A 536, having deep bell push-on joints with gaskets meeting ASTM F477.
 - a. HARCO 'Deep Bell' by the Harrington Corp. of Lynchburg, VA., (804) 845-7094; or Architect-approved equivalent.
 - b. Transition gaskets are not allowed.

February 27, 2026

2.02 COPPER PIPE AND FITTINGS

- A. Type K, hard tempered pipe, ASTM B 88.
- B. Solder joint type wrought copper fittings, ASTM B 828.
- C. 95/5 solder, ASTM B 32.

2.03 FLEXIBLE TUBING

- A. Rain Bird Swing Pipe, Toro 850-01, or equal thick wall flexible pipe.

2.04 CONDUIT

- A. Gray PVC Schedule 80 conduit with solvent weld fittings.
- B. Use separate conduits for each type of wire or cable run.
- C. Size conduits as indicated on Drawings or as required to accommodate anticipated number of wires without binding or damaging wire insulation.

2.05 SLEEVES

- A. Schedule 40 PVC for applications requiring 3 inches and smaller diameter.
- B. Class 200 PVC for applications 4 inches and larger.
- C. All sleeves shall be 2 pipe sizes larger than the diameter of the protected pipe run for pipe under 6 inches diameter and 2 pipe sizes larger for runs 6 inches and larger.

2.06 CONTROL WIRE

- A. Low-Voltage, Branch Circuit Cables:
 - 1. UL 1551, Type PE single solid-copper conductor; polyethylene insulation; suitable for direct burial.
 - 2. Control Wire: 14 AWG minimum between irrigation controller and automatic control valves.
 - 3. Common Wire: 12 AWG between all valves and home-run to irrigation controller.
- B. In all cases, wire size and specifications shall meet the minimum requirements of the installation instructions and recommendations of the manufacturer of the irrigation controller. Wire Connectors: DBR/Y-6 direct bury splice kits by 3M with 'Scotchlok'™ connectors.

2.07 BACKFLOW DEVICE

- A. Backflow Device: As indicated on Drawings.

February 27, 2026

2.08 VALVES

A. Gate Valves:

1. Manual Gate Valves 2-1/2 inches and smaller:

- a. Nibco T-113 or Architect-approved equivalent that includes the following options; 200 lb. saturated steam rated brass body, ASTM B62, with threaded joints, non-rising stem, screwed bonnet and bronze hand wheel.

B. Electric Control Valves: Type and size as indicated on Drawings.

C. Quick Coupler Valves: Type and size as indicated on Drawings.

2.09 CONTROLLERS

A. As indicated on Drawings.

B. Controller Cabinet:

1. Pedestal Mount: Strong Box SB-24SS, as manufactured by V.I.T. Products, Inc. ph (800) 729-1314
2. NEMA Type 3R rating with thermostatically controlled fan and louvered-vent filters
3. Include a minimum of two (2) GFCI receptacles within controller enclosure.
4. Include stainless steel pedestal as manufactured by V.I.T Products, Inc. to match controller cabinet.

2.10 SPRINKLER HEADS

A. Sprinkler Heads: As specified on Drawings.

B. Rotator Heads: As specified on Drawings.

2.11 DRIP IRRIGATION

A. Drip Emitters and Tubing: As specified on Drawings.

B. In all cases, inline dripline zones shall be constructed with a PVC supply manifold and a PVC exhaust/flush manifold.

C. All inline dripline zones shall include a manual flush valve plumbed to exhaust/flush manifold and installed in round valve box as indicated on the Drawings.

D. Install an air/vacuum relief valve at the highest point of the inline dripline zones as indicated on the Drawings or as required. Air/vacuum relief valve shall be brass or plastic housing, with corrosion-resistant internal parts.

E. Secure inline dripline to grade as recommended by the manufacturer. Install a 2-inch layer of mulch over dripline.

2.12 VALVE BOXES

A. All subgrade valves and valve assemblies located within planting areas are to be installed in black plastic boxes with matching purple lids as manufactured by Rain Bird.

February 27, 2026

1. For manual gate valves; 10 inches x 10-1/4 inches round box with bolt-down cover. Extension sleeve shall be PVC with minimum depth of 6 inches.
2. For Electric Control Valves; 11-3/4 inches x 17 inches x 12 inches rectangular box with bolt-down cover.
3. For quick coupler valves; 10 inches x 10-1/4 inches round box with bolt-down cover.

2.13 VALVE IDENTIFICATION TAGS

- A. Christy brand, Maxi Tag™, manufactured from polyurethane Bayer Desmopan, 3 inches x 4 inches, hot-stamped with black letters on yellow background. Attach one tag to each electric control valve providing field satellite and station numbers.
- B. All valves, regardless of type, shall have 'Reclaimed Water' ID tags attached. Tags shall be Christy brand Maxi Tag™, hot-stamped with black letters on purple background. Tags shall read "Warning - Reclaimed Water - Do Not Drink." Tag shall be printed in English and Spanish.
- C. Special order tags from T. Christy Enterprises, 655 East Ball Road, Anaheim, CA 92805. Ph: (800) 258-4583, Fax: (800) 468-4583.

2.14 DIELECTRIC FITTINGS

- A. General Requirements: Assembly of copper alloy and ferrous materials or ferrous material body with separating non-conductive insulating material suitable for system fluid, pressure, and temperature.
- B. Dielectric Unions:
 1. Factory fabricated union, 2 inches and smaller, 150 psi minimum.
 2. End Connections: Solder-joint copper alloy and threaded ferrous; threaded ferrous.
- C. Dielectric Flanges:
 1. Factory-fabricated, bolted, companion-flange assembly, 2-1/2 inches to 4 inches and larger; 150 psi minimum.
 2. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.
- D. Dielectric Flange Kits:
 1. Non-conducting materials for field assembly of companion flanges, 2-1/2 inches and larger; 150 psi minimum.
 2. Gasket: Neoprene or phenolic.
 3. Bolt Sleeves: Phenolic or polyethylene.
 4. Washers: Phenolic with steel backing washers.
- E. Dielectric Couplings:
 1. Galvanized steel coupling; 300 psi.
 2. End Connections: Female threaded.

February 27, 2026

3. Lining: Insert and non-corrosive, thermoplastic lining.
- F. Dielectric Nipples:
 1. Electroplated steel nipple complying with ASTM F1545; 300 psi.
 2. End Connections: Male threaded or grooved.
 3. Lining: Inert and non-corrosive; propylene.

2.15 DETECTABLE WARNING TAPE

- A. Provide products by T. Christy Enterprises, 655 East Ball Road, Anaheim, CA 92805. Ph: (800) 258-4583, Fax: (800) 468-4583.
- B. Detectable warning tape shall be installed below ground and be detectable with a non-ferrous metal detector when buried flat at depths recommended by the manufacturer. In all cases, install detectable warning tape according to manufacturer's instructions and recommendations.
- C. Detectable warning tape shall be 5.0 mil overall thickness, five-ply composition. Tape shall have ultra-high molecular weight, consist of 100 percent virgin polyethylene, and be acid, alkaline, and corrosion resistant.
- D. Detectable warning tape shall have a 0.35 mil solid aluminum foil core. Printed text shall be a repeated warning message, reverse printed on a 0.8 mil clear film, and laminated to aluminum foil with a 3.75 mil clear film backing; encapsulated within 2.55 mil polyethylene backing.
- E. Tensile strength of tape shall not be less than 7800 psi and in accordance with ASTM D882-80A.
- F. Elongation properties shall be in accordance with ASTM D882-80A and are less than 150 percent at break point.
- G. Tape color and legend combination shall be in accordance with APWA or local requirements. Tape lettering shall be 1-1/2 inches tall minimum.
- H. Tape width shall be minimum 3 inches wide.
- I. Tape Color: Green and in accordance with APWA or local requirements.
- J. Printed Text on Tape: "Cation Irrigation Line Buried Below" and in accordance with APWA or local requirements.

2.16 MISCELLANEOUS EQUIPMENT

- A. Stakes: #4 rebar – length as noted.
- B. Clamps: Stainless steel screw clamps.
- C. Swing Joints: Dura, Spears, Rain Bird maximum, or Lasco.
- D. Check Valves: KBI, NDS, Nibco, or approved equal.
- E. Concrete: 2500 psi/28-day concrete.

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

- A. Layout of irrigation pipe and equipment indicated on Drawings is diagrammatic. Actual locations are contingent upon actual site conditions and integration with other underground utilities.
- B. Verify dimensions, grades and points of connection in field prior to commencement of work.
- C. Do not proceed with installation when it is apparent that obstructions, grade differences or conflicts in the Drawings exist. Bring all such conflicts or discrepancies to the immediate attention of Architect for clarification.
- D. Obtain and pay all plumbing permits and inspections required by governing agencies.

3.02 SUPPLEMENTAL IRRIGATION

- A. Provide a supplemental drip irrigation system for all palm trees and all boxed trees with root balls 24 inches and larger installed under this contract. This system is to ensure that installed trees will be automatically irrigated during the plant establishment period.
- B. The supplemental system shall be designed by a qualified irrigation design professional that is experienced with drip and low flow irrigation systems.
 - 1. Submit for Architect approval, prior to commencing with work, schematic drawings showing intended drip irrigation design with all pertinent information for temporary water connections, equipment and installation.
- C. System to be installed and operational prior to tree planting, regardless of the availability of a permanent water connection. If permanent irrigation water is not available at the time the system is installed, provide a temporary water connection until a permanent connection can be made.
- D. Pipe and/or tubing, not in a hazardous area, to be installed on-grade. Pipe installed as a part of temporary irrigation shall not be re-used as any part of the permanent landscape irrigation system.
- E. All pipe and/or tubing shall be buried and sleeved under construction or access roads at a proper depth to prevent damage.
- F. Protect temporary system during entire planting process. Repair any damage to landscape caused by leaking or broken lines.
- G. The system should be designed at 90% capacity to allow for additional plant material or emitters as required. Ten percent (10%) additional emitters to be included in contract and installed at Architects discretion.
- H. Use the following table to determine the required quantity of emitters or spray stakes;
 - 1. 1 spray stake/emitter for all rootballs up to 2 feet measured in the largest dimension.

February 27, 2026

2. 2 spray stakes/emitters for all rootballs up to 4 feet measured in the largest dimension.
 3. 3 spray stakes/emitters for all rootballs up to 6 feet measured in the largest dimension.
 4. 4 spray stakes/emitters for all rootballs up to 8 feet measured in the largest dimension.
- I. Flow rates should be calculated using .25 GPM per emitter.
 - J. Upon completion of the permanent irrigation system, remove the supplemental system without damaging landscape. Battery operated controllers and valves shall be turned over to the Owner. Remainder of supplemental materials to be salvaged or properly disposed of off-site.

3.03 PREPARATION

- A. Layout of irrigation pipe and equipment indicated on Drawings is diagrammatic. Actual locations are contingent upon site conditions and integration with other underground utilities.
- B. Verify dimensions, grades, and point of connection in the field prior to commencement of the Work.
- C. Do not proceed with installation when it is apparent that obstructions, grade differences, or conflicts with Drawings exist. Bring all such conflicts or discrepancies to the immediate attention of the Architect for clarification.
- D. Set stakes to identify locations of proposed irrigation system. Obtain Architect's acceptance before excavation.

3.04 POINT OF CONNECTION

- A. Refer to Civil Drawings for points of connection within new valve box.

3.05 TRENCHING

- A. Lay-out system using an approved staking method.
- B. Coordinate routing of mainline piping and trenching with underground utilities and specimen tree locations.
 1. Planting locations shall take precedence over sprinkler and piping locations where possible.
 2. Maintain minimum clearance between pipes as required by code.
 3. Notify and coordinate with Architect of any major deviations from original layout.
- C. Trenching operations shall be done via mechanical or hand methods and to as true a line as possible. Trenching with grader or bulldozer will not be allowed. Excavate trenches with straight and vertical sides. No trench shall be excavated in such a manner that the trench section appears triangular or trapezoidal. Any trench excavated in an objectionable manner, as determined by the Architect, shall be backfilled and re-compacted by the Contractor before retrenching, at no additional cost.

February 27, 2026

- D. Provide continuous support for pipe on bottom of trenches. Lay pipe to uniform grade.
 - 1. Bottom of trench shall be free of rocks, clods, and other sharp-edged objects. The Architect reserves the right to have the trench over-excavated 3 inches and filled with accepted material at no additional cost should the trench bottom contain rocks or other objectionable material.
 - 2. Trench backfill material shall be on-site or imported select material in accord with Section 02315 – EXCAVATION AND FILL. Backfill material shall be free from rocks greater than 1/2-inch.
 - 3. Maintain 1-inch minimum clearance between lines which cross at 45-degree to 90-degree angles.
 - 4. Maintain 6 inches minimum clearance between sprinkler lines and between lines of other trades. Do not install sprinkler lines directly above any other pipes or utilities.
 - 5. Maintain 12 inches minimum clearance between mainline and potable water lines. Irrigation mainline crossings passing above potable water lines shall be concrete jacketed and conform to “Water System Standards” Department of Water, County of Kauai; Board of Water Supply, City and County of Honolulu; Department of Water Supply, County of Maui; Department of Water Supply, County of Hawaii; Volume 1 [26], county-adopted plumbing code, as amended, and other water purveyor requirements.
- E. Where irrigation lines occur within landscaping, trench depths shall be:
 - 1. Provide minimum cover of 24 inches over all pressure main lines 6 inches and larger. Maximum cover shall be 48 inches unless otherwise approved by Architect.
 - 2. Provide minimum cover of 24 inches over all pressure supply main lines 4 inches and larger. Maximum cover shall be 48 inches unless otherwise approved by Architect.
 - 3. Provide minimum cover of 12 inches over non-pressure lateral lines. Maximum cover shall be 18 inches unless otherwise approved by Architect.
- F. Where irrigation lines occur under vehicular paving, depth of coverage shall be measured from the bottom of paving material. Trench depths shall be:
 - 1. Provide minimum cover of 36 inches over all sleeves or direct-bury pressure main lines 6 inches and larger. Maximum cover shall be 48 inches unless otherwise approved by Architect.
 - 2. Provide minimum cover of 36 inches over all sleeves or direct-bury pressure supply main lines smaller than 6 inches. Maximum cover shall be 48 inches unless otherwise approved by Architect.
 - 3. Provide minimum cover of 36 inches over all sleeves or direct-bury non-pressure lateral lines. Maximum cover shall be 24 inches unless otherwise approved by Architect.
- G. Where irrigation lines occur under pedestrian walkway paving, depth of coverage shall be measured from the bottom of paving material. Trench depths shall be:

February 27, 2026

1. Provide minimum cover of 24 inches over all sleeves or direct-bury pressure main lines 6 inches and larger. Maximum cover shall be 36 inches unless otherwise approved by Architect.
 2. Provide minimum cover of 24 inches over all sleeves or direct-bury pressure supply main lines smaller than 6 inches. Maximum cover shall be 48 inches unless otherwise approved by Architect.
 3. Provide minimum cover of 24 inches over all sleeves or direct-bury non-pressure lateral lines. Maximum cover shall be 36 inches unless otherwise approved by Architect.
- H. Install, under mainline, one continuous No. 14 AWG UF tracer wire in all locations where control wires are not installed in same trench as mainline. Tracer wire shall be black with a white stripe.

3.06 BACKFILLING

- A. Backfill and compaction: In accord with Section 02315 - EXCAVATION AND FILL.
- B. Initial backfill over all pipe shall be clean, fine granular material.
- C. Backfill trenches via mechanical means or by hand methods. Loose soil shall be placed in the trench in lifts of 6-inches and compacted by tamping after each lift is placed. The top 6-inches of backfill in planting areas shall be accepted imported screened soil. Should any settling of the soil over trenches occur after completion of the irrigation system, the Contractor shall refill and compact the soil as directed at no additional cost to the Owner.
- D. Backfill only when pipe is cool. During hot weather, pipe can be cooled by operating the system for a short time prior to backfilling.
- E. Provide marking tape, as specified in Section 02500 – UTILITY SERVICES, over all pressure supply main lines.
- F. Properly compact backfill in trenches to dry density equal to the adjacent undisturbed soil, and conform to adjacent grades without dips, sunken areas, humps, or other irregularities.
- G. Restore grades and repair any damage where settlement may occur.

3.07 PLASTIC PIPE AND FITTINGS

- A. Install and connect plastic pipe in accord with manufacturer's recommendations.
- B. Install groups of pipes parallel to each other, spaced to permit valve servicing.
- C. Install fittings for changes in direction and branch connections.
- D. Install flanges adjacent to valves and to final connections to other components with 2-1/2 inches or larger pipe connection.
- E. Install underground piping according to ASTM D2774 and ASTM F690.
- F. Prepare all welded joints with approved cleaner prior to applying primer and solvent.
 1. Allow welded joints at least 15-minute set-up and curing time before moving or handling.

February 27, 2026

2. Partially center load pipe in trenches to prevent movement or shifting when water pressure is applied.
 3. Do not permit water in pipe for a minimum of 4 hours after applying solvent welds.
 4. When the temperature is above 80 degrees Fahrenheit, allow solvent weld joints at least 24 hours curing time before water is introduced under pressure.
 5. Suspend all solvent welding if air temperature falls below 40 degrees Fahrenheit. Pipe and fittings installed at temperatures below 40 degrees Fahrenheit shall be removed and replaced at no cost to Owner.
- G. Installing pipe under existing pavement:
1. Piping under existing pavement may be installed by jacking, boring, or hydraulic driving. Hydraulic driving will not be permitted under asphalt paving.
 2. Secure permission from Architect prior to cutting or breaking any existing pavement. Repairs or replacement to existing paving shall be approved and completed to the satisfaction of the Architect and shall be installed at no additional cost.
- H. Install transition fittings for plastic-to-metal pipe connections according to the following:
1. Underground Piping:
 - a. 1-1/2 inches and Smaller: Plastic-to-metal transition fittings.
 - b. 2 inches and Larger: AWWA transition couplings.
 2. Aboveground Piping:
 - a. 2 inches and Smaller: Plastic-to-metal transition unions.
 - b. 2 inches and Larger: Use dielectric flange kits with one plastic flange.
- I. Install dielectric fittings for dissimilar-metal pipe connection according to the following:
1. Underground Piping:
 - a. 2 inches and Smaller: Dielectric coupling or dielectric nipple.
 - b. 2-1/2 inches and Larger: Prohibited except in control valve box.
 2. Aboveground Piping:
 - a. 2 inches and Smaller: Dielectric union.
 - b. 2-1/2 inches to 4 inches: Dielectric flange.
 - c. 5 inches and Larger: Dielectric flange kit.
 3. Piping in Control Valve Boxes:
 - a. 2 inches and Smaller: Dielectric union.
 - b. 2-1/2 inches to 4 inches: Dielectric flange.
 - c. 5 inches and Larger: Dielectric flange kit.

- J. Detectable Marking Tape: Install continuous identifying and detectable warning tape above all pressure and mainline piping. Install at depth recommended by the manufacturer to ensure detection by non-ferrous detector.
- K. Flushing System:
 - 1. After all sprinkler pipe and risers are in place, open control valve and thoroughly flush system clean prior to installing sprinkler heads.
 - 2. Contractor shall be responsible for repair of clogged nozzles for a period of thirty days after notice of substantial completion.

3.08 JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plan ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- D. Flanged Joints: Select rubber gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
- E. Copper-Tubing Brazed Joints: Construct joints according to CDA's "Copper Tube Handbook," using copper-phosphorus brazing filler metal.
- F. Copper-Tubing Soldering Joints: Apply ASTM B813 water flushable flux to tube end unless otherwise indicated. Construct joints according to ASTM B828 or CDA's "Copper Tube Handbook," using lead-free solder alloy (0.20 percent maximum lead content) complying with ASTM B32.
- G. PE Piping Fastener Joints: Join with insert fittings and bands or fasteners according to piping manufacturer's written instruction.
- H. PVC Piping Solvent-Cemented Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
 - 1. Comply with ASTM F402 for safe-handling practice of cleaners, primers, and solvent cements.
 - 2. PVC Pressure Piping: Join schedule number, ASTM D1785, PVC pipe and PVC socket fittings according to ASTM D2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D2855.
 - 3. PVC Non-pressure Piping: Join according to ASTM D2855.

February 27, 2026

3.09 CONDUITS

- A. Install conduit where control wires pass through or under walks, walls and paving. Conduits shall be of adequate size to accommodate retrieval of wires for repair and shall extend 18 inches beyond edges of walls and pavement.
- B. Install continuous conduit for all flow sensor and communication cables.

3.10 SLEEVES

- A. Install sleeves for all pipes and conduits passing through or under walks, walls and paving as indicated on Drawings. Sleeving shall be of adequate size to accommodate retrieval of wiring or piping for repair and shall extend 18 inches beyond edges of paving or other construction.
- B. Field verify location, size and depth of existing sleeves where noted on the Drawings. Notify Architect of any discrepancies prior to the start of installation.

3.11 CONTROL WIRE

- A. Control wire shall be run in same trench adjacent to mainline pipe whenever possible. Multiple wires in run to be bundled and taped together at 12 foot intervals.
- B. Install control wire in PVC SCH. 40 gray conduit when not run with mainline.
- C. Use only continuous wire between controller and remote control valves. Do not use wire splices.
- D. Make underground wire connections to electric remote control valves with UL-listed 3M DBR/Y-6 connectors.
- E. An expansion curl shall be provided at each wire connection. Expansion curl shall be of sufficient length at each control valve, so that the valve bonnet may be brought to the surface for maintenance without disconnecting the wires.

3.12 VALVE ASSEMBLIES

- A. Install and connect all assemblies in accord with Drawings.
- B. Do not install multiple assemblies on individual service tees. Provide each assembly with its own outlet. When used, the pressure relief valve shall be the last assembly.
- C. All threaded fittings shall be assembled using Teflon tape applied to the male threads.
- D. When specified, install backflow assemblies in shrub areas at the minimum height required by local codes.
- E. Locations for all equipment, as indicated on Drawings, such as point of connection, field satellites and valves are approximate.
 - 1. Minor modifications to layout and location of equipment shall be provided at no additional costs to Owner.
 - 2. Stake out all equipment locations for Architect's review and obtain approval prior to installation. Failure to obtain Architect's approval prior to installation

February 27, 2026

may require Contractor to relocate or re-work installation at no additional costs to Owner.

3. System modifications shall be recorded and made part of the record drawings.

3.13 GATE VALVES

- A. Install in accord with Drawings.
- B. Check and tighten valve bonnet packing before backfill.

3.14 ELECTRIC CONTROL VALVES

- A. Install in accord with Drawings.
- B. Install at sufficient depth to provide not more than 6 inches and not less than 4 inches cover from top of valve to finish grade.
- C. Install valves in a plumb position with 24 inches minimum maintenance clearance from other equipment.
- D. Valves shall be located away from walkways and in locations as inconspicuous as possible.
- E. Electric control valves shall be connected to field satellites in numerical sequence as indicated on Drawings.

3.15 QUICK COUPLER VALVES

- A. Install in accord with Drawings.

3.16 CONTROLLERS

- A. Controller Assemblies:
 - 1. Secure the following services from the approved equipment supplier:
 - a. On-site meeting to review system operation and ensure that all personnel understand system installation techniques.
 - b. On-site technical assistance during installation period when requested by Contractor or Architect.
 - c. Testing of grounding system.
 - d. Hook-up of communication and sensor wires within assemblies.
 - e. Continuity and resistance tests on communication wires.
 - f. Address satellites and decoders.
 - g. Verify system flow range and calibrate pulse transmitter.
 - h. Test system components for proper operation.
 - i. Certification that equipment conforms to and is installed in accord with Drawings, Specifications, and manufacturers' recommendations.

February 27, 2026

B. High voltage wiring for controller:

1. 120V power connection to field satellites to be provided under Division 16 of Specifications.
2. All electrical work shall conform to local codes, ordinances, and authorities having jurisdiction.

C. Controller Interconnect Circuitry:

1. Warranty tests shall be performed by the approved supplier on all electrical circuits. Provide Architect with written approval from the equipment supplier prior to start of maintenance period.
 - a. Wire loop resistance (continuity): Test each circuit for maximum loop resistance not to exceed manufacturer's written recommendations.
 - b. Ground fault: Test each circuit with an ohm meter, after each interconnect circuit has been installed and connections have been made. Minimum ground resistance shall not exceed manufacturer's written recommendations. After test has been completed, remove splices and leave exposed in pull box for future access.
 - c. Record results of circuitry tests and submit to Architect prior to acceptance of work.
 - d. Functional test: Perform test to demonstrate each and every part of the system functions as specified and intended.
 - (1) The functional test for each new or modified electrical system shall consist of not less than 5 days of continuous, satisfactory operation. If unsatisfactory performance of the system develops, correct the condition and repeat test until 5 days of continuous satisfactory operation has been obtained.
 - (2) Functional tests and turn-on shall not be started on a Friday, or on a day preceding a legal holiday. Shutdown caused by factors beyond Contractor's control shall not constitute discontinuance of the functional test.

D. Interconnect Conductors:

1. Irrigation interconnect conductors shall be pulled by hand, leave 2 feet of coiled slack at each field controller and at each pull box.
2. Splices shall occur within controller enclosure, unless specifically authorized otherwise by Architect.
3. Make splices with UL-listed 3M DBR/Y-6 connectors only. Splices shall be capable of satisfactory operation under continuous submersion in water.

3.17 AUTOMATIC IRRIGATION CONTROL SYSTEM INSTALLATION

- A. Equipment Mounting: Install irrigation controllers on internal stainless steel backboards in stainless steel controller enclosures.

B. Free-Standing Pedestal Mount Enclosures:

1. Construct reinforced concrete pad, ensuring all required electrical, control wire, grounding connections, conduits, and anchoring devices are in place prior to placing concrete.
 2. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 3. Install anchor bolts to elevations required for proper attachment to supported equipment.
- C. Install control cable in same trench as irrigation piping and at least 2-inches below or beside piping. Provide conductors of size not smaller than recommended by controller manufacturer. Install cable in separate sleeve under paved areas.

3.18 GROUNDING

- A. Multiple controller locations shall have separate grounding for each controller or group of controllers. Lightning protection grids shall be installed in an irrigated area.
- B. Install ground plates a minimum of 12 feet from the controller and connect via a permanent exothermic Cadweld connection to #6 solid, bare copper wire. Additional ground plates shall be spaced at 20 feet intervals. The copper wire is to be installed in as straight a line as possible, and where necessary to make a turn or bend, it shall be done in a sweeping curve with a minimum radius of 9 inches and a minimum included angle of 90 degrees. There shall be no splices in the bare copper wire.
- C. Grounding plates shall be installed horizontally at 36 inches below grade with 100 lbs. of 'Powerset'™ ground enhancement material spread evenly above and below each plate in accordance with manufacturer's directions.
- D. Install a minimum of 6 inches of 4 inches perforated polyethylene pipe over each plate and cap with a flat PVC drain grate for periodic inspection. Plates shall also be covered with a 4 inches grated cover as specified, set a minimum of 1 inch below grade, to facilitate drainage onto the plate. Cover shall be installed on a minimum of 36 inches of 4 inches ADS corrugated polyethylene, perforated drainage pipe.

3.19 SPRINKLER HEADS

- A. Install in a plumb position, perpendicular to finish grade, at intervals not to exceed maximum spacing indicated on drawings.
- B. Install heads 1/2-inch above finish grade along curbs, walks, paving, and similar areas.
- C. Lay out sprinkler heads and make all minor adjustments required due to differences between site conditions and Drawings. All such deviations in layout shall be within the intent of the original Drawings, and without additional cost to Owner. Routing and layout of all piping shall be approved by Architect prior to installation.

February 27, 2026

- D. After all permanent sprinkler pipe lines and risers are in place and prior to installation of sprinkler nozzles, open control valves and flush out the system with a full head of water.
- E. Install nozzles of the required size and pattern for the area of coverage. Install pressure compensating screens per manufacturer's recommendations.

3.20 DRIP EMITTERS

- A. Install emitters and/or self-piercing barb connectors in emitter tubing using proper emitter installation tool.
- B. Flush all emitter tubing and PVC lateral lines prior to installation of emitters. Refresh lines after installation of emitters.

3.21 TRENCH RESTORATION

- A. Where irrigation systems are laid in existing lawns, the trenches, upon being properly backfilled and settled, shall be filled with approved existing onsite soil or imported screened soil to a depth of 4 inches, fine graded, completely re-grassed by use of sod, unless otherwise noted on the Drawings. The re-grassed trenches shall be maintained by watering, weeding, and fertilizing for a period to match plant establishment requirement for the Project.

3.22 FINAL ADJUSTMENTS

- A. Adjust sprinkler heights and vertical alignment as required to maintain proper relationship to established grades and planting. Re-grade and replant around sprinkler heads as necessary.
- B. Fill-in all depressions that may arise from possible settlement over trenching or other excavations, with proper soil mix. Compact lightly, and replant as needed to maintain planting design.
- C. Adjust nozzles to provide optimum coverage with no overspray to hardscape or building walls.
- D. Replace nozzles where required to provide full and complete coverage.
- E. Adjust or relocate moisture sensing equipment, as required, for proper operation.
- F. Adjust irrigation schedule and run times to provide adequate water to maintain landscaping.

3.23 INSTRUCTIONS

- A. After the irrigation system has been completed, inspected, and approved, the Contractor shall arrange for the services of a qualified instructor to instruct the maintenance personnel in the operation and maintenance of the system.

END OF SECTION

SECTION 02826 - METAL SECURITY FENCING

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Anti-climb, welded wire mesh, modular fencing panels including tubular steel posts.

B. Related sections:

1. Section 03300 - CAST-IN-PLACE CONCRETE: Concrete footings for support of fence posts.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM) Publications:

1. ASTM A36 - Structural Steel.
2. ASTM A121 - Standard Specification for Metallic-Coated Carbon Steel Barbed Wire.
3. ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
4. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
5. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
6. ASTM A505 – Standard Specification for Steel, Sheet and Strip, Alloy, Hot-Rolled and Cold-Rolled, General Requirements
7. ASTM A513 - Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing
8. ASTM A526 - Sheet Steel, G-90 Zinc-Coated (Galvanized) by the Hot-Dip Process.
9. ASTM A641 – Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire
10. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
11. ASTM A659 – Standard Specification for Commercial Steel (CS), Sheet and Strip, Carbon (0.16 Maximum to 0.25 Maximum Percent), Hot-Rolled
12. ASTM A787 - Standard Specification for Electric-Resistance-Welded Metallic-Coated Carbon Steel Mechanical Tubing
13. ASTM A792 - Steel Sheet, Aluminum-Zinc Alloy-Coated (Galvalume) by the Hot Dip Process.

February 27, 2026

14. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus.
15. ASTM D822 - Tests on Paint and Related Coatings Using Filtered Open-Flame Carbon-Arc Exposure Apparatus.
16. ASTM D1794 - Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
17. ASTM D2794 - Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
18. ASTM D3363 - Test Method for Film Hardness by Pencil Test.

1.03 SUBMITTALS

- A. Provide in accordance with Section 01330 – SUBMITTAL PROCEDURES:
- B. Product Data: Material descriptions, dimension of individual components and profiles, and finishes for the following:
 1. Fence, gate posts, brackets, rails and fittings.
 2. Gates and hardware
- C. Shop Drawings: showing layout, of fence, each gate, posts, rails, and details of gate swing direction, or other operation, hardware, and accessories.
 1. Indicate dimensions, spacing of components, and anchorage and installation details.
 2. Include plans, elevations, sections, gate swing direction and other required installation and operational clearances, and details of post anchorage, attachment and bracing.
 3. Installation recommendations and instructions by manufacturer describing all details for a typical fence and gates.
- D. Sample: 8 by 10 inches minimum size sample of fence panel illustrating design, fabrication workmanship, and selected color coating.
- E. Qualification 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. Maintenance Data: Material Safety Data Sheet available upon request.
- G. Copy of Manufacturer’s warranty specified in this Section for review by Architect.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed installations of fences and gates similar in material, design, and extent to those indicated for this project and whose work has resulted in construction with a record of successful in-service performance.
- B. Source Limitations for Fences and Gates: Obtain each color, grade, finish, type, and variety of components for fences and gates from one source with resources

February 27, 2026

to provide fences and gates of consistent quality in appearance and physical properties.

1.05 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify local utility making services before beginning work.
 - 2. Unless otherwise indicated in the general provisions of the contract, notify the Architect no less than two (2) days in advance of proposed utility interruptions.
 - 3. Do not proceed with utility interruptions without Architect's written permission.
- B. Field Measurements: Verify layout information for fences and gates shown on drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

1.06 WARRANTY

- A. Provide in accordance with Section 01700 – CONTRACT CLOSEOUT:
 - 1. Factory finish: 10 years warranty against cracking, peeling, and blistering under normal use.
 - 2. The surety shall not be held liable beyond two (2) years from the Project Acceptance date.

PART 2 - PRODUCTS

2.01 BASIS-OF-DESIGN PRODUCT

- A. Metal security fences and gates as manufactured by Ameristar Fence Products, Inc.
- B. Subject to compliance with the requirements manufacturer's offering equivalent products that may be incorporated into the Work include the following:
 - 1. Ameristar Fence Products, Inc.; Ameristar Wireworks Anti-Climb
 - 2. Or Approved equal.

2.02 STEEL AND IRON MATERIALS

- A. Plates, Shapes, and Bars: ASTM A36
- B. Steel Tubing: ASTM A500, Grade B, cold-formed steel tubing.
- C. Galvanized-Steel Sheet: ASTM A653, structural quality, Grade 50, with G90 coating.
- D. Metallic-Coated-Steel Wire: Welded-wire fence fabric, hot-dip galvanized after

fabrication. Weight of zinc coating is not to be less than **1.0 oz./sq. ft.**

- E. Galvanizing: For components indicated to be galvanized and for which galvanized coating is unspecified, hot-dip galvanize to comply with ASTM A123. For hardware items, hot-dip galvanize to comply with ASTM A153.
- F. Grout: Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, and water reducing and plasticizing additives complying with ASTM C1107.

2.03 WELD-WIRE MODULAR FENCE SYSTEM

- A. Type: Ornamental steel fencing system consisting of anti-climb, welded wire mesh modular fence panels, tubular steel posts, and strap or plate type panel fasteners and designed for medium and high security applications; Omega MAX as manufactured by Omega II Fence Systems
- B. Fence panels: Fabricated from pre-galvanized wire welded to form open mesh.
 - 1. Vertical wires: 5/32-inch diameter spaced at 3 inches on center.
 - 2. Horizontal wires: Two 5/32- inch diameter wires encasing vertical wires and spaced at 1/2-inch on center.
 - 3. The horizontal and vertical bar right angle shall not vary by more than 1°. Cut bars shall not exceed top, bottom nor panel sides.
 - 4. Cold rolled annealed wire made of AISI Grade 1018 steel with tensile strength of at least 75 000 psi in accordance with ASTM A853.
 - 5. Panel Size: As indicated on the Drawings.
 - 6. Panel fastener: Full height, steel closure plates fastened to posts with stainless steel bolts and nuts.
- C. Posts
 - 1. Type: Steel tubes fabricated from cold rolled 1008 grade steel to meet ASTM A500 and ASTM A787, Type 3 as selected by manufacturer for type and size of fencing
 - 2. Size:
 - a. Fence posts: 4-inches by 4-inches.
 - b. Gate posts: 4-inches by 4-inches.
 - 3. Wall thickness: Minimum 11 gage.
 - 4. Length: As scheduled on the Drawings.
 - 5. Overhang: The 45-degree extension has the same dimensions as the post and measuring a minimum 18-inches in length. They are welded at the end of the square post by forming an angle of 45-degree and provided with two (2) kits of fasteners to receive a panel of 16-inches.
 - 6. Post Caps: Manufacturer's aluminum alloy.
 - 7. Factory drill posts to receive fence panel attachment fasteners.

February 27, 2026

2.04 ACCESSORIES

- A. Fasteners: Type 316 stainless steel bolts of type, size, and spacing as recommended by fence manufacturer for specific condition.

2.05 FACTORY FINISH

- A. Zinc Coatings:
 - 1. Horizontal and vertical bars are coated with a minimum of 0.25 oz/ft². (80 g/m²) zinc (galvanizing before welding) in conformity with ASTM A641 Class 1.
 - 2. Square fence posts, swing gate frame and posts.
 - 3. Thickness of 11GA or less: Zinc coated (pre-galvanized process) with a minimum of 0.9 oz/ft² as per ASTM A653 Grade 90.
 - 4. Flat vertical bars are coated with a minimum of 1.7 oz/ft² (530 g/m²) zinc (hot-dip galvanizing) in conformity with ASTM A123 Grade 75.
 - 5. Individual brackets are coated with a minimum of 1.5 oz/ft² (460 g/m²) zinc (hot-dip galvanizing) in conformity with ASTM A123 Grade 65.
- B. Polyester powder coating: Electrostatically applied colored polyester powder coating heat cured to chemically bond finish to metal substrate, minimum thickness of 4 mils.
 - 1. Minimum hardness measured in accordance with ASTM D3363: 2H.
 - 2. Mechanical adhesion test as per ASTM D3359 - Method B.
 - 3. Shock resistance tests as per ASTM D2794.
 - 4. Direct impact resistance tested in accordance with ASTM D2794. Withstand 160 inch-pounds.
 - 5. Salt spray resistance tested in accordance with ASTM B117: No red rust appearance after 1000 hours.
 - 6. Weatherability tested in accordance with ASTM D822: No film failure and 88 percent gloss retention after 1 year exposure in South Florida with test panels tilted at 45 degrees.
- C. Color: Selected by Architect from manufacturer's standard range.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for a verified survey of property lines and legal boundaries, site clearing, earthwork, pavement work, and other conditions affecting performance.
- B. Do not begin installation before final grading is completed, unless otherwise permitted by Architect.
- C. Proceed with installation only after unsatisfactory conditions have been

February 27, 2026

corrected.

3.02 PREPARATION

- A. Prior to fabrication, field verify required dimensions. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 ft or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

3.03 IN-GROUND CONCRETE INSTALLATION

- A. Install fencing on established boundary lines inside property line.
- B. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacing indicated, in firm, undisturbed or compacted soil.
- C. Post Setting: Set posts in concrete footing. Protect portion of posts above ground from concrete splatter. Place concrete around posts and consolidation. Using mechanical devices to set posts is not permitted. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during placement and finishing operations until concrete is sufficiently cured.
 - 1. Dimensions and Profile: As indicated on Drawings.
 - 2. Space line posts uniformly at center to center.
 - 3. Exposed Concrete Footings: Extend concrete a distance above grade as indicated on the drawings. Smooth and shape to shed water.
 - 4. Posts Set into Concrete in Sleeves: Use steel pipe sleeves pre-set and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with non-shrink, non-metallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions, and finished sloped to drain water away from post.
 - 5. Posts Set into Concrete in Voids: Form or core drill holes not less than 5 in deep and 3/4 in larger than OD of post. Clean holes of loose material, insert posts, and fill granular space between post and concrete with non-shrink, non-metallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions, and finished sloped to drain water away from post.
 - 6. Flange Post Installation: Bolt mounting plates attached to each post to slab or structure as indicated, using expansion bolts.

3.04 INSTALLATION, GENERAL

- A. Install fencing in accordance with manufacturer's installation instructions and approved shop drawings.
- B. Install fence posts plumb and level by setting post in setting hole in concrete and grouting solid. Temporarily brace fence posts with 2 by 4 wood supports until grout is set.

February 27, 2026

- C. Do not install bent, bowed, or otherwise damaged panels. Remove damaged components from site and replace.

3.05 WELD-WIRE MODULAR FENCE INSTALLATION

- A. Install the fence along the specified layout according to the drawings. The fence panel shall be installed to maintain a clear minimum distance of 1-1/4 - inches and a maximum distance of 2-inches from the ground surface. Holes for posts shall be at least 8-inches in diameter and at least 42-inches deep.
- B. Install fence panels to posts after posts have been set in footings and grout is cured.
 - 1. Secure welded wire fence panels with steel closure plates as recommended by the manufacturer.
 - 2. Space fasteners and secure to posts at spacing indicated on approved shop drawings.
 - 3. For welded-wire fence attachment to building wall use fence manufacturer's wall mounted special panel fitting.
 - 4. Attach aluminum caps to steel posts.

3.06 ADJUST AND CLEAN

- A. Touch-up damaged finish with paint supplied by manufacturer and matching original coating.

END OF SECTION

SECTION 02900 – PLANTING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Labor, equipment, materials, plants, soil preparation, planting, and maintenance requirements for all landscaping work as indicated on Drawings.

1.02 RELATED SECTIONS

- A. Section 02300 - EARTHWORK
- B. Section 02360 –VEGETATION CONTROL
- C. Section 02810 – IRRIGATION SYSTEM

1.03 DEFINITIONS

- A. Injury; defined, without limitation, as any bruising, scarring, tearing, or breaking of roots, trunk, bark, branches or foliage which may lead to or result in permanent damage to plant health or significantly alter the desired aesthetics of the plant for which it was selected.
- B. Dead Tree; is a tree that has died or that has been damaged or stressed to an advanced state of decline and has been determined to be so by the Architect's Certified Arborist.
- C. Drip Line; defined as the outer most limits of the tree canopy.
- D. Certified Arborist; an individual with a current certification from the International Society of Arboriculture (ISA) or member of the American Society of Consulting Arborists trained and experienced in all aspects of proper tree care.

1.04 REFERENCES

- A. International Society of Arboriculture (ISA) "Guide for Plant Appraisal 8th Edition 1992," prepared by the Council of Tree and Landscape Appraisers (CTLA).
- B. Standardized Plant Names; as established by Hortus III.
- C. ANSI A 300 - American National Standards For Tree, Shrub, and Other Woody Plant Maintenance - Standard Practices: 1995.
- D. ANSI Z 60.1 - American Standards for Nursery Stock: 2004., as approved by the American Association of Nurseryman.
- E. Cabling, Bracing, and Guying Standards for Shade Trees, as published by the National Arborist Association (NAA), 174 Rt. 101, Bedford, NH 03102.

1.05 ALLOWANCES

- A. Allowances for plants are specified in Division 01.

February 27, 2026

1. Perform planting work under quantity allowances and only as authorized. Authorize work includes work required by Drawings and the Specifications and work authorized in writing by Architect.
2. Notify Architect weekly of extent of work performed that is attributable to quantity allowances.
3. Perform work that exceeds quantity allowances only as authorized by Change Orders.

1.06 UNIT PRICES

- A. Work of this Section is affected by unit prices specified in Division 01.
- B. Unit prices apply to authorized work covered by quantity allowance.
- C. Unit prices apply to additions to and deletions from the Work as authorized by Change Orders.

1.07 QUALITY ASSURANCE

- A. In accord with Section 01440 - QUALITY ASSURANCE AND QUALITY CONTROL.
- B. Qualifications of workmen:
 1. Contractor to be licensed by the State of Hawaii and a member in good standing of the Landscape Industry Council of Hawaii (LICH).
 2. Contractor shall have a minimum of 5 years of documented experience with successful landscape installations similar to the size and scope of work for this project.
 3. Contractor shall maintain a competent supervisor or foreman on site who is fluent in English and satisfactory to the Architect. Supervisor shall not be changed, except with prior consent of the Architect. Supervisor shall be present on-site during all operations and specified work in progress.
 4. Provide at least one person who is a Certified Arborist, to direct and be present during all tree pruning operations.
- C. Tests and Inspections:
 1. Plant Material:
 - a. All plant material shall be received in a healthy condition, free from pests and disease. Plants delivered to Contractor that are found to be damaged, root bound, diseased or distressed shall be brought to the Architect's attention prior to accepting delivery.
 - b. Plants shall be subject to inspection and approval by the Architect at nursery, growing grounds and upon delivery to site, for conformity to Specifications. Such approval shall not impair the right of further inspection or rejection during progress of work.
 - c. Pre-selection and tagging of plant material by the Architect or Landscape Architect is to meet design intent only and does not constitute any

guarantee by the Architect of the selected plants. Health and vigor of plant material shall remain the sole responsibility of Contractor.

- d. The Architect reserves the right to have plant samples analyzed at any time to verify plant health and conformity to Specifications. Furnish samples upon request. Testing to be done by the Architect's designated laboratory.
 - 1) Cost of testing plant samples will be responsibility of Contractor. Lab fees for testing found to be negative will be reimbursed by Change Order to the Contract.
 - 2) Rejected material shall be promptly removed and replaced at no cost to the Architect.

2. On-site Soils:

- a. Pre-Construction Testing: Preconstruction testing of existing on-site soil shall be performed on native soil not previously impacted by prior construction. Native soil boundaries are defined in "Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii" by United States Department of Agriculture, Soil Conservation Service, Issued August 1972.
- b. After rough grading has been completed and prior to planting operations, on-site soils are to be tested for agronomic suitability, biological function, and chemical characteristics. Soils report shall include amending requirements in order for on-site disturbed soils to be restored to optimal biological function and chemical characteristics. Contractor shall make all adjustments to improve the soils' characteristics and comply with final soils analysis recommendations as directed by soils report.
- c. In the event that soil amendment recommendations are substantially different than those described for base bid, adjustments will be made by Change Order to Contract as agreed upon by the Architect.
- d. The Contractor shall engage the services of a qualified agricultural soils testing laboratory to perform soil testing services of all areas to be planted.
 - 1) Soils testing shall be performed by Crop Nutrient Solutions, Inc., Post Office Box 40, Waimanalo, Hawai'i, 96795; Phone: (808) 386-4120.
- e. Laboratory services shall include the following:
 - 1) A minimum of six samples or one sample per every 5000 sq. ft. (whatever quantity is greater) of base soil after completion of rough grading in landscape areas as directed by the Architect.
 - 2) Chemical analysis and written report of each individual sample to cover the following:
 - a) Soil structure and percentage of organic matter.
 - b) pH, Salinity and Lime content
 - c) Mineral nutrients, including concentrations of nitrogen, phosphorus, potassium, calcium, magnesium, iron, manganese, zinc, copper, sulfur, and molybdenum.

- d) Potential hazards to healthy plant growth such as high salinity, sodium chloride, boron, impaired soil structure, or drainage.
 - 3) Recommendations for types, quantities, and application schedule for organic materials, fertilizers, and other materials found necessary to amend base soil for optimum plant growth.
 - 4) Recommendations for backfill mix or mix as appropriate to be utilized in installation of all plants for the project.
 - 5) Testing laboratory shall follow standards set forth in the USDA Agricultural Suitability Test in accord with Handbook-60 and in accord with the Methods of Soil Analysis by the Soil Science Society of America, Inc.
 - f. Testing laboratory may be employed by the Architect to provide additional periodic sampling and testing of amended landscape planting areas to ensure compliance with recommendations.
3. Imported Soil Amendment Material:
- a. The Contractor shall be responsible for submitting a soils analysis of the amended and restored soils at the end of the project for review and approval by the Architect in order to demonstrate that restored soils have optimum biological function and chemical characteristics and meet recommendations provided by soil analysis report. Types, quantities, and application schedule of required organic materials, fertilizers, and other amendments required to mitigate soil deficiencies identified in the soil analysis report shall be included for review by the Architect.
 - b. All proposed imported soil amendments for planting areas shall meet specified requirements and be pre-approved by the Architect based on soil test results.
 - c. Cost for soils tests for this purpose shall be paid by Contractor. Provide chemical analysis report, written recommendation, and intended source of imported soil amendments for each individual sample to the Architect.
 - d. In the event that the initial proposed imported soil amendment is found unsuitable, additional sources shall be found and tested at Contractor's expense.
4. Imported Screened Soil Material:
- a. The Contractor shall be responsible for submitting a soils analysis of the imported screen soil material at the beginning of the project for review and approval by the Architect in order to demonstrate adherence to recommendations provided by soils report.
 - b. All proposed imported soils for planting areas shall meet specified requirements and be pre-approved by the Architect based on soil analysis results.
 - c. Cost for soils tests for this purpose shall be paid by Contractor. Provide chemical analysis report, written recommendation, and intended source of imported soil for each individual sample to the Architect.

February 27, 2026

- d. In the event that the initial proposed import soil is found unsuitable, additional sources shall be found and tested at Contractor's expense.

5. Observation Schedule

- a. Observation and inspection of the work will be made on an ongoing basis and at the following stages of the work. Provide Architect prior notification to of the following with the advanced times indicated:
 - 1) Pre-installation conference: 10 working days.
 - 2) Completion of finish grading and soil preparation: 10 working days.
 - 3) Plant delivery to site: 10 working days.
 - 4) Tree locations prior to excavation of pits: 10 working days.
 - 5) Shrub layout prior to excavation pits: 10 working days.
 - 6) Pre-mulch inspection: 10 working days.
 - 7) Premaintenance: 10 working days.
 - 8) Final walk-through: 10 working days.

1.08 SUBMITTALS

- A. In accord with Section 01300 – SUBMITTAL PROCEDURES
- B. Submit manufacturer's data sheets for all proposed products to be used in work. Indicate specific items and product numbers.
- C. Contractor shall furnish all plant material indicated on Drawings. Any and all substitutions due to unavailability shall be requested in writing prior to confirmation of ordering.
 - 1. Submit for Architect's approval within 30 days after award of contract and prior to any start of work:
 - a. Documentation listing all required plant material by size, source, and quantity. Sort list by construction zone sequence if applicable.
 - b. Weed control program. Include all product information and schedule of operations.
 - c. Proposed schedule and sequence of work plan for all planting operations, with start dates and completion dates for planting trees, shrubs and groundcover.
 - d. List of proposed equipment to be used for tree planting and plan for plant storage on-site.
 - e. Soil test results and schedule of recommended fertilizers and amendments to correct soil deficiencies. Schedule of fertilizers and amendments shall include applications rates for pre-planting, planting, and post planting operations.

1.09 EXISTING CONDITIONS

- A. Protect all existing plant material that is to remain within or directly adjacent to the work to be performed. This shall include installing and maintaining protective barriers and/or temporary fencing.
- B. Maintain foliage of existing plants free of dust and debris from all construction operations. Wash plants down daily with potable water if necessary. Ensure water pressure and water stream do not damage plant material nor cause erosion or runoff.
- C. Vehicles and equipment shall not be parked, serviced, or operated within the drip line of existing trees or within newly planted areas. Access to all planting areas shall be limited to the personnel required for landscape installation.

1.10 MOCK-UP

- A. Provide mock-up samples for all materials as shown on drawings. Construct with all materials, methods, and procedures intended to be used in the final Work, including temporary supports, welded wire mesh support structure, and wire support. Mock-up shall be constructed a minimum of three months prior to commencement of work and shall be protected from construction. Maintenance service shall be provided for 90 days. At the end of 90 days, provide samples for Architect to review.
- B. Supervisors and installers that construct and finish mock-up are to be the same workman that install finish Work.
- C. Approved mock-up will be used as basis for judging and approval of final installation.
- D. If initial mock-up is not approved by the Architect, prepare subsequent mock-up(s) or provide modifications to initial mock-up until approved.

1.11 WARRANTY

- A. Warranty all plant material, smaller than 15-gallon container size, to be in healthy and flourishing condition of active growth for a period of one (1) year from the date of Substantial Completion.
- B. Warranty all plant material, 15 gallon or larger, to be in healthy and flourishing condition of active growth for a period of one (1) year from the date of Substantial Completion.
- C. Promptly replace all plant material found dead, dying, or damaged during the warranty period.
- D. Replacement shall be with material of same variety, size, form and character. Final selection to be approved by the Architect.
- E. Replacement shall include cost of plant material, delivery, labor, equipment and materials required for installation.
- F. Specimen trees that require replacement shall be removed and replaced in a timely and expedient manner. Coordinate with the Architect for selection of replacement tree and timing of work.

February 27, 2026

- G. Contractor will not be held responsible for failures that are directly attributed to Acts-of-God, vandalism or proven negligent care by Owner. Acts of God do not include diseases, pests, or moisture extremes noted herein.
- H. Special Warranty:
 - 1. All plant materials furnished shall be warranted as to the species, hybrid, flower color and/or variety specified.
 - 2. If after acceptance of the project, any warranted plant material proves to be of a different species, hybrid, flower color and/or variety not initially determinable, replace that plant with a new plant of the originally specified species, hybrid, flower color and/or variety. The new plant shall be equal in size to that of the incorrect plant at the time of its removal. The new plant shall meet the quality standards, be subject to the warranty, and be installed according to the specifications.
 - 3. There is no time limit to this warranty, although it does not include plants reverting to the general species. The Architect will determine the nonconformance of plant materials and notify the Owner in writing of the required replacement work. All materials and work shall be at the expense of the Owner.

1.12 PRODUCT HANDLING

- A. Procedures: In accord with Section 01660 – PRODUCT STORAGE AND HANDLING REQUIREMENTS.
- B. Delivery:
 - 1. Deliver fertilizers to site in original unopened packages and containers, bearing manufacturer's name, trademark, guaranteed chemical analysis and conformance to State Law. Deliver bulk materials to site with certificate that includes manufacturer name, trademark, guaranteed chemical analysis, conformance to State Law and quantity delivered.
 - 2. Furnish delivery receipts for all amendments to the Architect.
 - 3. Notify Architect seven (7) days in advance of plant material deliveries.
 - 4. Submit an itemized list of plants included in each delivery.
- C. Deliver all plants with legible identification labels.
 - 1. Label trees, bundles, or containers of like shrubs or ground cover plants.
 - 2. State correct botanical name and container size.
 - 3. Use durable waterproof labels with UV and water-resistant inks. Do not remove labels until so directed by the Architect.
 - 4. Protect plant material from damage during delivery. Plants loaded for delivery from nurseries should not be double stacked or vertically layered in any way to cause damage or stress.
 - 5. Inspect all plant material for injury, disease and insect infestation. Evaluate trees and shrubs for improper pruning. In the event such conditions are found, bring to the Architect's attention for direction and remedial action to be taken.

February 27, 2026

D. Handling:

1. Exercise care in handling, loading, unloading, and storing of plant material. Plants that have been damaged prior to or during installation shall be replaced at Contractor's expense.
2. Provide equipment of suitable size and capacity to safely off-load, transport and plant all trees.
3. The "choke" strapping method of lifting trees is strictly forbidden (except for single trunk palms); any trees hoisted in this manner will be rejected.

E. Storage:

1. Plant materials shall be maintained in a healthy growing condition. Protect plants from physical damage by construction operations as well as inclement weather conditions such as high winds, excessive heat or dust.
2. Plants stored on-site shall be spaced to allow clearance for light and air and not be spaced tightly together such that limbs are crowded.
3. Maintain root balls with adequate moisture at all times.
4. Plants grown in shade conditions shall be stored and maintained in equivalent shade conditions.
5. Do not store plants directly on asphalt paving.

1.13 VERIFICATION OF DIMENSIONS AND QUANTITIES

- A. All scaled dimensions are approximate. Before proceeding with any work, carefully check and verify all dimensions and quantities. Immediately inform Architect of all discrepancies between Drawings, Specifications, and actual conditions. Do not do work in any area where there is a discrepancy until approval to proceed has been given by the Architect.

1.14 REGULATORY REQUIREMENTS

- A. Provide for all inspections and permits required by federal, state, and local authorities for furnishing and transporting plant materials.
- B. Perform work in accord with all applicable laws, codes, and regulations including licensing and training requirements for pesticide and herbicide applications.

PART 2 - PRODUCTS

2.01 TOPSOIL

- A. Contractor shall provide imported screened soil as source of soil material or imported amendments for amendments to existing soil. Source and location to be approved by the Architect. Contractor to submit soils reports for Architect's approval.
- B. Soil shall meet the following requirements.
 1. General: Free of roots, clods, and stones larger than 1/2 inch in the greatest dimension, pockets of coarse sand, noxious weeds, sticks, brush, and other

litter. It shall not be infested with nematodes or other undesirable disease organisms such as insects and plant pathogens. Soil shall be friable and have sufficient structure in order to give good tilth and aeration to the soil. Total pore space content on a volume/volume basis shall be at least 15% when moisture is present at field capacity. Soil shall have a field capacity of at least 15% by weight.

2. Gradation: Soil shall be a sandy loam, or loam, and similar to the native site soil. The definition of soil texture shall be in accord with USDA classification scheme. Obtain Architect's approval prior to grading operations.

Class	Particle Size Range	Maximum Percentage	Minimum Percentage
Coarse Sand	0.5-2.0 mm	40%	0%
Clay	<0.05 mm	20%	10%
Silt	<0.05 mm	40%	10%
Gravel	2-13 mm	20%	0%
Rock	13-25 mm		10% volume
Organic		15%	0%

3. Permeability: Hydraulic conductivity rate shall be not less than 1 inch per hour or more than 20 inches per hour when tested in accord with USDA Handbook No. 60, Method 34b or other Owner-approved methods.
4. Acidity: Soil pH range measured in the saturation extract (USDA Handbook No. 60, Method 21a) shall be 6.0 to 7.9.
5. Salinity: Salinity range measured in the saturation extract (USDA Handbook No. 60, Method 3a) shall be 0.5 to 2.0 dS/m. If calcium ions and sulfate ions both exceed 20 milliequivalents per liter in the saturation extract, the max salinity shall be 4.0 dS/m.
6. Chloride: Maximum concentration of soluble chloride in the saturation extract (USDA Handbook No. 60, Method 3a) shall be 150 mg/l (parts per million).
7. Boron: Maximum concentration of soluble boron in the saturation extract (USDA Handbook No. 60, Method 3a) shall be 1 mg/l (parts per million).
8. Sodium Absorption Ratio (SAR): Maximum SAR shall be 6 measured in accord with USDA Handbook No. 60, Method 20b.
9. Organic Matter Content: Sufficient soil organic matter shall be present to impart good physical soil properties, but not be excessive to cause toxicity or cause excessive reduction in the volume of soil due to decomposition of organic matter. Soils shall have a minimum 5% Organic Matter as Humus content, utilizing Walkley-Black soil testing method.

10. Heavy metals: Maximum permissible elemental concentration in soil shall not exceed the following:

Metal	Parts per million (mg/kg)¹
Arsenic	3
Cadmium	2
Chromium	10
Cobalt	2
Lead	30
Mercury	1
Nickel	5
Selenium	3
Silver	0.5
Vanadium	3

¹ Ammonium Bicarbonate/DTPA Extractable, dry weight basis.

11. Fertility - Range of essential elemental concentration in soil shall be as follows:

Element	Low¹	High¹
Phosphorus	2	40
Potassium	40	220
Iron	2	35
Manganese	0.3	6
Zinc	0.6	8
Copper	0.1	5
Boron	0.2	1
Magnesium	50	150
Sodium	0	100
Sulfur	25	500
Molybdenum	0.1	30

¹ Ammonium Bicarbonate/DTPA Extractable, parts per million) (mg/kilogram), dry weight basis.

- 1) If soil pH is between 6 and 7, maximum permissible elemental concentration shall be reduced 50%. If soil pH is less than 6.0, maximum permissible elemental concentration -12. Phytotoxic constituent, herbicides, hydrocarbons, and similar materials: Germination and growth of plant shall not be restricted more than 10% compared to standard controls. Standard controls shall be both monocots and dicots. Total petroleum hydrocarbons shall not exceed

February 27, 2026

100 mg/kg dry soil measured in accord with modified EPA Method No. 8015. Total aromatic volatile organic hydrocarbons (benzene, toluene, xylene, and ethylbenzene) shall not exceed 2 mg/kg dry soil measured in accord with EPA Method No. 8020.

12. Red Humic latasol soils, or types known as "Palolo Clay" or "Lualualei Clay" or similar materials shall not be accepted.
13. Screened to pass through 1/2-inch screen.
- C. Contractor responsible for providing imported screened soil over all planting areas. Refer to Drawings for locations of various soil depths.
- D. Backfill Mix for Trees and Shrubs and Groundcovers: Mix thoroughly prior to placing:
 - 60% screened soil
 - 25% 3/8 inch minus black cinder
 - 15% "Menehune Magic"/organic composted soil amendment
 - 1 lb. Sustane Fertilizer per cubic yard of mix
- E. Backfill Mix for Palms: Mix thoroughly prior to placing:
 - 85% washed beach sand
 - 15% "Menehune Magic"/organic composted soil amendment
 - 2 lb. Sustane Fertilizer per cubic yard of mix

2.02 AMENDMENTS

- A. Organic Amendments:
 1. Types of acceptable products are composts low in salts and heavy metals, free from weed seeds, pathogens and other deleterious materials meeting U.S. Composting Council specifications.
 2. Composted wood products are conditionally acceptable (stable humus shall be present). Wood based products which are based on red wood or cedar are not acceptable.
 3. Sludge-based materials are not acceptable.
 4. The compost shall be aerobic without malodorous presence of decomposition products.
 5. Humus material with an ash content of not less than 8% and not more than 50%.
 6. The pH shall be between 6 and 7.5.
 7. Salt content shall be less than 10 milliohm/cm at 25 degrees Celsius (ECe less than 10) in a saturated paste extract. The maximum rate of application shall not exceed 15% by volume unless the salinity is lower than 10 milliohm/cm at 25 degrees Celsius.
 8. Boron content of the saturated extract shall be less than 1.0 parts per million.
 9. Silicon content (acid-insoluble ash) shall be less than 20%.

February 27, 2026

- 10. Calcium carbonate shall not be present.
- 11. Carbon: nitrogen ratio shall be less than 20:1.
- 12. Approved organic amendments and suppliers include Ferto (6-4-2) or Gro-Power Plus (5-3-1) or Architect approved equal.

B. Sand: Washed, No 16 granite.

Sieve No. (US Standard)	Percent Dry Weight Passing
10	100
16	65-100
20	0-20
35	0-5
40	0-2

- C. Perlite: Coarse or No. 2 perlite, free of weeds and impurities.
- D. Calcium Carbonate: Minimum 95% calcium carbonate, 100% passing a No. 60 sieve.
- E. Single Super Phosphate (0-20-0): Granular commercial grade, minimum 20% P205.
- F. Soil Conditioner: Menehune Magic by Hawaiian Earth Products, ph (808) 682-5895.

2.03 FERTILIZER

- A. Organic Fertilizer Tablets: N-P-K as recommended by soil analysis, uniform in composition, slow releasing, free-flowing and suitable for application with approved equipment, delivered to the site in unopened containers. Each fully labeled, conforming to the applicable fertilizer laws, and bearing the name or mark of the manufacturer. Sustane Enhanced with Sumicoat Controlled Release Fertilizer in Root Zone Feeder Pack, by Sustane, ph (507) 263-3003, www.sustane.com
- B. Organic fertilizer: N-P-K as recommended by soil analysis, uniform in composition, slow-release nitrogen, free-flowing and suitable for application with approved equipment, pathogen and weed free, no sewage, blood or meat products, delivered to the site in unopened packaging. Each fully labeled, conforming to the applicable fertilizer laws, and bearing the name or mark of the manufacturer; apply according to manufacturer's written instructions. Sustane Fertilizer, ph (507) 263-3003, www.sustane.com

2.04 HERBICIDE

- A. Pre-emergent Herbicide: Chipco Ronstar-G as manufactured by Bayer.
- B. Pre-planting Herbicide: Round-Up or equal
- C. Soil Fumigant: Basamid G® Granular Soil Fumigant as manufactured by Cetris USA, Ltd.

2.05 PLANT MATERIALS

- A. Nomenclature: Plant names listed on Drawings conform to "Standardized Plant Names" established by Gardens of Hawaii by movie C. Neal and/or Hortus III. Except for changes covered therein, established criteria of horticulture nomenclature is followed.
- B. All plants shall meet or exceed American Standards for Nursery Stock, ANSI Z60.1 latest edition.
 - 1. Acceptable sources for native plants:
 - a. Hui Ku Maoli Ola (Native Hawaiian Plant Nursery), ph (808)-235-6165.
- C. Plants shall be symmetrical as is typical for their variety and species, in a condition of healthy and vigorous growth with healthy normal root systems well filling their containers, but not to the point of being rootbound. They shall be free from plant disease, insects or their eggs or soil borne pathogens.
- D. Height and spread of all plants shall be measured with branches in their normal position. Where specific dimensions of any plant material are omitted from Plant List, plants shall be as approved by the Architect.
- E. All liners, plugs, dug sprigs, and flatted material shall be fully rooted. Plants should not be pruned prior to delivery, except as authorized by the Architect.
- F. Balled and burlap plant material shall meet standards of American Standards for Nursery Stock. Burlap shall be 100% natural fiber. No leno will be accepted.
- G. Palm Trees: Palms shall have square shaped root balls cut a minimum of 30 inches from base of trunk face. Retain a minimum of six fronds on head of palm, or as directed by Architect.
- H. Caliper measurement shall be taken at a point on the trunk 6 inches above natural ground line for trees up to 4 inches in caliper, and at a point 12 inches above the natural ground for trees over 4 inches in caliper
- I. Grass Plug, species as shown on the Drawings:
 - 1. Shall be healthy, living, with well-developed roots, 3-1/2 inches to 4 inches in length, freshly separated plugs and free from weeds.
 - 2. The source is to be inspected and approved by the Architect.
 - a. For native grasses, acceptable sources:
 - 1) Hui Ku Maoli Ola (Native Hawaiian Plant Nursery), ph (808)-235-6165.
 - 3. Immediately following harvesting, the plugs shall be thoroughly watered then kept moist during storage and transportation until planted. No plugs shall be accepted which are not in a cool, moist, fresh condition.
 - 4. Plugs are to be delivered and planted on the same day they are harvested to assure optimum rooting. If, for any reason, it is impossible to plant them at once, plugs shall be placed in a cool shady place so air can get to them, and they should be kept moist.
- J. Grass Sod, species as shown on the Drawings:
 - 1. The turf shall be sufficiently dense so that no soil is visible when mowed to a 1-1/2 inch height.

February 27, 2026

2. Purchased in fresh, mature state from local suppliers, delivered weed free containing no more than 1% undesirable grasses.
 3. Growing media shall be friable and well-drained and shall not exceed 1/2 inch when cut. Standard size sections of turf grass shall be strong enough that they can be picked up and handled without damage
- K. Grass Stolons, species as shown on the Drawings:
1. Shall be healthy, living, well developed runners, 1-1/2 inches to 2-1/2 inches in length, freshly dug up sprigs and free from weeds.
 2. The source is to be inspected and approved by the Architect.
 3. Immediately following harvesting, the stolons shall be thoroughly watered then kept moist during storage and transportation until planted. No sprigs or stolons shall be accepted which are not in a cool, moist, fresh condition.
 4. Sprigs and/or stolons are to be delivered and planted on the same day they are harvested to assure optimum rooting. If, for any reason, it is impossible to plant them at once, stolons or sprigs shall be placed in a cool shady place so air can get to them, and they should be kept moist.
- L. Hydromulch: Mulch shall be (paper or virgin wood cellulose fiber mulch) specifically processed fiber containing no growth or germination inhibiting factors. It shall be such that after addition and agitation in the hydraulic equipment with seeds, fertilizer, water and other additives not detrimental to plant growth, the fibers will form a homogeneous slurry. The hydromulch equipment shall be capable of mixing all the necessary ingredients to a uniform mixture and to apply the slurry to provide uniform coverage. Fertilizer and mulch mix shall be applied in one operation by approved hydraulic equipment. The equipment shall have a built-in agitation system with an operating capacity sufficient to keep the mix in uniform distribution until pumped from the tank. Distribution and discharge lines shall be large enough to prevent stoppage and shall be equipped with hydraulic discharge spray nozzles, which provide a uniform distribution of the slurry.

2.06 MISCELLANEOUS MATERIALS

- A. Water: Furnished by Owner. Distribution and connections by Contractor.
- B. Tree Stakes: Lodgepole Pine wood stakes treated with wood preservative in strict compliance with state and federal regulations 2-inch diameter x length as required per Drawings.
- C. Staking Ties: Cinch Ties, 32 inch by V.I.T. Products, Inc., Tel: (760) 735-2450
- D. Tree Guys:
1. Type A: #12 ga galvanized iron wire for 15- and 25-gallon trees, #9 ga. Galvanized iron wire for field stock trees, up to 3-inch caliper, or Architect - approved equivalent. Hose shall be 1/2-inch diameter black rubber hose.
 2. Type B: Duckbill DTS Guy Kit, Model DTS-88 and Model DTS-138 for trees 10-inch caliper and larger by Forsight Products, Inc., www.earthanchor.com, Tel: (800) 325-5360.

February 27, 2026

3. Type C: Duckbill DTS Guy Kit, Model RBA-88 and Model RBK-138 for rootball anchoring systems of palm trees. Forsight Products, Inc., www.earthanchor.com, Tel: (800) 325-5360.
- E. Rebar: #4 24 inch minimum length for trees 25 gallon and smaller. #7 36-inch minimum length for larger trees.
- F. Marker: Plastic surveyor tape. Bright color, minimum 18 inches length. Use same color throughout project.
- G. Aluminum Edging: Standard-profile extruded-aluminum edging - 1/8 inch thick by 5-1/2 inches deep, ASTM B221, Alloy 6063-T6, Black anodized, aluminum stakes – ASTM B221, Alloy 6061-T6 approximately 1-1/2 inches wide by 12 inches long. Provide from one of the following manufacturers:
 1. Permaloc Corporation, ph (616-399-9600)
 2. Sure-loc Edging Corporation
- H. Root Control Barriers: DeepRoot Tree Root Barriers, www.deepproot.com, ph (415) 781-9700.
- I. Filter Fabric: Style 307, as manufactured by Belton Industries, ph (800) 851-5049.
- J. Gravel: No. 3b fine blue rock, 3/4 inch minus.
- K. Black Cinder: 3/8 inch minus crushed black cinder.
- L. Ili ili Stone: "Tumbled Lava" by Geobunga, blended 50% 1 inch x 2 inches, 50% 2 inches x 3 inches, <http://geobunga.com/puka-lava-tumbled-beach-rock>, ph (808-422-4567), provide additional 10% in quantity for Owner's future use.
- M. Natural Moss Rock Boulders: Local weathered Field stones, 18 inches – 36 inches diameter, for placement in landscape areas as shown on Drawings.
- N. Synthetic Lawn: Style BAREFOOT / SoftLawn (PL960), Camofill infill, as manufactured by NyLawn, ph (808-485-8885).

PART 3 EXECUTION

3.01 SITE PREPARATION

- A. Weed Control:
 1. Before and during preliminary and finish grading, dig out all noxious or invasive weeds and grasses by roots and dispose of off-site. Any non-perennial type grasses, except for Torpedo and Nut Grass, less than 2-1/2 inches high and not bearing seeds, may be turned under. Prior to planting, eliminate any weeds present in delivered plant stock.
 2. Site shall be maintained weed-free throughout planting operations and until final acceptance. Prior to mulching, apply pre-emergent herbicide to all shrub and groundcover areas.
 3. Fumigate soil for all sodded or seeded planting areas with Basamid® G granular fumigant. Apply per manufacturer's directions.

February 27, 2026

B. Soil Preparation (pre-tillage) for all planted areas on grade:

1. All planting areas that are compacted 85% to 90% are to be cross-ripped to 12 inches depth. Areas with over 90% compaction shall be cross-ripped to 24 inches depth, and all unacceptable materials removed.
2. In areas to receive import soil, scarify top of the existing soil to 4 inches minimum depth prior to backfilling.
3. Soil for planting shall be free of rocks over 1/2 inch in diameter, and any foreign debris, refuse, plant roots, clods, weeds, sticks, solvents, petroleum products, concrete, plaster, or other deleterious, undesirable and unwanted materials. Such materials shall be removed, including all temporary road bases or pavement already in place.
4. Soil shall be free of soil-borne diseases and capable of sustaining healthy plant life.

C. Landscape Erosion Control:

1. Provide and maintain temporary erosion control for all planting areas. This shall include, but not necessarily be limited to; installation of silt fences at top and bottom of slopes and at 10 foot intervals along the face. Do not block irrigation coverage with silt fences.
2. Provide sand bags, sod, and/or erosion control silt fence at drainage swales until planting is established and soil has been stabilized. See Section 02370 for additional requirements.
3. Repair all scars caused by erosion to original grades.

3.02 LAYOUT

- A. Confirm locations and depth of all underground utilities and obstructions. If underground construction or utility lines are encountered during excavation for planting, alternate locations for may be selected by Architect.
- B. Preliminary layout for trees shall be accomplished with colored flags or wooden stakes, each indicating plant name and container size (or other Architect approved method). Shrub material shall be spotted and approved in place by Architect prior to planting.

3.03 FINISH GRADING

- A. Minor grading modifications may be required to establish final grades.
- B. Finish grading shall ensure proper drainage of site as indicated on Civil Engineering Drawings.
- C. Planting areas shall be graded such that final grades will be 2 inches below adjacent paving, sidewalks, headers and similar conditions unless otherwise indicated on Drawings.
- D. Surface drainage shall be away from building foundations at 1/4 inch per foot to aid in water runoff.
- E. Remove or redistribute excess soil before application of fertilizer. Make allowances when establishing finish grades for earth excavation from planting pits and mulch.

February 27, 2026

- F. Trenches: If sprinkler system has been installed after grading and fertilizing has been completed, re-till trench backfill and fertilize to depth specified for area, to conform to specified requirements.
- G. Eliminate all erosion scars after each erosion event and prior to commencing maintenance period, unless directed otherwise by Owner.

3.04 INSTALLATION

A. General:

1. Ensure that final grades to ± 0.10 feet have been established. Provide for inclusion of all amendments, settling, and other preparatory needs. Ensure that finish grading of all planting areas is as indicated on Drawings and as directed by Architect. Ensure all drainage swales and flow lines have been established.
2. Do not commence any planting until completion of all soil import, soil amendment and grading operations have been completed and approved by Architect.
3. Do not commence shrub planting until the landscape irrigation system has been installed and approved for proper coverage. Trees may be planted in advance of final landscape irrigation system provided provisions for adequate interim watering have been made. Interim watering may include providing automatic drip irrigation to all trees. Refer to irrigation Drawings and Specifications for requirements.
4. Actual planting shall be performed only during periods of suitable weather and soil conditions and during daylight hours.
5. Only as many plants as can be planted and watered on that same day shall be distributed in a specific planting area.
6. Relative position of each tree and plant as shown on the Drawings is subject to Architect approval and shall, if necessary to achieve project design objectives, be relocated prior to planting at no additional cost to Owner. Verify exact layout and locations of all plants with Architect prior to planting.

B. Planting:

1. Excavate plant pit sizes as indicated on Drawings.
 - a. Auger drain holes in bottom of planting pits.
 - b. Excavation for planting shall include stripping and stacking of all acceptable topsoil encountered within areas to be excavated for trenches, tree pits, plant pits, and planting beds.
 - c. Excess soil generated from planting pits not used as backfill, water basins, or in establishing final grades shall be removed from site.
2. Handle each plant in such a manner as to not cause injury or damage during placement or planting. Any plants damaged as a result of Contractor's operations shall be rejected and replaced at Contractor's expense.
3. The "choke" strapping method of lifting trees is strictly forbidden (except for single trunk palms); any trees hoisted in this manner will be rejected.

February 27, 2026

4. Scarify root ball as needed and to cut any circular root systems. Properly cut off broken or frayed roots.
5. Center plants in pits or as directed by Architect.
6. Face plants with fullest growth facing forward or as directed by Architect.
7. Plant trees and shrubs to expose original container soil and set with root crown approx. 1 inch above finished grade. Backfilling will not be permitted around trunks.
8. All plants which settle deeper than their surrounding grade are to be carefully raised and replanted at correct elevation at no additional cost to Owner.
9. Set each plant plumb and hold rigidly in position until soil has been tamped firmly around rootball. All palm apical meristems shall be plumb. Fill pit with prepared soil, progressively settling soil by water jetting and flooding to remove air pockets and voids.
10. Water thoroughly immediately following planting. Backfill all voids which develop with additional prepared planting soil to bring to finish grade
11. Box container removal:
 - a. Remove bottom of wood boxes before planting. If it is not possible to remove box bottom because of size, soil type or condition of rootball, remove every other bottom board, or other method approved by Architect.
 - b. Remove sides of box without damage to root ball after positioning plant and partially backfilling.
12. Ball and burlap removal: Remove burlap away from the crown of the tree or palm. Cut away as much of burlap as possible without injury to root ball. Remove wire basket to 18 inches below finish grade

C. Backfill:

1. Planting pits shall be backfilled with amended soil mix. Water jet to remove all air pockets.
2. In a suitable area "central mix" all backfill soil to achieve a uniform blend with amendments. The intent is to achieve a consistent well blended soil in one location and not amend soil adjacent to each planting pit. Clean-up unused excavated soil and dispose of off-site. Protect mix from water until it has been placed around plants.

D. Fertilizer Tablets:

1. Apply in accord with manufacturer's recommendations.
2. Initially set required number of tablets on the top of each root ball while plants are still in their containers to facilitate planting and verification by Architect.
3. Locate plant tablets 1/3 depth of root ball in accord with manufacturer's instructions.

E. Watering Basins:

1. Where no other temporary watering system is required, construct an earthen basin around each tree. Each basin shall be of a depth sufficient to hold at least

February 27, 2026

4 inches of water. Maintain water basins until removal is required for installation of shrubs or turf.

2. Monitor tree and shrub root balls for adequate moisture content. Deep water and/or flood water basins as needed to maintain proper soil moisture.

F. Tree Staking and Guying:

1. Staking and guying of all trees shall be completed immediately after planting. Provide new stakes and ties or guying cables and anchors as shown on Drawings.
2. Remove and dispose of all original nursery stakes and ties.

G. Pruning: shall be limited to the minimum amount necessary to remove injured branches and to shape tree for design intent as directed by Architect. This shall include, but not be limited to: lifting of branch structure, thinning of canopy, and elimination of cross branching. Pruning is not to be done in nursery prior to delivery. Pruning paint shall not be used.

H. Auger Holes: Provide 12-inch diameter augured drain holes at 15 feet o.c. in all planting areas and in each tree pit and as indicated on drawings. Triangular space auger holes in large areas. Backfill with amended planting soil. Required depth of drain holes is to be to free draining soil layer below planter or a maximum of 6 ft. below bottom of planting pit.

I. Root Control Barriers: Prior to backfilling, install root control barriers around rootballs as required for specified trees shown on drawings. Connect panels to form a continuous barrier around root ball. Install per manufacturer's directions.

J. Soil Preparation:

1. For sodded, sprigged, and ground cover areas (except slopes 2:1 or greater): After approximate finished grades have been established, uniformly apply required amendments and thoroughly cultivate by means of mechanical tilling into the top 6 inches of soil.
2. The following rates and quantities shall be used for basis of bid only. Specific recommendations will be made after rough grading operations are complete and soil samples have been tested. In the event conditions are substantially different than described, adjustment will be made by Change Order as agreed upon with the Architect.

Application rates given are per 1000 sq. ft.:

- a. Organic amendment: 2 cu. yd. (Humus material).
- b. Fertilizers: Single superphosphate (0-20-0) 6 lb.
- c. Potassium sulfate (0-0-50): 4 lb.
- d. Ureaformaldehyde (38-0-0): 1/2 lb.
- e. Polyacrylamide (PAM): 12 lb.

NOTE: If PAM is unavailable, increase organic amendment to 3 cu. yd. per 1000 sq. ft.

3. For soil preparation with PAM, broadcast the amendments and fertilizers as noted above. Apply PAM with a drop spreader. Use caution to avoid drift onto

non-soil areas. PAM must be kept dry until it has been incorporated into the soil. Rototill amendments thoroughly into the soil 6 inches deep within 4 hours after application of PAM. Slightly dampened soils will need an immediate tillage after the PAM application. If the organic amendment is damp and is applied after the PAM, rake the PAM into the soil to the addition of the organic amendment or allow the amendment to dry prior to application of PAM. Irrigate the soil to allow water to penetrate to a depth of 6 inches. The soil needs to be damp but not saturated. Allow the soil to dry or at least dry to the point where the stringiness has disappeared, then re-rototill the soil 6 inches deep.

K. Sod Planting:

1. Preparing soil: Remove rocks, debris and perform weed abatement for area to be sodded. Rip soil to a depth of 6 inches and break up all clods to less than 1 inch in size. Soil prep as described elsewhere in Specifications.
2. Grading and rolling: Carefully smooth surface areas to be sodded. Roll areas to expose soil depressions or surface irregularities. Regrade as required to obtain optimum conditions.
3. Fertilizing: As noted in soil preparation. Verify turf fertilizer with Soils Report prior to purchasing.
4. Laying sod: Lay first strip of sod slabs along a straight line (use a string in irregular areas). Butt joints tightly, do not overlap edges. On second strip, stagger joints (much as in laying bricks). Use a sharp knife to cut sod to fit curves, edges, and sprinkler heads. Do not use sod strips less than 10 inches wide.
5. Watering: Do not lay entire lawn area before watering. When a conveniently large area has been sodded, water lightly to prevent drying out. Continue to lay sod, and to water, until installation has been completed.
6. Rolling sod: After laying of sod has been completed, lightly roll to eliminate irregularities and to form good contact between sod and soil. Avoid very heavy rollers or excessive initial watering to avoid roller marks.
7. Irrigation: Thoroughly water complete lawn surface. Soil should be moistened at least 2 inches deep. Repeat sprinkling at regular intervals to keep sod moist 2 inches deep at all times. After sod is established, decrease watering frequency and increase amount of water per application as needed. Do not allow water to pond. Avoid excessive watering. Soil shall be moist but not saturated. Monitor irrigation as required.
8. Replacement: Replace all dead or dying sod with equivalent quality material as directed by Architect.
9. Minimize pedestrian traffic over sodded areas during its growth establishment (90 days).

L. Hydromulch/Hydrosprigging

1. Areas to be hydro-sprigged shall be brought to a smooth even surface according to civil grading plans. Maintain previously established grades and swales.
2. After ground surfaces have been raked smooth and on an even plane, in accordance to specifications and upon approval by Architect, proper soil

moisture must be obtained then broadcast stolons/seed uniformly at rates listed on the Drawings.

3. Determine the proper fertilizer required, for both planting and on-going maintenance, for the plant materials. Determine the quality, analysis and ratio; method of application; and frequency of the fertilizer, to insure sufficient nutrients for the sustained growth of the plant material.
4. Broadcast grass sprigs uniformly over prepared surface at a rate of 10 cu. Ft./1000 sq. ft. and mechanically force sprigs into lightly moistened soil.
5. On the same day and immediately following sprigging operations, indicated field areas are to be capped with wood fiber using conventional "Hydromulch" equipment as manufactured by the Bowie Machine Works, or approved equal. When hydraulically sprayed on the soil, the fibers shall form a blotter like ground cover, which readily absorbs water and allows infiltration to the underlying soil. In every application, complete coverage of the soil shall be attained. Mulch shall be applied at the minimum rate of 40 lb. per 1,000 sq. ft. (1700 lb. per acre) using water at the rate of 25 gallons per 1,000 sq. ft. (1,000 gallons per acre).
6. Hydromulching of turf areas shall consist of mixing the hydromulch slurry, pre-plant fertilizer product, and spraying the mixture over the newly installed grass sprigs and soil.

3.05 PLANT MAINTENANCE

- A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring watering basins, adjusting and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings.
- B. Fill in, as necessary, soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.
- C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices when possible to minimize use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

3.06 CLEAN UP

- A. Pick up all trash resulting from this work no less frequently than the last working day of each week or as directed by Architect. All trash shall be removed completely from site. After planting operations have been completed, remove trash, excess soil, empty plant containers and rubbish from property. Scars, ruts, and other marks in ground caused by this work shall be repaired and the site left neat and orderly throughout.
- B. Leave site area broom-clean and wash down all paved areas within Contract area, leaving premises in a clean condition.

3.07 MAINTENANCE SERVICE

- A. Maintenance Service for Trees and Shrubs: Provide maintenance by skilled employees of Landscape Installer. Maintain as required in 3.05 PLANT MAINTENANCE. Begin maintenance immediately after plants area installed and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below:
 - 1. Maintenance Period: Six months from date of acceptance of planting completion.
- B. Maintenance Service for Ground Cover and Other Plants: Provide maintenance by skilled employees of Landscape Installer. Maintain as required in 3.05 PLANT MAINTENANCE. Begin maintenance immediately after plants area installed and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below:
 - 1. Maintenance Period: Six months from date of acceptance of planting completion.

3.08 FINAL ACCEPTANCE

- A. Maintain all planted areas free of debris and insects. Mow, cultivate, weed and water all areas until final acceptance of work is made by Architect. All punch list items shall be completed and all irrigation to be operational prior to Architect's acceptance of project installation.
- B. Prior to final approval of work:
 - 1. Re-sod or replant areas where necessary to obtain full and even coverage.
 - 2. Remove all debris resulting from work of this Section.
 - 3. Regrade, lightly compact, and replant around sprinkler heads where necessary to maintain proper vertical positioning in relation to established grade.
 - 4. Fill all depressions and eroded channels with sufficient soil mix to repair grade and ensure proper drainage. Compact lightly, and replant filled areas in accord with Drawing requirements.
- C. Final acceptance of work and approval by Architect for Substantial Completion shall include, but may not be limited to:
 - 1. Punch list items completed and approved by Architect.
 - 2. Final grades approved in accord with Drawings and Specifications.
 - 3. Site weed-free and in accord with approved weed control plan.
 - 4. Trees, shrubs, groundcovers, and mulches are all installed in accord with Drawings and Specifications.
 - 5. Landscape irrigation system complete and fully operational.
- D. Architect will issue a Letter of Acceptance upon final completion and approval of all work.

END OF SECTION

SECTION 03300 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mix design, placement procedures, and finishes.

1.02 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume.

1.03 SUBMITTALS

- A. Submit under the provisions of Section 01330 – SUBMITTAL PROCEDURES.
- B. Product Data: Reinforcing steel - Certified mill test results or laboratory test results. Indicate bar size, yield strength, ultimate tensile strength, elongation and bend test. Provide chemical composition for rebars that are to be welded.
- C. Design Mixes: For each concrete mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments. Indicate amounts of mix water to be withheld for later addition at Project site.
- D. Steel Reinforcement Shop Drawings: Details of fabrication, bending, and placement, prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement". Include material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports of concrete reinforcement. Include special reinforcement required for openings through concrete structures.
- E. Welding Certificates: Copies of certificates for welding procedures and personnel if welding is required.
- F. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance with the requirements indicated, based on comprehensive testing of current materials.
- G. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:
 - 1. Form materials and form-release agents.
 - 2. Steel reinforcement and reinforcement accessories.
 - 3. Curing materials.
 - 4. Floor and slab treatments.
 - 5. Bonding agents.
 - 6. Adhesives.
 - 7. Vapor barriers.

February 27, 2026

8. Epoxy joint filler.
 9. Joint-filler strips.
 10. Repair materials.
- H. Formliner Shop Drawing: Indicate formliner layout and termination details. Include jointing, form tie location, and pattern placement.
- I. Warranty: Submit warranty as noted under items entitled "WARRANTY" and "DRYING CONCRETE SLABS TO LIMIT MOISTURE VAPOR EMISSIONS AND ALKALINITY" hereinbelow.

1.04 QUALITY ASSURANCE

- A. Professional Engineer Qualifications: A Professional Engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for formwork and shoring and reshoring installations that are similar to those indicated for this Project in material, design, and extent.
- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C94/C94M requirements for production facilities and equipment.
- C. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C1077 and ASTM E329 to conduct the testing indicated. 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.
- D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.
- E. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code--Reinforcing Steel", if welding is required.
- F. ACI Publications: Comply with the following, unless more stringent provisions are indicated and maintain a copy at the field office.
 1. ACI 301, "Specification for Structural Concrete".
 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials".
 3. ACI 347R "Guide to Formwork for Concrete".

1.05 DELIVERY, STORAGE, AND HANDLING

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

1.06 WARRANTY

- A. Manufacturer's Warranty for Floor Vapor Emission Control System: Warrant against bond failure with concrete and failure of the system due to vapor emission and alkalinity levels for 5 years. The warranty period shall commence from the project acceptance date.

1. Warranty Provisions: The warranty provisions and number of years for the warranties required in this Section shall take precedence over the standard provisions in the Interim General Conditions (IGC).
- B. Manufacturer's Extended Warranty for Floor Vapor Emission Control System:
1. Replace original finished flooring materials and vapor emission control system due to failure of the vapor emission control system to control vapor emission and prevent unacceptable alkalinity levels.
 2. Provide extended warranty that is covered by a separate material and installation bond or by the manufacturer's product liability insurance policy specifically covering the work on this Project. Contracting Officer shall have final approval of accepting the bond or manufacturer's insurance policy.

PART 2 - PRODUCTS

2.01 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Comply with ACI 347R. Provide new or good finish 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 ACI 347R approved panel materials.
 2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
 - a. High-density overlay, Class 1, or better.
 - b. Medium-density overlay, Class 1, or better, mill-release agent treated and edge sealed.
 - c. Structural 1, B-B, or better, mill oiled and edge sealed.
 - d. B-B (Concrete Form), Class 1, or better, mill oiled and edge sealed.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved
- C. material. Provide lumber dressed on at least 2 edges and one side for tight fit.
- D. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4-inch, minimum.
- E. 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. Form oils or waxes shall not be used for concrete surfaces intended to be painted. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- F. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
1. Furnish units that will leave no corrodible metal closer than one-inch to the plane of the exposed concrete surface.
 2. Furnish ties that, when removed, will leave holes not larger than 1-1/2 inches in diameter in concrete surface.

February 27, 2026

3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.02 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A615/A615M, Grade 60, deformed, unless otherwise noted on the drawings. All reinforcing bars to be welded shall comply with ASTM A706/A706M, Grade 60, deformed.
- B. Welded Wire Reinforcement: ASTM A1060/A1060M, galvanized. Provide welded wire reinforcement in sheets.

2.03 REINFORCEMENT ACCESSORIES

- A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place that will not puncture the vapor barrier. Use plastic straps or brightly colored tie wires to secure reinforcing. Manufacture bar supports according to CRSI's "Manual of Standard Practice" galvanized from steel wire, plastic, or precast concrete, and as follows:
 1. For concrete surfaces exposed to view and where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected. Refer to item entitled "STEEL REINFORCEMENT" hereinbelow for chair support spacing.
 2. For reinforcing supports against earth or vapor barrier, use precast concrete supports that have a surface area not less than 4 square inches and have a compressive strength equal to or greater than specified compressive strength of concrete being placed.
- B. Round Dowel Bars at Slab-on-Grade Joints: Hot-dipped galvanized ASTM A36/A36M rods. Galvanize in accordance to ASTM A123/A123M. Factory fabricated dowel baskets (galvanized) shall be used to align and support dowels.
- C. Zinc Repair Material: ASTM A780/A780M, zinc-based solder, electroplated zinc, paint containing zinc dust, or sprayed zinc.
- D. Tapered Plate Dowels: Galvanized plates, ASTM A36/A36M or ASTM A108.

2.04 CONCRETE MATERIALS

- A. Portland Cement: ASTM C150/C150M, Type 1.
- B. Pozzolans:
 1. Fly Ash: ASTM C618, Class C or F.
 2. Ground Granulated Blast-Furnace Slag: ASTM C989/C989M, Grade 100 or 120.
- C. Normal-Weight Aggregate: ASTM C33/C33M, uniformly graded, and as follows:
 1. Class: Moderate weathering region, but not less than 3M.
 2. Aggregate Size: 1-1/2 inches.
 3. Aggregate Size: No. 57 (one-inch to No. 4).
 4. Aggregate Size: No. 67 (3/4-inch to No. 4).

- D. Size of Coarse Aggregate: Except when otherwise specified or permitted, maximum size of coarse aggregate shall not exceed three-fourths of the minimum clear spacing between reinforcing bars (or bundled bars), one-fifth of the narrowest dimension between the sides of forms, or one-third of the thickness of slabs or toppings.
- E. Water: Mixing water for concrete shall be potable, non-potable or a blend of potable and non-potable water.
 - 1. Potable water may be used without testing for conformance to ASTM C1602/C1602M.
 - 2. Non-potable water or a blend of potable and non-potable water shall be tested for conformance to ASTM C1602/C1602M.
 - 3. Use only potable water for site-produced concrete.

2.05 ADMIXTURES

- A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material and to be compatible with other admixtures and cementitious materials. Do not use admixtures containing calcium chloride.
- B. Air-Entraining Admixture: ASTM C260/C260M.
- C. Water-Reducing Admixture: ASTM C494/C494M, Type A.
- D. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
- E. Water-Reducing and Accelerating Admixture: ASTM C494/C494M, Type E.
- F. Water-Reducing and Retarding Admixture: ASTM C494/C494M, Type D.
- G. Crystalline Integral Waterproofing Admixture: Commercially formulated, chemical admixture capable of initiating and promoting growth of long, narrow crystal structures sufficient to fill and block capillary pores and micro-cracks within the concrete in order to prevent the passage of water.

2.06 VAPOR BARRIERS

- A. Vapor Barrier: ASTM E1745, Class A except as modified in subparagraph entitled "Permeance Rating" below, nylon- or polyester-cord-reinforced 3-ply high-density polyethylene sheet or one-ply extruded polyolefin sheet; 15 mil minimum thickness. Compliance to ASTM standards shall be confirmed by an independent testing agency.
 - 1. Permeance Rating: ASTM E96/E96M, ASTM E154/E154M not exceeding 0.01 gr/ft²/hr.

2.07 FLOOR AND SLAB TREATMENTS

- A. Slip-Resistive Aggregate Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of silicon carbide, or fused aluminum-oxide granules or crushed emery with emery aggregate containing not less than 50 percent aluminum oxide and not less than 25 percent ferric oxide; unaffected by moisture, and cleaning materials.

February 27, 2026

- B. Penetrating Liquid Floor Treatment: Chemically reactive, waterborne solutions of inorganic silicate or silicate or polymerized polyester polymer or other materials and proprietary components; odorless; colorless; that penetrates, hardens, waterproofs or densifies concrete surfaces.

2.08 CURING MATERIALS AND EVAPORATION RETARDERS

- A. Moisture-Retaining Cover: ASTM C171, polyethylene film or white burlap-polyethylene sheet.
- B. Water: Potable.
- C. Clear, Solvent-Borne, Membrane-Forming Curing Compound: ASTM C309, Type 1, Class B.
- D. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C1315, Type 1, Class A.
- E. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C1315, Type 1, Class A.

2.09 RELATED MATERIALS

- A. Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber.
- B. Epoxy Joint Filler: 2-component, semi-rigid, 100 percent solids, epoxy resin with a Shore A hardness of 80 per ASTM D2240.
- C. Bonding Agent: ASTM C1059/C1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- D. Epoxy-Bonding Adhesive: ASTM C881/C881M, 2-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class and grade to suit requirements, and as follows:
 - 1. Type II, non-load bearing, for bonding freshly mixed concrete to hardened concrete.
 - 2. Types I and II, non-load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
 - 3. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
- E. Cementitious Coatings: Cement based polymer modified concrete finishing materials.
- F. Sleeves:
 - 1. Schedule 40 steel pipe, galvanized per ASTM A53/A53M. Cut ends of galvanized pipe shall be ground smooth of burrs and cut ends shall be galvanized following ASTM A780/A780M.
 - 2. Schedule 40 PVC Pipe.
- G. Reglets: Fabricate reglets of not less than (0.0217-inch) thick galvanized steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

- H. Dovetail Anchor Slots: Hot-dip galvanized steel sheet, not less than 0.0336-inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

2.10 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. Products shall contain no added gypsum.
 - 1. Cement Binder: ASTM C150/C150M, Portland cement or hydraulic or blended hydraulic cement as defined in ASTM C219.
 - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4-inch or coarse sand as recommended by underlayment manufacturer.
 - 4. Compressive Strength: Not less than 4,000 psi at 28 days when tested according to ASTM C109/C109M.
- B. Repair Topping: Traffic-bearing, cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4-inch. Products shall contain no added gypsum.
 - 1. Cement Binder: ASTM C150/C150M, Portland cement or hydraulic or blended hydraulic cement as defined in ASTM C219.
 - 2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4-inch or coarse sand as recommended by topping manufacturer.
 - 4. Compressive Strength: Not less than 5,500 psi at 28 days when tested according to ASTM C109/C 109M.

2.11 CONCRETE MIXTURES

- A. Prepare mixture proportions for each type and strength of concrete determined by either laboratory trial mix or field test data bases, as follows:
 - 1. Proportion normal-weight concrete according to ACI 211.1 and ACI 301.
- B. Footings: Proportion normal-weight concrete mixture as follows:
 - 1. Minimum Compressive Strength: 4,000 psi at 28 days.
 - 2. Maximum Water-Cement Ratio: 0.50. Maximum water-cement ratio includes maximum 2 gallons water per cubic yard added in the field.
 - 3. Slump Limit: 6-inches.
- C. Slabs-on-Grades and Equipment Pads on Grade: Proportion normal-weight concrete mixture as follows:
 - 1. Minimum Compressive Strength: 4,500 psi at 28 days.

February 27, 2026

2. Maximum Water-Cement Ratio: 0.45. Maximum water-cement ratio includes maximum 2 gallons water per cubic yard added in the field.
 3. Slump Limit: 6-inches.
- D. Walls, Beams, Columns, and Other Miscellaneous Elements Shown on Structural Plans: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 4,000 psi at 28 days.
 2. Maximum Water-Cement Ratio: 0.50. Maximum water-cement ratio includes maximum 2 gallons water per cubic yard added in the field.
 3. Slump Limit: 6-inches.
- E. Slab Vapor Emissions Rates: At the time of finished flooring installation, vapor emissions shall not exceed a maximum of 5 pounds per 1,000 square feet per 24 hours or the maximum emission established by the flooring manufacturer whichever is less. If the vapor emission rate exceeds the limit specified, take measures specified in item entitled "DRYING CONCRETE SLABS TO LIMIT MOISTURE VAPOR EMISSIONS AND ALKALINITY" hereinbelow to reduce the emissions to an acceptable level without delaying the project.
- F. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than Portland cement in concrete as follows:
1. Fly Ash: 25 percent.
 2. Combined Fly Ash and Pozzolan: 25 percent.
 3. Ground Granulated Blast-Furnace Slag: 50 percent.
 4. Combined Fly Ash or Pozzolan and Ground Granulated Blast-Furnace Slag: 50 percent Portland cement minimum, with fly ash or pozzolan not exceeding 25 percent.
- G. Do not add air entrainment to concrete of trowel-finished interior floors. Do not allow entrapped air content to exceed 3 percent.
- H. Limit water-soluble, chloride-ion content in hardened concrete per ACI 318 Chapter 4 for corrosion protection of reinforcing steel.
- I. Admixtures: Use admixtures according to manufacturer's written instructions.
1. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) 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 required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
 4. Use crystalline integral concrete waterproofing admixture in all walls and beams exposed to the exterior; exterior walls, retaining walls, planter walls, interior slabs-on-grade, and slabs-on-grade containing reinforcement. Dosage of the waterproofing admixture shall be at 2 percent by mass of all cementitious content of up to a maximum of 13.5 pounds per cubic yard of concrete.

2.12 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice".
- B. Any steel reinforcement to be welded shall follow the procedures of AWS 1.4/1.4M, "Structural Welding Code - Reinforcing Steel".

2.13 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C94/C94M, and ASTM C1116/C1116M and furnish batch ticket information. Batch ticket information shall include design mix reference, water that can be added at the jobsite, and admixtures. For transit mixing, complete not less than 70 revolutions of the drum at the manufacturer's rated mixing speed. Discharge concrete into its final position within 90 minutes after introduction of batch water to the cement. If a retarder admixture is used, the discharge time limit of 90 minutes may be increased by the time specified for retardation by the admixture manufacturer or the concrete supplier. Mix concrete a minimum of one minute at mixing speed immediately prior to discharge.
- B. Project-Site Mixing: Measure, batch, and mix concrete materials according to ASTM C94/C94M. Mix concrete materials in appropriate drum-type batch machine mixer.
 - 1. For mixer capacity of one cubic yard or less, continue mixing at least one and one-half minutes, but not more than 5 minutes after all ingredients are in mixer, before any part of batch is released.
 - 2. For mixer capacity larger than one cubic yard increase mixing time by 15 seconds for each additional one cubic yard.
 - 3. Provide batch ticket for each batch discharged and used in the work, indicating Project identification name and number, date, mix type, mix time, quantity, and amount of water added. Record approximate location of concrete placement in structure.
 - 4. Hand mixed concrete will not be allowed, except to make up shortages for fence post footing, thresholds, curbs and gutters, thrust block and utility trench encasements.

2.14 FIBER REINFORCEMENT

- A. Synthetic fiber shall be fibrillated or monofilament polypropylene fiber engineered and designed for use in concrete, complying to ASTM C1116/C1116M, Type III, 2-1/4 inches long. Dosage shall not be less than 5 pounds per cubic yard.

PART 3 - EXECUTION

3.01 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 concrete structure can support such loads.

February 27, 2026

- 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 347R as abrupt or gradual, as follows:
 - 1. Class A, 1/8-inch.
 - 2. Class B, 1/4-inch.
 - 3. Class C, 1/2-inch.
 - 4. Class D, one-inch.
- D. Construct forms 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 one vertical. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal. Do not use rust-stained steel form- facing material.
- 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. Maintain the integrity of the vapor barrier membrane.
- 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. Place 3/4-inch chamfer strips in corners of formwork to produce beveled edges on permanently exposed surfaces.
- 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.
- M. Formliners: Provide special forming materials to produce form surfaces with face design, texture, arrangement, and configuration as shown or noted on the Architectural Drawings.

3.02 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.

February 27, 2026

1. Install anchor bolts, accurately located, to elevations required with embedment required.
 2. Install reglets to receive top edge of foundation sheet waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
 3. Install dovetail anchor slots in concrete structures as indicated.
 4. Install inserts, hangers, metal ties, nailing strips, blocking, grounds and other fastening devices needed for attachment of other work.
- B. Locate electrical or mechanical conduits and fittings so that the strength of the concrete member is not impaired. "Conduits" include pipes, ducts, and electrical conduits. Unless required otherwise on the drawings, conform to the following:
1. Concrete Walls:
 - a. Conduits larger than one-inch outside diameter shall not be embedded vertically in any wall. Conduits shall be spaced a minimum of 10 times outside diameter and shall be placed in the middle of the wall thickness.
 - b. No conduits shall be embedded horizontally in any wall, lengthwise.
 - c. Conduits passing through walls shall not impair the strength of the wall and shall be provided with Schedule 40 galvanized steel pipe (ASTM A53/A53M) sleeve.
 2. Concrete Beams:
 - a. Conduits larger than one-inch outside diameter shall not be embedded vertically in any beam. Conduits embedded vertically shall be spaced a minimum of 10 times outside diameter and shall be placed in the middle third of the beam thickness.
 - b. No conduits shall be embedded horizontally in any beam lengthwise.
 - c. Conduits passing through beams shall not impair the strength of the beam and shall be provided with Schedule 40 galvanized steel pipe (ASTM A53/A53M) sleeve.
 3. Concrete Slabs on Grade: Do not embed conduits within the thickness of any concrete slab on grade. Place conduits in the subgrade below the concrete slabs, but not within the thickness of the base course or gravel cushion, if any is required.
- C. Obtain Contracting Officer's approval to install conduit or pipe penetrations that may unduly impair the strength of the structural member (for example, vertical conduit embedded in a concrete column or multiple pipe penetrations near the face of a column).
- D. The Contractor shall coordinate the installation of all embedded items and penetrations. Cost of any added reinforcement required at pipe and conduit penetration and embedment shall be borne by the Contractor.

3.03 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 degrees Fahrenheit for 24 hours after placing concrete provided concrete is hard enough to not be damaged by form- removal operations and provided curing and protection operations are maintained. The 24 hour period may be reduced to 12 hours in compliance with ACI 347R with prior approval from the Contracting Officer.
- B. Leave formwork and shoring in place to support construction loads and weight of concrete in structural members until in-place strength of concrete has reached its specified compressive strength at 28 days. Determine compressive strength of in-place concrete by testing representative field-cured test specimens according to ACI 301.
 - C. 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 reuse at exposed surfaces. Apply new form-release agent.
 - D. 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 the Contracting Officer.
 - E. Clean formliner before each use. Replace damaged formliner whose continued use of repair would negatively impact the aesthetics of the concrete finish.

3.04 SHORES AND RESHORES

- A. Comply with ACI 318, ACI 318M, ACI 301, and recommendations in ACI 347R for design, installation, and removal of shoring and reshoring.
- B. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

3.05 VAPOR BARRIERS

- A. Vapor Barrier: Place, protect, and repair vapor-barrier sheets according to ASTM E1643, "Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs", and manufacturer's written instructions. The more stringent shall apply.
 - 1. Use the greatest widths and lengths practical to minimize lap joints. Seal laps joints and edges with tape or materials compatible with the vapor barrier. Remove and replace torn, punctured, or damaged vapor barrier materials, except when minor repairs or patches are allowed by manufacturer's instructions.
 - 2. Do not cut or puncture vapor barrier. No penetrations of the vapor barrier allowed except for permanent utilities. Seal all penetrations including pipes and reinforcing. Repair damage and reseal vapor barrier before placing concrete.
 - 3. Do not leave the vapor barrier exposed to sunlight for more than a few days prior to the concrete pour. Remove standing water from the vapor barrier prior to placing concrete.

3.06 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, and other foreign materials.
- 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.
 - 1. Shop or field-weld reinforcement according to AWS D1.4, where indicated.
 - 2. Support slab reinforcing bars as follows:

BAR SIZE	MAXIMUM DISTANCE BETWEEN SUPPORTS
#3	2-feet
#4	3-feet
#5	4-feet
#3 at 15-inches each way	4-feet 6-inches on center each way

- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

3.07 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 the Contracting Officer.
 - 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 from preformed galvanized steel, plastic keyway-section forms, or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete.
 - 3. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 - 4. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- 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. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8-inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.

2. 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. Complete sawing within 12 hours of concrete placement.
- 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. Terminate full-width joint-filler strips not less than 1/2-inch or more than one-inch below finished concrete surface where joint sealants, specified in SECTION 07920 - SEALANTS, are indicated.
 3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
- E. Dowel Joints: Install dowel sleeves, dowels, dowel bars, or plates, and support assemblies at joints where indicated. Use dowel sleeves or lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.08 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed. Provide notification to the Contracting Officer 2 days prior to the placement of concrete.
- B. Before placing concrete, water may be added at Project site, subject to limitations of ACI 301. Up to 2 gallons of water per cubic yard of concrete may be added at the jobsite provided the approved design mix accommodates the additional water. Do not add water to concrete after adding high-range water-reducing or plasticizing admixtures to mix.
- C. Convey concrete from mixer to the place of final deposit rapidly by methods that prevent segregation or loss of ingredients and will ensure the required quality of concrete. Use conveying equipment, conveyors, hoppers, baffles, chutes, pumps that are sized and designed to prevent cold joints from occurring and prevent segregation in discharged concrete. Clean conveying equipment before each placement.
- D. Deposit concrete continuously or in 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 specified. Deposit concrete to avoid segregation.
- E. Deposit concrete in forms in horizontal layers with proper consolidation into previous layers and in a manner to avoid inclined construction joints. Place each layer while preceding layer is still plastic, to avoid cold joints. For high wall pours (above 12-feet), Contractor must show its experience and demonstrate its proficiency before the Contracting Officer will permit pours in excess of 12-feet.

1. Consolidate placed concrete with mechanical vibrating equipment. Use equipment and procedures for consolidating concrete recommended by ACI 309R.
 2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the vibrator. Place vibrators to rapidly penetrate placed layer and at least 6-inches 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 around reinforcement, embedded items, and into corners of forms to eliminate honeycombing or planes or weakness due to air voids and stone pockets.
 3. Make construction joints only where located on drawings unless otherwise approved by the Contracting Officer. Plan pours to continuously place concrete from one construction joint to another.
- F. Deposit and consolidate concrete for 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, free of humps or hollows, before excess moisture or bleed-water appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- G. Hot-Weather Placement: Place concrete according to recommendations in ACI 305R and as follows, when hot-weather conditions exist:
1. Cool ingredients before mixing to maintain concrete temperature below 95 degrees Fahrenheit 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. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
 3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.09 CONCRETE SLABS ON GRADE

- A. For interior areas, unless specified elsewhere, place concrete floor slabs directly over vapor barrier overlain atop granular fill-capillary barrier and reinforce slabs as indicated on plans.

February 27, 2026

1. Place floor slabs in alternate panels, long strip pattern, and following construction or contraction joints.
 2. Provide a bond-break filler strip, between concrete slab and abutting vertical surfaces and as detailed.
- B. For exterior areas, unless specified elsewhere, place concrete slabs directly over granular compacted fill and reinforce slabs as indicated on plans. Provide isolation and contraction joints where detailed and, at intersections, corners and at abutments. Place contraction joints not more than 15-feet apart, unless detailed otherwise. Finish concrete true to grade, section and cross slope for sloped or crowned walks at 1.5 percent (one percent minimum and 2 percent maximum). Round edges to 1/8-inch radius except saw-cut joints. Finish steps in connection with walks with same finish as walks.
- C. At "house keeping slab", reinforce with synthetic fiber. Synthetic fiber shall be uniformly dispersed in concrete mix. The dosage shall be not less than 5 pounds per cubic yard of concrete. Average residual strength as tested by ASTM C1399/C1399M shall not be less than 200 psi.

3.10 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defective areas repaired and patched. Remove fins and other projections exceeding ACI 347R limits for class of surface specified.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8-inch in height.
1. Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, or painting.
 2. Do not apply rubbed finish to smooth-formed finish.
- C. Rubbed Finish: Apply the following to smooth-formed finished concrete:
1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
 2. Grout-Cleaned Finish (Burlap): 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 for at least 36 hours.
 3. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix one part Portland cement and one part fine sand with a 1:1 mixture of bonding agent and water. Add white Portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Compress grout

into voids by grinding surface. In a swirling motion, finish surface with a cork float.

4. Cementitious Coating (Cement Wash): Prepare, apply and cure the coating per manufacturer's requirements. Apply in 1/16-inch thick coats not to exceed 1/8-inch. Cementitious coatings are finished coatings and not to be used as patching or repair materials. Cement-sand-water mix are not cementitious coatings as defined under item entitled "RELATED MATERIALS" hereinabove. Under no circumstances will products containing gypsum plaster be allowed as a cementitious coating.
- D. 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.

3.11 FINISHING FLOORS AND SLABS

- A. General: Comply with recommendations in ACI 302.1R 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. Apply scratch finish to surfaces indicated and to surfaces to receive concrete floor topping or mortar setting beds for ceramic or quarry tile, Portland cement terrazzo, and other 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. Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.
- D. Trowel Finish: After applying float finish, apply first trowel finish 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 indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system.
 2. Finish surfaces to the following tolerances, measured within 24 hours according to ASTM E1155 for a randomly trafficked floor surface:
 - a. Specified overall values of flatness, F(F) 25; and levelness, F(L) 20; with minimum local values of flatness, F(F) 17; and levelness, F(L) 15.

- b. Specified overall values of flatness, F(F) 35; and levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and levelness, F(L) 17; for slabs-on-grade.
 - c. Specified overall values of flatness, F(F) 30; and levelness, F(L) 20; with minimum local values of flatness, F(F) 24; and levelness, F(L) 15; for suspended slabs.
 - d. Specified overall values of flatness, F(F) 45; and levelness, F(L) 35; with minimum local values of flatness, F(F) 30; and levelness, F(L) 24.
3. Finish and measure surface so gap at any point between concrete surface and an unlevelled freestanding 10-foot-long straightedge, resting on 2 high spots and placed anywhere on the surface, does not exceed 1/8-inch.
- E. Trowel and Fine-Broom Finish: Apply a partial trowel finish, stopping after second troweling, to surfaces indicated and to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method. Immediately after second troweling, and when concrete is still plastic, slightly scarify surface with a fine broom.
- F. Broom Finish: Apply a broom finish to exterior concrete walkways (covered and exposed), platforms, steps, and ramps, and elsewhere as indicated. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Contracting Officer before application.

3.12 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete 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 of manufacturer furnishing machines and equipment.
- D. Electrical Work: Use 3/4-inch maximum size of aggregates for duct encasement. Unless detailed otherwise, encase underground ducts or conduits as follows:
- 1. Provide 3-inches minimum concrete cover around ducts or conduits. Use spacers to place and hold ducts. Provide 18-inches minimum earth cover over top of concrete encasement unless otherwise detailed.
 - 2. For future connections, provide a one-foot section of ducts or conduits to extend beyond concrete encasement and terminate with a coupling or end cap.
- E. Concrete for Drainage, Sewer and Plumbing Systems:

February 27, 2026

1. Do not use calcareous coarse aggregates in sewerage structures or components.
2. Unless specified elsewhere, construct sewer manholes in accordance with the latest adopted/amended edition of Section 23 SEWER MANHOLES of the "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION".

3.13 CONCRETE PROTECTION 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 with recommendations in ACI 305R for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces 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. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including slabs and other surfaces, by one or a combination of the following methods:
 1. Moisture Curing: Keep surfaces continuously moist for not less than 7 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 a 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 7 days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 - a. Moist cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
 - b. Cure concrete surfaces to receive floor coverings with either a moisture- retaining cover or a curing compound that the manufacturer recommends for use with floor coverings.
 3. Curing Compound: Apply uniformly in continuous operation by spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
 4. Curing: Apply uniformly to slabs indicated in a continuous operation by spray or roller according to manufacturer's written instructions. Recoat areas

subjected to heavy rainfall within 3 hours after initial application where recommended by the manufacturer. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.14 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions. Defer joint filling as long as possible. Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semi-rigid epoxy joint filler full depth in saw-cut joints and at least 2-inches deep in formed joints. Overkill joint and trim joint filler flush with top of joint after hardening.

3.15 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas. Remove and replace concrete that cannot be repaired and patched to the Contracting Officer's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part Portland cement to 2 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 in solid concrete but not less than one-inch in depth. 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 the Contracting Officer.
- 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 one-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 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 mix 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 one-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 the Contracting Officer's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to the Contracting Officer's approval.

3.16 DRYING CONCRETE SLABS TO LIMIT MOISTURE VAPOR EMISSIONS AND ALKALINITY

- A. For concrete slabs (on grade or suspended) receiving floor finish susceptible to vapor emissions, protect, dry or seal concrete slabs to meet the required vapor emission level(s) of the intended floor finish systems. If choosing to use a floor sealing system, furnish submittals for approval.
1. Once slab drying has started, protect it from getting wet prior to floor finish installation. Test floor for moisture and alkalinity.

February 27, 2026

2. Test floor for vapor emission at locations and quantities recommended by the test kit manufacturer. Test pH levels of Concrete and humidity per ASTM F2170.
 3. If the concrete slab does not meet the vapor emission or alkalinity level(s), use other means such as mechanical drying or floor sealing system(s) (penetrants, coatings, or membranes) to achieve the required levels.
 4. If the concrete floor slab does not meet the required alkalinity level, neutralize, cure, dry or seal concrete to bring the concrete to an acceptable alkalinity level.
 5. Be aware that no additional time or costs will be granted to meet the required vapor emission levels or alkalinity levels of the concrete surfaces.
- B. Floor Vapor Emission Control System:
1. Install per manufacturer's requirements to achieve a guaranteed vapor emission rate that meets the finished flooring recommended rates. Treatment shall not provide detrimental conditions to the concrete slab or floor covering materials. Make sure flooring adhesives are compatible with the treatment materials.
 2. Installer shall provide proof of installer's certification by the treatment manufacturer.
 3. Warranty Requirements: Refer to item entitled "WARRANTY" hereinabove.

3.17 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement according to requirements specified in this Article.
- B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C172/C172M shall be performed according to the following requirements:
1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mix exceeding 5 cubic yards, but less than 25 cubic yards, plus one set for each additional 50 cubic yards or fraction thereof.
 2. Slump: ASTM C143/C143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
 3. Air Content: ASTM C231/C231M, pressure method, for normal-weight concrete; ASTM C173/C173M, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
 4. Concrete Temperature: ASTM C1064/C1064M; one test hourly when air temperature is 40 degrees Fahrenheit and below and when 80 degrees Fahrenheit and above, and one test for each composite sample.

5. Unit Weight: ASTM C567/C567M, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
6. Compression Test Specimens: ASTM C31/C31M; cast and laboratory cure one set of 4 standard 6-inch by 12-inch cylinder specimens for each composite sample. Cast and field cure one set of 4 standard 6-inch by 12-inch cylinder specimens for each composite sample.
7. Compressive-Strength Tests: ASTM C39/C39M;
 - a. Test 2 laboratory-cured specimens at 7 days and 2 at 28 days.
 - b. Test 2 field-cured specimens at 7 days and 2 at 28 days.
 - c. A compressive-strength test shall be the average compressive strength from 2 specimens obtained from same composite sample and tested at age indicated.
- C. 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.
- D. Strength of each concrete mix will be satisfactory if every average of any 3 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.
- E. Test results shall be reported in writing to the Contracting Officer, 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 mix proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
- F. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by the Contracting Officer but will not be used as sole basis for approval or rejection of concrete.
- G. Moisture Vapor Emission Test: Standard test method meeting ASTM F1869.
- H. Alkalinity (pH Level) Testing: Standard test required for floor slabs and all wall and ceiling surfaces to receive painted finishes. Testing of concrete to receive paint finish may be conducted under SECTION 09901 - PAINTING.
- I. 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 the Contracting Officer. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42/C42M or by other methods as directed by the Contracting Officer.

END OF SECTION

SECTION 03305 – UNDER-SLAB VAPOR AND TERMITE BARRIER

PART 1 - GENERAL

1.01 SUMMARY

- A. Vapor and Termite Control barrier and accessories for installation under concrete slabs.
- B. Related Sections:
 - 1. Section 02300 – EARTHWORK
 - 2. Section 03300 – CAST-IN-PLACE CONCRETE

1.02 CODES AND STANDARDS

- A. In addition to referenced codes and standards within this specification, the work shall comply with the latest edition of the following standards. When conflicts arise between standards, the more stringent shall apply.
 - 1. American Society for Testing and Materials (ASTM):
 - a. ASTM D882 – Test Method for Tensile Properties of Thin Plastic Sheeting.
 - b. ASTM D1709 – Test Methods for Impact Resistance of Plastic Film by Free-Falling Dart Method.
 - c. ASTM D4833 – Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.
 - d. ASTM E154 - Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
 - e. ASTM E1745-11 Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.
 - f. ASTM E1643-11 Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
 - 2. Technical Reference - American Concrete Institute (ACI):
 - a. ACI 302.2R-06 Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials.

1.03 SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. Include manufacturer's installation instructions for placement, seaming, penetration repair, and perimeter seal per ASTM E1643 and any additional procedures to account for subterranean termite protection.
- B. Samples:

February 27, 2026

1. Three, 12-inch square samples of termite/vapor barrier sheet
2. Three, 12-inch-long samples of seam and penetration tape.
3. Three, 12-inch-long samples of perimeter/edge seal.
4. Three samples of penetration prevention accessory.

C. Test Reports:

1. Reports, by qualified testing agency, showing compliance with performance requirements specified when tested in accordance with ASTM E 1745.
2. Reports, by qualified testing agency, documenting laboratory and in-field termite resistance testing.

1.04 DELIVERY, STORAGE AND HANDLING

- A. All materials must be delivered in original, unopened containers with the manufacturer's name, labels, product identification. Damaged material or must be removed from the site immediately.
- B. Store all materials in a clean dry area until ready for use.
- C. Store and handle the specified products in a manner to prevent damage.

1.05 WARRANTY

- A. Warranty: Provide manufacturer's limited warranty against underslab termite infestation of the buildings constructed under the contract caused by subterranean termite penetration of the termite control barrier membrane due to defects in material and workmanship for a period of five (5) years from the Date of Substantial Completion. The warranty shall also stipulate that the membrane is constructed without the use of any chemical termiticides and meets all of the requirements for its designated ASTM E1745 classification.
 1. The warranty excludes any defect or damage caused by:
 - a. Faulty or improper installation of the barrier membrane, including the failure to comply with published specification and installation recommendations in effect at the time of installation.
 - b. Improper use, storage or site conditions (e.g noncompliance with the terms of the products material safety data sheet)
 - c. Any below-concrete slab or similar activity, and any other maintenance, repair, alteration or new installation to the building that occurs after the completion of the original installation that impacts the barrier membrane
 - d. Damage caused by materials not by the barrier membrane manufacturer
 - e. Factors beyond the reasonable control of the barrier membranes manufacturer or its affiliates, including, but not limited to, natural disasters such as lightning, floods, windstorms, seismic

disturbances, hurricanes, tornadoes, or impact of foreign objects or other violent storms or casualty

- f. Damage resulting from any form of misuse, abuse or negligence
- g. Damage resulting from exposure to chemicals or other materials that degrade or destroy the barrier membrane
- h. Structural defects or failures in the building to which the barrier membrane is installed.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Termite Control and Vapor Barrier System (Basis-of-Design): Multi-layered plastic extrude sheet comprised of manufacturer's propriety materials and high-grade prime, virgin polyolefin resins having a minimum thickness of 15 mils; Pango Wrap Termite/Vapor Barrier as manufactured by Stego Industries, LLC.
- B. Minimum Performance Requirements
 - 1. Water Vapor Permeance: 0.01 Perms [grains/(ft²*hr*in-Hg)] or less when tested in accordance with ASTM E 1745.
 - 2. Puncture Resistance per ASTM D4833: 137 Newtons
 - 3. Classification: ASTM E1745 Class C Minimum
 - 4. Tensile Strength: 48.6 lbf/in when tested in accordance with ASTM D 882.

2.02 ACCESSORIES

- A. Seam and Penetration Tape: Manufacturer's seam tape composed of polyethylene file with acrylic pressure sensitive adhesive; Pango Tape
- B. Perimeter/Edge Seal: Manufacturer's 3-inch wide multi-layered tape used to at the termite/vapor barriers terminating edges along the concrete slab. Tape consists of a polyethylene file with acrylic pressure sensitive adhesive laminated to an aperture film that creates a textured surface for wet concrete to mechanically bond to; Pango Claw.
- C. Penetration Sealant System:
 - 1. Sealant: Two-component, high performance modified cycloaliphatic epoxy sealant; Pango Sealant, having the following physical properties:
 - a. Tensile Strength: ASTM D 412, 2,000 psi
 - b. Compressive Strength: ASTM C 695, 8,800 psi
 - c. Hardness, Shore D: ASTM D 2240, 52
 - d. Water Vapor Permeance: ASTM E 96, 0.027 perms @ 20mils.
 - 2. Sealant Form: Flexible, closed-cell polyethylene foam with an acrylic pressure-sensitive adhesive; Pango Sealant Form.
- D. Penetration Prevention and Screed Accessory: Manufacturers 3 component systems consisting of the following:

February 27, 2026

1. A polypropylene base with a peel-and-stick adhesive, a press fit center hub and a threaded side hub; Beast Foot.
2. A threaded polypropylene post with slab elevation markings; Beast Screed Post
3. A polypropylene adjustable cap having two inches of adjustability; Beast Screed Cap.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Ensure approval of compaction tests of fill and backfill as required by soils report. And the completion of the placement of drainage fills as required.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Prior to the placement of the reinforcing steel for slabs on grade, install termite/vapor barrier in accordance with manufacturer's instructions and ASTM E 1643.
 1. Unroll termite/vapor barrier with the longest dimension parallel with the direction of the concrete placement and face laps away from the expected direction of the placement whenever possible.
 2. Extend termite/vapor barrier to the perimeter of the slab. If practicable, terminate it at the top of the slab, otherwise at a point acceptable to the Architect and/or Structural engineer.
 3. Seal termite/vapor barrier to slab using perimeter/edge seal, per manufacturer's instructions.
 4. Overlap joints a minimum of 6 inches and seal with manufacturer's seam tape.
 5. Apply seam tape and perimeter/edge seal to a clean and dry membrane
 6. Seal all penetrations (including pipes) per manufacturer's instructions.
 7. For interior forming applications, avoid the use of non-permanent stakes driven through vapor barrier. Use blunt-end and/or threaded nail stakes (screed pad posts) and insert them into screed systems base. Ensure base's peel-and-stick adhesive base is fully adhered to the vapor barrier
 8. If non-permanent stakes must be driven through vapor retarder, repair as recommended by vapor retarder manufacturer.
 9. Use reinforcing bar supports with base sections that eliminate or minimize the potential for puncture of the vapor barrier.
 10. For vapor barrier-safe concrete screeding applications, install manufacturer's screed system per manufacturer's instructions prior to placing concrete.

February 27, 2026

11. Repair damaged areas by cutting patches of termite/vapor barrier, overlapping damaged area a minimum of 6 inches and taping all sides with seam tape.

3.03 FIELD QUALITY CONTROL

- A. Site Observation: Provide periodic site observation by the vapor and termite barrier manufacturer's technical representative at the commencement and completion of the installation of the vapor and termite barrier membrane for the on-ground slab areas for each building.
- B. Observation at the completion of installation for each area shall take place immediately before placement of the concrete when all reinforcing bars, screeds, utility, plumbing and other slab penetrations are in place, addressed and sealed.
- C. Repair or remove and replace components of vapor and termite barrier system that the technical representative indicates are damaged or and not properly installed and do not comply with the manufacturers installation and specified requirements.

END OF SECTION

SECTION 03715 – CONCRETE SEALER

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes film-forming concrete sealer treatments for the following horizontal surfaces: as scheduled.
 - 1. Cast-in-place concrete.

1.02 SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. Include manufacturer's recommended number of coats for each type of substrate and spreading rate for each separate coat.
- B. Qualification Data: For qualified Applicator
- C. Product Certificates: For each type of concrete sealer, from manufacturer.

1.03 QUALITY ASSURANCE

- A. Applicator Qualifications: An employer of workers trained and approved by manufacturer.

1.04 PROJECT CONDITIONS

- A. Limitations: Proceed with application only when the following existing and substrate conditions permit concrete sealer to be applied according to manufacturers' written instructions and warranty requirements:
 - 1. Concrete surfaces and mortar have cured for not less than 28 days.
 - 2. Ambient temperature is above 40 deg F and below 120 deg F and will remain so for 24 hours.
 - 3. Substrate-surface temperature is above 40 deg F and below 120 deg F
 - 4. Not less than 24 hours have passed since surfaces were last wet.

PART 2 - PRODUCTS

2.01 MEMBRANE-FORMING CONCRETE SEALERS

- A. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
 - 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. Dayton Superior; Cure & Seal 1315 EF (Basis-of-Design).

February 27, 2026

- b. BASF Construction Chemicals - Building Systems; Kure 1315.
- c. ChemMasters; Polyseal WB.
- d. Euclid Chemical Company (The), an RPM company; Super Diamond Clear VOX; LusterSeal WB 300.
- e. Meadows, W. R., Inc.; Vocomp-30.
- f. or approved equal.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements and conditions affecting performance of the Work.
 - 1. Verify that surfaces are clean and dry according to concrete sealer manufacturer's requirements.
 - 2. Inspect for previously applied treatments that may inhibit penetration or performance of concrete sealer.
 - 3. Verify that there is no efflorescence or other removable residues that would be trapped beneath the application of concrete sealer.
 - 4. Verify that required repairs are complete, cured, and dry before applying concrete sealer.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Cleaning: Before application of concrete sealer, clean substrate of substances that could impair penetration or performance of product according to concrete sealer manufacturer's written instructions and as follows:
 - 1. Remove oil, curing compounds, laitance, paint, old flooring adhesive, coatings and other substances that inhibit penetration or performance of concrete sealer according to ICRI Technical Guideline No. 310.2
- B. Protect adjoining work, including mortar and sealant bond surfaces, from spillage or blow-over of concrete sealer. Cover adjoining and nearby surfaces of aluminum and glass if there is the possibility of concrete sealer being deposited on surfaces. Cover live vegetation.
- C. Coordination with Crack and Spall Repair: Do not apply concrete sealer until cracks and/ or spall repairs in concrete floor receiving concrete sealer treatment have been filled, cured and ground flush.
 - 1. Concrete sealer work may precede crack repair only if crack repair material adhesion and compatibility have been tested and verified using

February 27, 2026

substrate, concrete sealer, and crack repair materials identical to those required.

3.03 APPLICATION

- A. Apply a continuous, uniform film by low-pressure spray only, shortnap roller, or lamb's wool applicator to cured concrete. For best results, use a Hudson® Industro® or equivalent canister curing compound sprayer. Use tip number 8004 or equivalent for water-based or waterborne products.
- B. Apply a second coating, repeating first application. Comply with manufacturer's written instructions for limitations on drying time between coats and after rainstorm wetting of surfaces between coats. Consult manufacturer's technical representative if written instructions are not applicable to Project conditions.

3.04 CLEANING

- A. Immediately clean concrete sealer from adjoining surfaces and surfaces soiled or damaged by concrete sealer application as work progresses. Correct damage to work of other trades caused by concrete sealer, as approved by Architect.
- B. Comply with manufacturer's written cleaning instructions.

END OF SECTION

DIVISION 4 – MASONRY

SECTION 04400 – ADHERED SIMULATED STONE VENEER

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes simulated stone veneer in the following applications:
 - 1. Exterior Application: Simulated stone masonry veneer applied to scratch and brown coat base on concrete or concrete unit masonry substrate.
 - 2. All sealants, caulking, joint fillers and seals for a weathertight performance, as specified in Section 07910 – EXTERIOR WALL JOINT SEALANTS.
 - 3. All flashings and counter-flashings, flashings around penetrations, end dams, and trim as shown, or as may be required in conjunction with system or to join systems to adjacent construction. Metal flashing is specified in Section 07600 – FLASHING AND SHEET METAL.
- B. Related Work Described Elsewhere:
 - 1. Section 07910 – EXTERIOR WALL JOINT SEALANTS

1.02 CODES AND STANDARDS

- A. The work of this section shall comply with the latest edition of the following standards. When conflicts arise between standards, the more stringent shall apply.
 - 1. ANSI – American National Standards Institute.
 - a. ANSI A108.1, Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar.
 - b. ANSI A108.1B, Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or latex-Portland Cement Mortar.
 - c. ANSI A108.4, Installation of Ceramic Tile with Organic Adhesives or Water-Cleanable Epoxy Adhesives.
 - d. ANSI A118.4 American National Standard Specifications for Latex-Portland Cement Mortar
 - e. ANSI A118.6 American National Standard Specifications for Standard Cement Grouts for Tile Installation.
 - 2. ASTM – American Society for Testing and Materials
 - a. ASTM C150, Specification for Portland Cement
 - b. ASTM C206, Specification for Finishing Hydrated Lime
 - c. ASTM C 267, Standard Test Method for Chemical Resistance of Mortars, Grouts, and Monolithic Surfacing.
 - d. ASTM C897, Specification for Aggregate for Job – Mixed Portland

Cement Based Plasters

- e. ASTM C 926, Specification for Application of Portland Cement Based Plaster

3. Code

- a. Building Code Requirements for Masonry Structures, ACI 530/ASCE 5/TMS 402, Chapter 6 "Veneer".
- b. IBC 2018 with Kauai County amendments or additions

1.03 SUBMITTALS

- A. Product submittals: Follow Section 01330 – SUBMITTAL PROCEDURES.
- B. Product data: Submit manufacturer's product data, specifications, installation procedures and all other data required to demonstrate compliance with the specified requirements for all mortar, grout, admixtures, metal lath and accessories.
- C. Simulated Stone Veneer and Colored Mortar Samples: Submit cured samples of mortar, with integral colorant added and stone veneer. Approved samples will establish color of mortar required for the project.
- D. Installation System Samples: Submit sample of installation system demonstrating compatibility/functional relationships between adhesives, mortars, grouts and other components. Submit evidence from veneer manufacturer or supplier verifying suitability of veneer for specific application and use; including dimensional stability, water absorption, resistance to thermal cycling, and other characteristics that the project may require.
- E. Certificates
 - 1. Material Certificates: Submit certificate signed by manufacturer for each kind of plaster aggregate certifying that materials comply with requirements.
- F. Shop Drawings: Submit complete shop drawings to the Architect for approval. Shop drawings shall include full scale detail sections of every typical composite member, fully drawn, not outlined. Also show method of anchorage, joint systems, expansion provisions, flashing details, and systems attachment and other pertinent details, and indicate all materials and finishes. Do not fabricate prior to acceptance.
- G. Qualification Data: For Installer.
- H. Warranty: Sample warranties for masonry veneer installation system and stone veneer.

1.04 QUALITY ASSURANCE

- A. Installation System Manufacturer Qualifications: Manufacturer with a minimum of ten (10) years' experience in manufacturing Portland cement plaster, mortars, grouts and other installation materials products similar to scope of this Project with a record of successful in-service performance. Obtain installation materials from single source manufacturer to insure consistent quality and full compatibility.

February 27, 2026

- B. Simulated Stone Veneer Manufacturer (single source responsibility): Company specializing in manufactured/fabrication of simulated stone veneer products with three (3) years minimum experience. Obtain veneer units from a single source with resources to provide products of consistent quality in appearance and physical properties
- C. Installers Qualifications: An installer who employs experienced workers who are skilled in installing simulated stone veneer assemblies similar in material, design, and extent to those indicated for this Project with five (5) years documented experience and whose projects have a record of successful in-service performance.
- D. Coordination: Coordinate layout and installation of simulated stone veneer system with other adjacent work interfacing with simulated stone veneer.
- E. Testing:
 - 1. Mortar Laboratory Testing: For each mix required, test according to ASTM C 780 for compressive strength.
 - 2. Site Testing:
 - a. Conduct adhesion testing to verify bond to prepared substrates in accordance with ASTM D4541.
 - b. Conduct tests for the duration of the project at frequency and locations specified by design professional.
 - c. Conduct wet sealant adhesion testing in accordance with sealant manufacturer's field quality control test procedure. Notify design professional minimum 7 days prior to testing.
- F. Pre-Installation Meeting: Prior to commencement of work, conduct a pre-installation meeting with the Architect, Owner and their representatives, General Contractor, and any other related representative to review installation procedures, weather conditions under which work can be installed, storage, etc.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- B. Store aggregates where grading and other required characteristics can be maintained, and contamination avoided.
- C. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.
- D. Protect plaster accessories and trim from being bent or damaged.

1.06 PROJECT CONDITIONS

- A. Protection of Simulated Stone Veneer Assemblies: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed simulated stone veneer assemblies when construction is not in progress.

February 27, 2026

1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
- B. Stain Prevention: Immediately remove mortar and soil to prevent them from staining the face of simulated stone veneer assemblies.
 1. Protect base of walls from rain-splashed mud and mortar splatter by coverings spread on the ground and over the 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.
- C. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
- D. Contractor is responsible for the full and satisfactory compatibility and performance between all sealants used for the work on this section and those sealants used by other trades that may be in direct contact with or adjacent to sealants in this work.

1.07 WARRANTY

- A. Simulated Stone Warranty: Provide manufacturer's standard limited warranty against defects in materials and manufacturing of the simulated stone product for a period of fifty (50) years following the date of Substantial Completion. The Manufacturer will provide free of charge, new materials to replace those which are determined to be defective.
- B. Masonry Veneer Installation System Warranty: Submit written warranty (2 copies) before Substantial Completion signed by both the Manufacturer and Contractor agreeing to repair or replace defective plaster materials or components that fail in materials or workmanship during the warranty period.
 1. This warranty shall cover all on-site labor to repair or replace all defective parts for the entire warranty period.
 - a. Warranty Period: 10 years after date of Substantial Completion.
- C. The warranty, the enforcement or lack of enforcement thereof, shall not deprive the Owner of other actions, rights or remedies available to him. Warranty shall be in form approved by the Owner. Warranty does not cover the natural stone veneer, damage resulting from vandalism, acts of nature exceeding performance criteria, alterations, abuse of the work, failure of the supporting structure and other causes beyond the Contractor's control. This warranty and its enforcement shall not deprive the Owner of other action right or remedy available to him.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Simulated Stone Veneer: Subject to compliance with requirements, available product from the following manufacturers may be incorporated into the work:
 - 1. Big Rock Manufacturing Inc.
 - 2. Or Approved Equal.
- B. Stone Veneer Installation System: Subject to compliance with requirements of Contract Documents, provide product by one of manufacturers named below. If not named, submit as substitution according to Conditions of the Contract and appropriate Division 01 Sections.
 - 1. Sto Corporation; StoPowerwall MVES(Basis-of-Design)
 - 2. Parex (www.parex.com)
 - 3. Senergy (www.senergy.com)
- C. Source Limitations for Cementitious Materials: Obtain plastering ingredients of a uniform quality from a single manufacturer for each cementitious component and from one source or producer for each aggregate.

2.02 SIMULATED STONE MATERIALS

- A. Simulated Stone Veneer: Moss Lava Rock in random shapes and size, unless indicated or selected otherwise.
 - 1. Thickness Range: 1-1/2-inch to 2-inches

2.03 INSTALLATION MATERIALS AND ACCESSORIES

- A. Plaster Accessories for Portland Cement Plaster
 - 1. General:
 - a. Comply with material provisions of ASTM C 1063.
 - b. Except as indicated below, fabricate plaster accessories from zinc alloy, ASTM B 69, 99% pure zinc.
 - c. PVC plastic in compliance with ASTM D1784, cell classification 13244C.
 - d. Coordinate depth of accessories with thicknesses and number of coats required.
 - 2. Casing beads: Square edge, 24-gage, non-expanded non-perforated flanges, size as required for plaster thickness. (#66). (Expanded Flange Casing Bead with approval only).
 - 3. Control joints: Prefabricated, one-piece type: Folded pair of non-perforated screeds in M-shaped configuration, with expanded flanges, size as required for plaster thickness, with removable tear strip, or approved equal.
 - 4. Foundation Sill (Weep) Screed: Non-expanded non-perforated profile

February 27, 2026

designed for use at sill plate line to form plaster stop and prevent plaster from contacting damp earth, 24 gauge, in size as required for plaster thickness.

5. Available Manufacturers:

- a. AMICO (Alabama Metal Industries Corp.).
- b. CEMCO (California Expanded Metal Co.).
- c. Clark Western Building Systems.
- d. Dietrich Metal Framing.
- e. Fry Reglet

B. Air/Water Resistive Barrier and Components:

1. Primary Air and Water-Resistive Barrier Material (**AWRB-2**): – Single component, trowelable, polymer modified Portland cement-based air and water-resistive barrier; Sto ExtraSeal. This material is use as the skim coat and scratch coat of the plaster system.
2. Air and Water Resistive Barrier Detailing Components:
 - a. Single component gun-applied STPE liquid flashing, rough opening protection, joint treatment and transition detailing material; Sto RapidGuard.
 - b. Self-Adhered sheet membrane flashing for rough opening protection and transition detailing; StoGuard Conformable Membrane.

C. Metal Flashing: As specified in Section 07600 – FLASHING AND SHEET METAL

D. Joint Sealants: High-movement, medium modulus, non-sag one-component silyl-terminated polyether joint sealant in compliance with ASTM C920 Type S, Grade NS, Use NT, A, M, Class 100/50; StoSeal STPE Sealant.

E. Masonry Preparation Materials:

1. Patching and Levelling Material for Prepared Concrete and Masonry
 - a. Polymer modified Portland cement-based patch and leveling material for prepared concrete and masonry surfaces for leveling up to 1/4 inch; Sto Leveler and Skim Coat.
 - b. Polymer modified Portland cement-based lightweight patch and leveling material for prepared concrete and masonry surfaces for leveling up to 1/8 inch; Sto BTS Xtra.
2. Crack Fillers: Substrate manufacturer's recommended crack fillers or sealants compatible with assembly components and adjacent materials.

F. Mortar for Thick Beds: Factory blended polymer fortified Portland Cement mortar designed for vertical thick bed substrates for masonry veneer installations.

1. Scratch Coat: StoPowerwall ExtraSeal – Polymer modified Portland cement-based stucco scratch coat.
2. Brown Coat: 102 StoPowerwall Stucco Pre-Blended: Fiber reinforced one coat Portland cement stucco pre-blended with graded sand.

HAWAII HEALTH SYSTEMS CORPORATION – KAUAI DIVISION

Samuel Mahelona Memorial Hospital
Behavioral Health New Patient Facility
Project No. 221093-01

Adhered Simulated Stone Veneer
04400-6

February 27, 2026

- G. Veneer Mortar: Factory blended polymer fortified mortar specifically designed for vertical masonry veneer installations; StoColl; Sto Corp.
 - 1. Shear bond strength meets ANSI A118.4 and A118.15 requirements.
- H. Pointing Mortar: Polymer-Modified Tile Grout: ANSI A118.7 composed of Portland cement, graded aggregates, polymers and color-fast pigments.
 - 1. Product: Laticrete, Permacolor Select.
 - a. Color: As selected by the Architect from the manufacturer's full line of colors.
- I. Joint Sealants: StoSeal STPE Sealant; Sto Corp, high-movement, medium modulus, non-sag one-component silyl-terminated polyether joint sealant in compliance with ASTM C920 Type S, Grade NS, Use NT, A, M, Class 100/50.
 - 1. Colors: Colors of exposed sealants to be selected by the Architect from the manufacturer's full range of colors.
- J. Water: Potable.

2.04 SEALER

- A. Sealers: Provide breathable, water-based formula specifically designed for topical application on natural stones in exterior applications; Laticrete Stonetech Heavy-Duty Exterior Sealer.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine the surfaces and conditions under which the work of this section will be performed. Do not proceed until unsatisfactory conditions detrimental to timely and proper completion of the work have been corrected. Starting work within a particular area will be construed as applicator's acceptance of surface conditions.
- B. Verify the following:
 - 1. Ensure surface of concrete or concrete unit masonry is free from deleterious materials such as algae, dirt, dust, efflorescence, form oil, fungus, grease, mildew or other foreign substances.
 - 2. Concrete and CMU surfaces are smooth and flat without protrusions and as no surface deficiencies such as cracks, friable, chalkiness, laitance, bugholes, honeycombs, and spalls.
 - 3. Concrete and concrete unit masonry shall be free from moisture damage or deterioration.
 - 4. CMU mortar joints are struck flush.
- C. Report deviations from the requirements of project specifications or other conditions that might adversely affect the air barrier installation. Do not start work until deviations are corrected.

3.02 PREPARATION

- A. Protection: Protect adjacent work from soiling, spattering, moisture deterioration and other harmful effects which might result from plastering.
- B. Remove projecting joint mortar so it is even with the plane of the wall. Remove surface contaminants such as efflorescence, existing paint or coatings, or any other surface contamination by chemical or mechanical means. Pre-moisten the surface with water just prior to placement of air barrier.
- C. Verify sealant adhesion with pull tests as directed in 1.04.G Testing.

3.03 INSTALLATION SKIM COAT AND ACCESSORIES

- A. Installation Performance Requirements: Ensure air and water resistive barrier isolates building interiors from air and water infiltration through exterior walls.
- B. Installation Quality Standards: In addition to standards listed elsewhere, perform work according to following, unless otherwise specified:
 - 1. ASTM C 926 for application and curing of plaster.
 - 2. ASTM C 1063 for installing metal trim accessories.
 - 3. Respective manufacturer's written installation instructions.
 - 4. Approved submittals.
 - 5. Contract Documents
- C. Install materials only when surface and ambient temperature are minimum 40 degrees F and rising during application and drying period and below 100 degrees F. Install air barrier material to dry or damp surfaces (no standing or glistening water)
- D. Mix, apply, store, and handle materials in accordance with manufacturer's written instructions.
- E. Skim Coat Installation:
 - 1. Install one liberal coat of air and water resistive barrier material in a uniform, continuous application by trowel at nominal 1/8 inch thick. Surface must be free of voids and pinholes when dry. Final application must not show CMU surface texture or joints. Do not install over working or moving joints or joint sealants.
- F. Metal Flashing Installation
 - 1. Install true to line and levels indicated; minimize quantity of lap joints by using longest units possible.
 - 2. Set in proper locations with outside hemmed edges flush with building face location indicated; securely attach to substrate with same fasteners as used for attaching metal lath.
 - 3. Terminate ends of horizontal flashings with properly folded and constructed end dams with a depth of not less than 1 in, with continuous soldered joints.

February 27, 2026

4. At lap joints of horizontal flashings, form neat and aligned joints by interlocking splice plate within hemmed edge of sheet metal flashing profile; apply air/moisture resistant barrier membrane and reinforcing mesh as indicated to create water-resistant joint.
- G. Transitions:
1. Install appropriate air barrier accessory material or auxiliary material at transition areas: foundation, flashings, lintels and shelf angles, openings and penetrations such as pipes, vents, windows and doors, masonry anchors, rafters or beams, joints in construction, projections such as roof line. Refer to approved shop drawings and manufacturer's installation instructions.
 2. Limit extension of transition materials to limit of expanded flange accessories at stucco terminations.
- H. Plaster Accessories:
1. General:
 - a. Comply with referenced standards for provision and location of plaster accessories of type indicated, unless shown otherwise.
 - b. All plaster accessories when installed shall be properly lapped, spliced and set in silicone sealant or sealant called for in the contract documents. All perimeter edges shall be sealed with silicone sealant upon installation.
 - c. Flash all accessory intersections as indicated on the drawings with approved air/moisture resistant barrier membrane and reinforcing mesh. Air/moisture barrier system must lap on to ALL substrates that are shown on the drawings.
 - d. All termination beads around windows and openings must be set in a continuous bead of mastic sealant. Take great care to insure that no mastic product is exposed or in contact with any surface that shall receive silicone sealant.
 - e. Ensure that air/moisture resistant barrier are properly interfaced with accessories, and shingle laps required for drainage are going in the proper direction.
 - f. Erect metal accessories so that finished plaster surfaces may be true to line, level, plumb, square, curved or as otherwise required, without excessive thickness of plaster.
 - g. Install the longest possible lengths of trim accessories.
 - h. Accessories shall be secured to substrate in accordance with requirements of fastener manufacturer. Space per manufacturer's directions
 2. Casing Beads:
 - a. Install casing beads where shown on architectural drawings and at locations where plaster system terminates.

February 27, 2026

- b. Install casing beads around wall penetrations with proper lapping of air/moisture resistant barrier membrane and reinforcing mesh.
 - c. Allow 1/4-inch min. joint between plaster stop at ceiling and wall junction where bases are of dissimilar material.
 3. Corner Reinforcement:
 - a. Install corner bead reinforcement at vertical exterior corners.
 - b. Install Drip screeds, or similar at horizontal exterior corners.
 4. Control Joints:
 - a. Locate control joints strategically at points where building movement is anticipated. The air/moisture resistant barrier must continue unbroken behind trim accessory joints in vertical or horizontal direction.
 - b. Install joints in exterior plaster walls at locations and spacing indicated, to delineate areas not more than 144 sq.ft.. Distance between control joints shall not to exceed 18-feet on center each way or a length to width ratio of 2-1/2 to 1.
 - c. Install vertical joint continuous from bottom to top of wall with top sections lapping over bottom Sections. Butt horizontal joints into vertical joints sealing the intersection with silicone or approved sealant.
 - d. Control joints at interior corners: Inside corner trim accessories are not recommended unless the structure of the intersection wall construction is different, in which case one or both walls should terminate, and the joint should have a sealant system or a fabricated inside corner expansion joint.
 5. Expansion Joints:
 - a. Provide metal expansion joints in plaster, soffits and walls at locations indicated.
 - b. Allow minimum 1/2-inch joint between stops or as indicated and keep joint free of plaster.
 - c. Install a looped reinforcing mesh coated with air/moisture resistant barrier membrane inside joint expansion opening at gypsum sheathing. Refer to architectural drawings.
 - d. Attach each flange to a separate supporting members.
 6. Foundation Screed:
 - a. Termination of the stucco assembly at the base of the building to be located no lower than 4-inch from the finished grade and 2-inch from the hard surface.
 - b. An 1/8-inch minimum gap is recommended below the sheathing (between sheathing and foundation) for a capillary break.

3.04 PLASTER MORTAR BED APPLICATION

A. General

1. Tolerances: Do not deviate more than 1/8" in 10'-0" from a true plane in finished plaster surfaces, as measured by a 10'-0" straightedge placed at any location on surface.
2. Sequence plaster application with the installation and protection of other work, so that neither will be damaged by the installation of the other.
3. Plaster flush with metal frames and other built-in metal items or accessories which act as a plaster ground, unless otherwise indicated. Where plaster is not terminated at metal by casing beads, cut base coat free from metal before plaster sets and groove finish coat at the junctures with metal.
4. Apply thicknesses and number of coats of plaster as indicated; or as required by referenced standards.
5. Corners: Make internal corners and angles square; finish external corners flush with corner beads, square and true with plaster faces.

B. Portland cement plaster application: Comply with ASTM C 926.

1. Scratch Coat: Allow skim coat to dry minimum 24 hours and apply nominal 1/4-inch scratch coat of Sto ExtraSeal by trowel. Scratch the surface horizontally with a stucco rake tool.
2. Brown Coat: Allow scratch coat to dry minimum 24 hours and install stucco brown coat in accordance with applicable codes and manufacturer's requirements. Limit total thickness, including scratch coat, and stucco brown coat, to 5/8 inches maximum. Moist cure the brown coat in accordance with ASTM C926 including recommendations for time between coats and curing in "Annex A2 Design Considerations".

3.05 SETTING OF STONE VENEER

- A. Install stone veneer and mortar in accordance with manufacturer's instructions, Masonry Veneer manufacturer's Association "Installation Guide for Adhered Concrete Masonry Veneer" and ACI 530.1/ASCE 6/TMS 602.
- B. Mark layout lines in accordance with planning, generally taking into account pattern (e.g., running bond, stacked bond, etc.), size of grout joints, location of expansion joints, and other start and stopping points of the installation, and aesthetics.
- C. Using a 1/2"x1/2"x1/2" U-notched trowel spread the adhesive with flat side of the trowel to "wet-out" the prepared substrate. Then use the notched side of the trowel to spread additional adhesive with ribbons of adhesive oriented horizontally.
- D. Clean and dampen the back surface of stone with a wet sponge, back butter stone units by applying a nominal 1/2-inch layer of veneer mortar with the flat side of the trowel.
- E. Immediately place units slightly offset from their final position in the freshly

- applied wall adhesive, then slide into place while applying firm pressure to fully bed the units in the adhesive so no voids exist in the adhesive. Use a straight edge to check for evenness of the surface when installing stone.
- F. If adhesive skins, remove and discard the skinned adhesive, and re-apply fresh adhesive.
 - G. As units are placed, periodically remove a unit to verify full contact of adhesive with the substrate and the back of the unit, and full embedment (no voids) in the adhesive.
 - H. Arrange stone veneer for good fit in un-coursed rubble pattern with joint widths within tolerances indicated on the Landscape Drawings. Insert small stones into spaces between larger stones as needed to produce joints as uniform in width as practical. Generally, use larger stone at the bottom and smaller stones at the top of the wall.
 - I. Arrange stone veneer with color and size variations uniformly dispersed for an evenly blended appearance.
 - J. Maintain uniform joint widths except for variations due to different stone sizes and where minor variations are required to maintain bond alignment, if any. Lay walls with joints not more than 1/2-inch at widest points.
 - K. Before the adhesive dries scrape out any excess mortar in the grout joints or on the surface of the units. Allow to cure for at least 24 hours before grouting/pointing. Allow additional drying time during cool and/or humid weather conditions to ensure adequate bond and to minimize the risk of efflorescence.
 - L. Movement Joints: Follow TCNA "Handbook for Ceramic, Glass and Stone Tile Installation" Section EJ171 Movement Joint Guidelines for Ceramic, Glass and Stone. Provide expansion, control, and pressure-relieving joints of widths and at locations indicated on the Drawings and approved shop drawings. If not shown or indicated provide movement joints as follows:
 - 1. Space movement joints a maximum of 12-feet on center with a minimum joint width of 3/8-inch for exterior installations. Joint width may need to increase based on surface temperature of tile in accordance with TCNA EJ171.
 - 2. Install perimeter joints where tile abuts restraining surfaces such as perimeter walls, curbs, columns, and changes in plane and corners.
 - 3. Sealing of expansion, control, and pressure-relieving joints is specified in Section 07910 – EXTERIOR WALL JOINT SEALANTS.
 - 4. Keep expansion, control, and pressure-relieving joints free of plaster, mortar, grout, and other rigid materials.
 - M. Cutting and Fitting: Cut and fit thin veneer stone for chases, pipes, conduit, sleeves, grounds, and other penetrations and adjacent materials. Coordinate with other work to provide correct size, shape, and location.
 - N. During the progress of the work, cover top of unfinished stone veneer work for protection from weather.
 - O. Sound tiles after setting to ensure proper bonding. Hollow sounding tiles shall be replaced.

February 27, 2026

3.06 POINTING

- A. Allow stone units to set a minimum of 48 hours prior to pointing. The pointing mortar shall be forced into the joints to the full depth. Take special care not to scratch tile during this operation. Remove surplus pointing mortar before it has hardened and leave the face of the tile clean. Keep expansion and control joints free of mortar.
- B. Point stone joints by placing and compacting pointing mortar in layers not more than 3/8 inch deep. Compact each layer thoroughly and allow to become thumbprint hard before applying next layer.
- C. Tool joints, when pointing mortar is thumbprint hard, with a smooth jointing tool to produce the following joint profile:
 - 1. Joint Profile: Concave.

3.07 SEALANTS

- A. Prepare joints and apply sealants of type and at locations indicated to comply with applicable requirements in Section 07910 – EXTERIOR WALL JOINT SEALANTS. Remove temporary shims before applying sealants.

3.08 ADJUSTING AND CLEANING

- A. Remove and replace simulated stone veneer assemblies of the following description:
 - 1. Broken, chipped, stained, or otherwise damaged stone. Stone may be repaired if methods and results are approved by Architect.
 - 2. Defective joints.
 - 3. Simulated stone veneer assemblies not matching approved samples and mockups.
 - 4. Simulated stone veneer assemblies not complying with other requirements indicated.
- B. Replace in a manner that result in simulated stone veneer assemblies' matching approved samples and mockups, complying with other requirements, and showing no evidence of replacement.
- C. In-Progress Cleaning: Clean simulated stone veneer assemblies as work progresses. Remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After the mortar is thoroughly set and cured, clean simulated stone veneer assemblies as follows:
 - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 - 2. Test cleaning methods on mockup; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before cleaning stone veneer assemblies.
 - 3. Clean simulated stone veneer assemblies in accordance to manufacturer's

HAWAII HEALTH SYSTEMS CORPORATION – KAUAI DIVISION

Samuel Mahelona Memorial Hospital
Behavioral Health New Patient Facility
Project No. 221093-01

Adhered Simulated Stone Veneer
04400-13

February 27, 2026

instructions.

4. Apply breather type (non-film forming) masonry sealer to completed surfaces in accordance with manufacturer's instructions.

3.09 PROTECTION

- A. Provide final protection and maintain conditions to ensure stone veneer work will be without damage or deterioration at time of Substantial Completion.

END OF SECTION

DIVISION 04 - MASONRY

SECTION 04810 - UNIT MASONRY ASSEMBLIES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes unit masonry assemblies consisting of the following:
 - 1. Concrete masonry units.
 - 2. Architectural concrete masonry units.
 - 3. Mortar and grout.
 - 4. Reinforcing steel.
 - 5. Masonry joint reinforcement.
 - 6. Ties and anchors.
 - 7. Miscellaneous masonry accessories.
- B. Related Work Described Elsewhere:
 - 1. SECTION 07920 - SEALANTS.
 - 2. SECTION 09901 - PAINTING testing for moisture and alkalinity.

1.02 DEFINITIONS

- A. Reinforced Masonry: All cells of masonry shall be solid grouted.

1.03 SUBMITTALS

- A. Submit in accordance with SECTION 01330 - SUBMITTAL PROCEDURES.
- B. Product Data: For each different masonry unit, strength classification, additive, accessory, and other manufactured product specified.
 - 1. Reinforcing steel - Certified mill test results or laboratory test results. Indicate bar size, yield strength, ultimate tensile strength, elongation and bend test. Provide chemical composition for rebars that are to be welded.
- C. Shop Drawings: Show fabrication and installation details for the following:
 - 1. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement".
- D. Qualification Data: For firms and persons specified in item entitled "QUALITY ASSURANCE" hereinbelow.
- E. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:

February 27, 2026

1. Each cement product required for mortar and grout, including name of manufacturer, brand, type, and weight slips at time of delivery.
 2. Grout mixes. Include description of type and proportions of ingredients to assure compliance with ASTM C476.
 3. Each material and grade indicated for reinforcing bars.
 4. Each type and size of joint reinforcement.
 5. Each type and size of anchor, tie, and metal accessory.
- F. Test Reports: Manufacturer's tests shall be in accordance with ASTM C140/C140M for conformance with the requirements of ASTM C90.
- G. Quality Control Inspection Documents: Provide one copy of the following industry documents for use by Contracting Officer.
1. NCMA TEK 08-02A (Revised 2005): Removal of Stains from Concrete Masonry.
- H. Samples for the following:
1. Architectural Block: For each type of architectural block provide 6-inch square finish sample with specified sealers applied.
 2. For each type of mortar color specified provide colored mortar samples.

1.04 QUALITY ASSURANCE

- A. 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, through one source from a single manufacturer for each product required. Block plant shall maintain a quality control program to monitor and control block chloride ion content. Soluble chloride ion content should not exceed 0.30 per cent by volume of the cement material in the block, based on ACI 318 19 Table 19.3.1.1.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source or producer for each aggregate.
- C. Architectural Block In-Place Mockup: Before installing architectural unit masonry, build mockup wall as part of the work, using materials indicated for the completed work, to verify selections made under sample Submittals and to demonstrate aesthetic effects. Build sample panel, full size of the wall indicated.
1. Mockup wall location to be determined by the Contracting Officer.
 2. Clean exposed faces of panels with masonry cleaner indicated.
 3. Where masonry is to match existing, erect wall adjacent and parallel to existing surface.
 4. Maintain mockup during construction in an undisturbed condition as a standard for judging the completed work.
 5. Approval of mockup is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of

joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Contracting Officer in writing.

- a. Approval of mockup does not constitute approval of deviations from the Contract Documents contained in sample panels, unless such deviations are specifically approved by the Contracting Officer in writing.

6. Approved mockup may become part of the completed work if undisturbed at time of substantial completion.

- D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in SECTION 01310 - PROJECT MANAGEMENT AND COORDINATION.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. Carefully stack and handle masonry units so as to prevent chipping, marring or cracking of corners, edges and faces.
- 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 lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.06 PROJECT CONDITIONS

- A. Protection of Masonry: In rainy locations and conditions, cover tops of walls, projections and sills with waterproof sheeting to repel water.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.
- C. Stain Prevention: Protect to prevent stain damage to mar final finish or finishing techniques. Prevent grout, mortar, and soil from staining the face of masonry to be left exposed, stained or painted.
- D. Hot-Weather Requirements: Protect unit masonry work when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Provide artificial shade and wind breaks and use cooled materials as required. When ambient temperature exceeds 90 degrees Fahrenheit with a wind velocity greater than 8 mph, do not spread mortar beds more than 48-inches ahead of masonry. Set masonry units within one minute of spreading mortar.

PART 2 - PRODUCTS

2.01 CONCRETE MASONRY UNITS

- A. General: Provide shapes indicated and as follows:
 - 1. Provide special shapes for lintels, corners, jambs, sash, headers, bonding, and other special conditions.
 - 2. Provide square-edged units for outside corners, unless indicated as bullnose.
 - 3. Provide "H" blocks for below grade foundation walls and scheduled to be fully grouted unless otherwise indicated on the drawings.
- B. Concrete Masonry Units: ASTM C90 and as follows:
 - 1. Unit Compressive Strength: Provide load bearing high strength units with minimum average net-area compressive strength of 3,750 psi. The assembly strength (CMU, grout, and mortar) shall be $I_{nn} = 2,500$ psi.
 - 2. Size (Width): Manufactured to the following dimensions within variations in dimensions only as permissible per ASTM C90:
 - a. 8-inches nominal; 7-5/8 inches actual.
 - b. 12-inches nominal; 11-5/8 inches actual.
- C. Architectural Concrete Masonry Units: Shall be standard units manufactured to the same specifications as standard concrete masonry units with the addition of an integral water repellant admixture.
 - 1. Pattern and Texture:
 - a. Standard pattern, filled, ground exposed aggregate finish. Match Contracting Officer's sample.
 - b. Ground exposed aggregate faces to be on both exposed-to-view sides of field blocks and on 3 exposed-to-view sides of end blocks, lintel and sill blocks.
 - 2. Colors: To be selected by Contracting Officer.
 - 3. Water Repellant and Efflorescence Control Admixture: Liquid polymeric, integral water-repellent admixture that improves compressive and flexural bond strength and control efflorescence.
 - a. Products: Master Builders Inc., Rheopel Plus Multipurpose admixture, or accepted equivalent.
 - 4. Special Aggregate: Provide units made with aggregate matching aggregate in Contracting Officer's sample.
 - 5. Basis-of-Design Product: Architectural Block as manufactured by Tileco Inc. or accepted equivalent. Campbell Industrial Park, 91-209 Hanua Street, Kapolei, HI 96707.

2.02 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C150/C150M, Type I or ASTM C595, Type IL.

February 27, 2026

- B. Mortar: Shall comply with proportion specification of ASTM C270, Type M with 28-day compressive strength of 2,500 psi.
- C. Grout: Shall conform to ASTM C476 with 28-day compressive strength of 3,000 psi.
- D. Aggregate for Mortar: ASTM C144.
- E. Aggregate for Grout: ASTM C404.
- F. Plasticizer Additive: Acceptable for use in ASTM C270 Mortar Cement as a substitute for hydrated lime in masonry mortar.
 - 1. Powder Type: Proprietary pozzolanic mortar plasticizer.
 - 2. Liquid Type: Proprietary mixture of resins.
- G. Water for Use in Mixing Mortar and Grout: Potable, clean, and free from injurious amounts of oils, acids alkalis, salts, organic materials, or other substances that may be deleterious to both mortar and reinforcement.
- H. The compressive strength of the assembly (CMU, grout, and masonry) shall be $f'_m = 2,500$ psi.
- I. Colored Cement Product: Packaged blend made from Portland cement and lime, masonry cement or mortar cement and mortar pigments, all complying with specified requirements, and containing no other ingredients.
 - 1. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.
 - a. Grout Colors: To be selected by the Contracting Officer.
 - 2. Pigments shall not exceed 10 percent of Portland cement by weight.
 - 3. Pigments shall not exceed 5 percent of masonry cement or mortar cement by weight.
- J. Water Reducing Admixture in Grout: ASTM C494.
- K. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with concrete masonry units, containing integral water repellent by same manufacturer.
 - 1. Products: Master Builders, Inc.; Rheopel Mortar Admixture or accepted equivalent.

2.03 REINFORCING STEEL

- A. Uncoated Steel Reinforcing Bars: ASTM A615/A615M; deformed, Grade 60 unless otherwise indicated on the drawings or specified herein. Any reinforcing to be welded shall be low-alloy steel reinforcing bars conforming to ASTM A706/A706M, Grade 60.

2.04 MASONRY JOINT REINFORCEMENT

- A. General: ASTM A951/A951M Standard Specification for Masonry Joint Reinforcement and as follows:

February 27, 2026

1. Hot-dip galvanized, carbon-steel wire for both interior and exterior walls.
 2. Wire Size for Side Rods: No. 9 diameter.
 3. Wire Size for Cross Rods: No. 9 diameter.
 4. Provide in lengths of not less than 10-feet. Provide prefabricated corner and tee units in lengths not less than 2-feet where indicated.
- B. For single-wythe masonry, provide either ladder or truss type with single pair of side rods and cross rods spaced not more than 16-inches on center.

2.05 TIES AND ANCHORS, GENERAL

- A. General: Provide ties and anchors, specified in subsequent articles, made from materials that comply with this Article, unless otherwise indicated.
- B. Hot-Dip Galvanized Carbon-Steel Wire: ASTM A1064/A1064M; with ASTM A153/A153M, Class B-2 coating.

2.06 MISCELLANEOUS ANCHORS

- A. Anchor Bolts: Headed anchor bolts complying with ASTM F1554, Grade 36 weldable galvanized per ASTM A153/A153M, Class C; with ASTM A563/A563M hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A153/A153M, Class C of diameter and length indicated.

2.07 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene, urethane or PVC.
- B. Preformed Control-Joint Gaskets: Material as indicated below, designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
1. Styrene-Butadiene-Rubber Compound: ASTM D2000, Designation M2AA-805, or
 2. PVC: ASTM D2287, Type PVC-65406.
- C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D226/D226M, Type I (No. 15 asphalt felt).
- D. Reinforcing Bar Positioners: Commercial plastic or wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding reinforcing bars in center of cells. Units are formed from 0.142-inch steel wire, hot-dip galvanized after fabrication. Commercial plastic units are fabricated for the intended purpose.
1. Provide units with either 2 loops or 4 loops as needed for number of bars indicated.
 2. Other Suitable Devices: Other suitable devices may be used, upon proper submittal to and approval by Contracting Officer.

February 27, 2026

- E. Adhesive: Type recommended by insulation board manufacturer for application indicated.

2.08 MASONRY CLEANERS

- A. Job-Mixed Detergent Solution: Solution of 1/2-cup dry measure tetrasodium polyphosphate and 1/2-cup dry measure laundry detergent dissolved in one- gallon of water.
- B. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar or grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

2.09 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. Do not use calcium chloride in mortar or grout.
- B. Pre-Blended, Dry Mortar Mix: Furnish dry mortar ingredients in the form of a pre-blended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to the job site.
- C. Mortar for Unit Masonry:
 - 1. The proportioning of materials for mortar and grout shall be by volume and done in such manner that the specified proportions can be controlled and accurately maintained. Measure fine aggregate in a damp loose condition. Mix materials in a mechanical batch mixer for at least 3 minutes for mortar and 5 minutes for grout, but do not mix more than 10 minutes. Hand mixing is permitted only for small batches of 3 cubic feet or less.
 - 2. Prepare Mortar Mix Design 1 with sufficient water to provide a workable consistency. Use and place mortar within 1-1/2 hours after mixing. No materials which start to set shall be retempered.
 - 3. Prepare Mortar Mix Designs 2 through 3 strictly in accordance with the admixture manufacturer's instructions. Place mortar with 2-1/2 hours after mixing. No materials which start to set shall be retempered.
- D. Mortar Mix Designs: Mortar shall be freshly prepared and uniformly mixed in one of the following proportions unless directed otherwise:
 - 1. Mortar Mix 1:

Type M Mortar	
One part	masonry cement
2-1/2 to 3 parts	mortar aggregate
 - 2. Mortar Mix 2:

Type M Mortar	
2 sacks	Portland cement
1/2 to one bag	powdered plasticizer additive (7 pound bag)

	6 cubic feet	mortar aggregate
3. Mortar Mix 3:
 - Type M Mortar
 - One sack
 - 3 ounces
 - 2-1/4 to 2-3/4 cubic feet
 - Portland cement
 - liquid plasticizer additive
 - mortar aggregate
 - E. Grout for Unit Masonry: Sufficient water shall be used to produce a consistency just fluid enough for pouring or pumping without segregation. Grout shall be used and placed in final position within 90 minutes after mixing, but shall in no case be used after initial set has occurred. This time limitation is permitted to be waived, if the grout is of such slump that it can be placed without addition of water.
 1. Grout shall attain not less than 3,000 psi 28-day compressive strength per ASTM C1019 unless noted otherwise on drawings.
 2. Use plasticizers additives for below grade foundation walls scheduled to be grouted to ensure full dispersal of mix.
 3. Grout shall be mixed to a slump of 8 to 11-inches as determined by ASTM C143/C143M.
 - F. Grout Mixes: Conform to ASTM C476 for grout mixed on-site. Prepare and uniformly mix grout with the proportions specified in ASTM C476:
 1. Ready-Mix Grout: Conform to ASTM C476 for grout designed by ready-mix suppliers. Proportions shall be established by 28-day compressive strength tests in accordance with ASTM C1019.

2.10 SEALERS

- A. Anti-Graffiti Sealer: Clear, solvent-based silicone elastomer formulated to weatherproof concrete block and other porous masonry materials and protect treated surfaces from repeated graffiti attacks without altering the natural appearance; 333 Omegaseal Water Repellent & Graffiti Management as manufactured by Diedrich Technologies or accepted equivalent.
- B. Coordinate sealers compatibility with sealants and other materials that it may come in contact with prior to its use.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance.
 2. Verify that floor levels, footing levels or foundations are within tolerances specified.
 3. Verify that reinforcing dowels are properly placed.

February 27, 2026

4. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Before installation, examine rough-in and built-in construction to verify actual locations of piping connections.

3.02 INSTALLATION, GENERAL

- A. General: All masonry units shall be clean and handled to protect and minimize chipping, spalling and cracking. All bed on which masonry is to be laid shall be clean.
- B. Masonry units shall not be wetted prior to use. Units which have become wet shall be allowed to dry thoroughly before laying. If water is splashed on the block and a color difference does not occur (from the water) then the block units are too wet to be laid.
- C. Build chases and recesses to accommodate items specified in this Section and in other sections of the Specifications.
- D. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to the opening.
- E. Cut masonry units with motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide a continuous pattern and to fit adjoining construction. Where possible, use full-size units without cutting. Allow units cut with water-cooled saws to dry before placing, unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- F. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.

3.03 CONSTRUCTION TOLERANCES

- A. Comply with the tolerances in TMS 602, "Specification for Masonry Structures", as applicable to climate indigenous to Hawaii and as noted.
- B. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/4-inch in 20-feet, nor 1/2-inch maximum.
- C. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4-inch in 10-feet, nor 1/2-inch maximum.
- D. For conspicuous horizontal lines, such as exposed lintels, sills, parapets, and reveals, do not vary from level by more than 1/4-inch in 20-feet, nor 1/2-inch maximum.
- E. For exposed 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. Do not vary from bed-joint thickness of adjacent courses by more than 1/8-inch.
- F. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8-inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8-inch.

3.04 CONDUITS

- A. All electrical and mechanical conduits and fittings shall be located such that they do not impair the strength of the masonry member and shall be subject to acceptance by the Contracting Officer. Conduits referred to in the items below include pipes, ducts, and electrical conduits. Conduits and fittings shall conform to the following, unless shown on structural drawings.
- B. Conduits, pipes, sleeves and fixtures shall be of material compatible with masonry which will not corrode. Aluminum shall not be used unless it is effectively coated and covered.
 - 1. Masonry Columns:
 - a. Electrical conduits and other pipes and fittings may not be embedded in a column if they will displace more than 2 percent of the cross-sectional area of the column.
 - b. Conduits in columns shall not be larger in outside diameter of one-inch or than 1/8 the least dimension of the column, whichever is smaller. Minimum spacing shall be 3 diameters on center.
 - c. Conduits shall not pass through or be embedded in a column or pilaster horizontally.
 - 2. Masonry Walls:
 - a. Do not embed any conduits and boxes in CMU cells that contain vertical reinforcement.
 - b. No conduits shall be embedded horizontally in walls parallel to the plane of the wall.
 - c. Conduits larger than one-inch outside diameter shall not be embedded vertically in any wall. Conduits shall be spaced a minimum of 16 times outside diameter and shall be placed in the middle of the member thickness.
 - d. Conduits passing through walls shall not impair the strength of the member and shall be provided with Schedule 40 galvanized steel pipe (ASTM A53/A53M) sleeve. The sleeves shall be spaced a minimum of 16 times the outside diameter of the sleeve.
 - e. Electrical boxes shall not impair the strength of the wall and beam.
 - 3. Masonry Beams and Lintels:
 - a. Do not embed any conduits and boxes in CMU cells that contain vertical reinforcement.
 - b. No conduits shall be embedded horizontally in beams and lintels parallel to the plane of the beam or lintel.
 - c. Conduits larger than one-inch outside diameter shall not be embedded vertically in any beam. Place vertical conduits in middle beam/lintel thickness, middle third of beam span and space a minimum of 10 times the larger outside diameter on centers.

- d. Conduits passing through a beam/lintel shall not impair the strength of the member and shall be provided with Schedule 40 galvanized steel pipe (ASTM A53/A53M) sleeve.
- C. Where a number of conduits, pipes, boxes and fittings are intended to be embedded or penetrate a structural masonry member at a location which may unduly impair the strength of the member, such as at the base of the wall or end of a shear wall, the Contracting Officer shall be informed and his approval must be obtained before the conduits and pipes are placed.
- D. Contractor shall coordinate the installation of all embedded conduits, pipes and penetrations. Cost of any added reinforcement required at conduit and pipe penetrations and embedments shall be borne by the Contractor.

3.05 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. When foundation is at specified levels, lay first course masonry units in a mortar bed not exceeding 3/4-inch thick. Bed webs of adjoining cells that contain reinforcement in mortar to prevent escape of grout.
- C. Bond Pattern for Exposed Masonry: Lay exposed masonry in the following bond pattern; do not use units with less than nominal 4-inches horizontal face dimensions at corners or jambs. One-half running bond with vertical joint in each course centered on units in courses above and below unless otherwise indicated on drawings.
- D. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 2-inches. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inches horizontal face dimensions at corners or jambs.
- E. Stopping and Resuming Work: In each course, rack back one-half-unit length for one-half running bond or one-third-unit length for one-third running bond; do not tooth. Clean exposed surfaces of set masonry and remove loose masonry units and mortar before laying fresh masonry.
- F. Built-In Work: As construction progresses, build in items specified under this and other sections of the Specifications. Fill in solidly with masonry around built-in items.
- G. Grout space between hollow-metal frames and masonry solidly with mortar, unless otherwise indicated.
 - 1. Grout Mix: Use one of the following:
 - a. One of the mortars mixed specified in Part 2 above.
 - b. One of the grout mixes specified in Part 2 above.
 - 2. Gypsum board joint compound or other gypsum containing compounds are not permitted.

- H. Where built-in items are to be embedded in cores of hollow masonry units, install and secure in place to prevent movement.

3.06 MORTAR BEDDING AND JOINTING

- A. Lay hollow masonry units as follows:
 - 1. With full mortar coverage on horizontal and vertical face shells.
 - 2. Bed webs in mortar in starting course on footings and in all courses of piers, columns, and pilasters.
- B. Form head joints with sufficient mortar so excess will be squeezed out as units are placed in position. Butter both sides of units to be placed, or butter one side of unit already in place and one side of unit to be placed.
- C. Maintain joint thicknesses indicated, except for minor variations required to maintain bond alignment. If not indicated, lay walls with 3/8-inch thick joints.
- D. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than the joint thickness, unless otherwise indicated.
- E. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint), unless otherwise indicated.

3.07 BONDING OF MASONRY

- A. Intersecting and Abutting Walls: Unless vertical expansion or control joints are shown at juncture, bond walls together as follows unless otherwise shown in drawings:
 - 1. Provide individual metal ties not more than 16-inches on center.
 - 2. Provide continuity with masonry joint reinforcement by using prefabricated "T" units.

3.08 MASONRY JOINT REINFORCEMENT

- A. General: Provide continuous masonry joint reinforcement as indicated. Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8-inch on exterior side of walls, 1/2-inch elsewhere. Lap reinforcement a minimum of 6-inches.
 - 1. Space reinforcement not more than 16-inches on center.
 - 2. Space reinforcement not more than 8-inches on center in foundation walls.
 - 3. Provide reinforcement not more than 8-inches above and below wall openings and extending 24-inches beyond openings. Reinforcement above is in addition to continuous reinforcement.
- B. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
- C. Provide continuity at corners and wall intersections by using prefabricated "L" and "T" sections. Cut and bend reinforcing units as directed by manufacturer for

continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.09 ANCHORING MASONRY TO STRUCTURAL MEMBERS

- A. Anchor masonry to structural members where masonry abuts or faces structural members to comply with the following:
 - 1. Provide an open space not less than one-inch in width between masonry and structural member, unless otherwise indicated. Keep open space free of mortar or other rigid materials.
 - 2. Anchor masonry to structural members with flexible anchors embedded in masonry joints and attached to structure.
 - 3. Space anchors as indicated, but not more than 24-inches on center vertically and 36-inches on center horizontally.

3.10 CONTROL AND EXPANSION JOINTS

- A. General: Install control and expansion joints in unit masonry where indicated. Build-in related items as masonry progresses. Do not form a continuous span through movement joints unless provisions are made to prevent in-plane restraint of wall or partition movement.
- B. Form control joints in concrete masonry as follows:
 - 1. Fit bond-breaker strips into hollow contour in ends of concrete masonry units on one side of control joint. Fill resultant core with grout and rake joints in exposed faces.
 - 2. Install preformed control-joint gaskets designed to fit standard sash block.
 - 3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar or rake joint.
 - 4. Install temporary foam-plastic filler in head joints and remove excess filler and seal joint when unit masonry is complete.
- C. Form expansion joints as follows:
 - 1. Form open joint of width indicated, but not less than 3/8-inch for installation of sealant and backer rod specified in SECTION 07920 - SEALANTS. Keep joint free and clear of mortar.
- D. Build in horizontal, pressure-relieving joints where indicated; construct joints by either leaving an air space or inserting a compressible filler of width required for installing sealant and backer rod specified in SECTION 07920 - SEALANTS.

3.11 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores to support reinforced masonry elements during construction.
 - 1. Construct formwork to conform to shape, line, and dimensions shown. Make it 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 temporary loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in TMS 602.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist grout pressure. Comply with requirements of TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
- D. Grout all masonry solid.
- E. Place grout within 1-1/2 hours from introducing water in the mixture and prior to initial set.
- F. Consolidate grout by mechanical vibration and reconsolidate by mechanical vibration after initial water loss and settlement has occurred.

3.12 FIELD QUALITY CONTROL

- A. Engage a qualified independent testing agency to perform special inspection of masonry wall construction as indicated on drawings. Payment of these services will be made by the Contractor.

3.13 ARCHITECTURAL BLOCK SEALER APPLICATION

- A. Protect people, property, vehicles, plants, windows, painted surfaces, aluminum and all non-masonry surfaces that may come into contact with the product, spray or wind drift. Use polyethylene or other proven protective material.
- B. Clean surfaces to be treated and let dry completely. All sealing and caulking compounds should be in place and cured before sealer application. Ensure sealers compatibility with these materials.
- C. Apply a thin, even coat of block sealer with a brush, roller, or low- pressure sprayer. If an airless sprayer is used, minimize pressure to produce a spray mist. Avoid over-application.
- D. Brush out runs and drips immediately to create a uniform film thickness and to avoid an uneven appearance.
- E. Multiple applications may be necessary on more porous concrete block surfaces. Allow at least 4 hours between applications. Apply additional coats perpendicular to the original coat to produce the best finish.
- F. Protect treated surfaces from rain for 4 to 6 hours following application.
- G. Anti-Graffiti Sealer shall be applied to vertical surface up to 14-feet above adjacent grade or finished walking surfaces.

3.14 REPAIRING, POINTING, AND CLEANING

- A. Prior to grout placement, 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.
- 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 Contracting Officer's approval of sample cleaning before proceeding with cleaning of masonry.
 - 3. Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
 - 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing the surfaces thoroughly with clear water.
 - 5. Clean concrete masonry by cleaning method indicated in NCMA TEK 08-02A applicable to type of stain on exposed surfaces.

END OF SECTION

SECTION 05120 - STRUCTURAL STEEL

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes structural steel.
- B. Related Work Described Elsewhere: SECTION 09901 - PAINTING for surface preparation and priming requirements.

1.02 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Engineer structural steel connections required by the Contract Documents to be selected or completed by the fabricator to withstand design loadings indicated.
- B. Engineering Responsibility: Engage a fabricator who utilizes a qualified Professional Engineer to prepare calculations, shop drawings, and other structural data for structural steel connections.

1.03 SUBMITTALS

- A. Submit under the provisions of Section 01330 – SUBMITTAL PROCEDURES.
- B. Product Data: Submit product data for each type of product specified.
- C. Shop Drawings: Submit shop drawings detailing fabrication of structural steel components.
 - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
 - 2. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.
 - 3. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify high-strength bolted slip-critical, direct-tension, or tensioned shear/bearing connections.
 - 4. Include shop drawings signed and sealed by a qualified Professional Engineer responsible for their preparation.
- D. Qualification Data: Submit qualification data for firms and persons specified in item entitled "QUALITY ASSURANCE" hereinbelow 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. Mill test reports signed by manufacturers certifying that their products, including the following, comply with requirements.
 - 1. Structural steel, including chemical and physical properties.
 - 2. Bolts, nuts, and washers, including mechanical properties and chemical analysis.
 - 3. Direct-tension indicators.
 - 4. Shear stud connectors.

February 27, 2026

5. Shop primers.
6. Nonshrink grout.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who has completed structural steel work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- B. Fabricator Qualifications: Engage a firm experienced in fabricating structural steel similar to that indicated for this Project and with a record of successful in- service performance, as well as sufficient production capacity to fabricate structural steel without delaying the work.
- C. Comply with applicable provisions of the following specifications and documents:
 1. AISC's "Specification for Structural Steel Buildings---Allowable Stress Design and Plastic Design".
 2. AISC's "Specification for Allowable Stress Design of Single-Angle Members".
 3. AISC's "Specification for Load and Resistance Factor Design of Single-Angle Members".
 4. AISC's "Seismic Provisions for Structural Steel Buildings".
 5. ASTM A6/A6M, "Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling".
 6. Research Council on Structural Connections' (RCSC) "Specification for Structural Joints Using High-Strength Bolts".
- D. Professional Engineer Qualifications: A Professional Engineer who is legally authorized to practice in the jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for projects with structural steel framing that are similar to that indicated for this Project in material, design, and extent.
- E. Welding Standards: Comply with applicable provisions of AWS D1.1, "Structural Welding Code--Steel". Present evidence that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver structural steel to Project site in such quantities and at such times to ensure continuity of installation.
- B. Store materials to permit easy access for inspection and identification. Keep steel members off the ground by using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.
 1. Store fasteners in a protected place. Clean and relubricate bolts and nuts that become dry or rusty before use.

February 27, 2026

2. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.06 SEQUENCING

- A. Supply anchorage items to be embedded in or attached to other construction without delaying the work. Provide setting diagrams, templates, instructions, and directions, as required, for installation.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Wide Flange Shapes: ASTM A992/A992M.
- B. Channels, Angles, Plates, and Bars: ASTM A36/A36M.
- C. Cold-Formed Structural Steel Tubing: ASTM A500/A500M, Grade C.
- D. Steel Pipe: ASTM A53/A53M, Type E or S, Grade B.
 1. Weight Class: Standard.
 2. Finish: Hot-dipped galvanized and painted.
- E. Anchor Rods, Bolts, Nuts, and Washers: As follows:
 1. Headed and Unheaded Anchor Rods: ASTM F1554, Grade 36, unless otherwise indicated on drawings.
 2. Hot-Dip Zinc Coating: ASTM A153/A153M, Class C.
 3. Nuts: ASTM A563/A563M heavy hex carbon steel, galvanized.
 4. Plate Washers: ASTM A36/A36M, galvanized.
- F. Nonhigh-Strength Bolts, Nuts, and Washers: ASTM A307, Grade A; carbon- steel, hex-head bolts; carbon-steel nuts; and flat, unhardened steel washers.
 1. Finish: Hot-dip zinc-coating, ASTM A153/A153M, Class C.
 2. Nuts: ASTM A563/A563M heavy hex carbon steel, galvanized.
 3. Plate Washers: ASTM A36/A36M, galvanized.
- G. High-Strength Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 1, heavy hex steel structural bolts, heavy hex carbon-steel nuts, and hardened carbon-steel washers.
 1. Finish: Hot-dip zinc-coating, ASTM A153/A153M, Class C.
 2. Nuts: ASTM A563/A563M heavy hex carbon steel, galvanized.
 3. Hardened Carbon-Steel Washers: ASTM F436/F436M.
- H. Welding Electrodes: Comply with AWS requirements.

February 27, 2026

2.02 PRIMER

- A. Galvanizing: Steel members and components shall be hot-dipped galvanized after fabrication in accordance with ASTM A123/A123M and ASTM A153/A153M, as applicable.
- B. Fill vent holes and grind smooth after galvanizing.
- C. Galvanizing Repair Paint: High-zinc-dust-content paint for coating field welds and repair painting galvanized steel, with dry film containing not less than 93 percent zinc dust by weight and complying with DOD-P-21035A or SSPC-Paint 20.

2.03 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, Portland cement, shrinkage compensating agents, plasticizing and water-reducing agents, complying with ASTM C1107/C1107M, of consistency suitable for application, and a 30-minute working time.

2.04 FABRICATION

- A. Fabricate and assemble structural steel in shop to greatest extent possible. Fabricate structural steel according to AISC specifications referenced in this Section and in shop drawings.
 - 1. Camber structural steel members where indicated.
 - 2. Mark and match-mark materials for field assembly.
 - 3. Fabricate for delivery a sequence that will expedite erection and minimize field handling of structural steel.
 - 4. Complete structural steel assemblies, including welding of units, before starting shop-priming operations.
 - 5. Comply with fabrication tolerance limits of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for structural steel.
- B. Fabricate architecturally exposed structural steel with exposed surfaces smooth, square, and free of surface blemishes, including pitting, rust and scale seam marks, roller marks, rolled trade names, and roughness.
 - 1. Remove blemishes by filling, grinding, or by welding and grinding, prior to cleaning, treating, and shop priming.
 - 2. Comply with fabrication requirements, including tolerance limits, of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for architecturally exposed structural steel.
- C. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible. Plane thermally cut edges to be welded.
- D. Finishing: Accurately mill ends of columns and other members transmitting loads in bearing.

2.05 SHOP CONNECTIONS

- A. Shop install and tighten nonhigh-strength bolts, except where high-strength bolts are indicated.
- B. Shop install and tighten high-strength bolts according to RCSC's "Specification for Structural Joints Using High-Strength Bolts".
- C. Weld Connections: Comply with AWS D1.1 for procedures, appearance and quality of welds, and methods used in correcting welding work.
 - 1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without warp.
 - 2. Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent surface bleeding of back-side welding on exposed steel surfaces. Grind smooth exposed fillet welds 1/2-inch and larger. Grind flush butt welds. Dress exposed welds.

2.06 SOURCE QUALITY CONTROL

- A. Correct deficiencies in or remove and replace structural steel that inspections and test reports indicate do not comply with specified requirements.
- B. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.
- C. In addition to visual inspection, shop-welded connections will be inspected and tested according to AWS D1.1 and the inspection procedures listed below, at testing agency's option.
 - 1. Liquid Penetrant Inspection: ASTM E165/E165M.
 - 2. Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
 - 3. Radiographic Inspection: ASTM E94/E94M; minimum quality level "2-2T".
 - 4. Ultrasonic Inspection: ASTM E164.

2.07 MISCELLANEOUS MATERIAL

- A. Bituminous Paint: SSPC-Paint 12 (cold-applied asphalt mastic).

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Before erection proceeds, and with the steel erector present, verify elevations of concrete and masonry bearing surfaces and locations of anchorages for compliance with requirements.
- B. Do not proceed with erection until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place, unless otherwise indicated.

3.03 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303, "Code of Standard Practice for Steel Buildings and Bridges", and ANSI/AISC 360, "Specification for Structural Steel Buildings - Allowable Stress Design".
- B. Base and Bearing Plates: Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen surfaces prior to setting base and bearing plates. Clean bottom surface of base and bearing plates.
 - 1. Set base and bearing plates for structural members on wedges, shims, or setting nuts as required.
 - 2. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of base or bearing plate prior to packing with grout.
 - 3. Pack grout solidly between bearing surfaces and plates so no voids remain. Finish exposed surfaces, protect installed materials, and allow to cure. Comply with manufacturer's instructions for proprietary grout materials.
- C. Maintain erection tolerances of structural steel within AISC 303.
- D. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 - 1. Level and plumb individual members of structure.
 - 2. Establish required leveling and plumbing measurements on mean operating temperature of structure. Make allowances for the difference between temperature at time of erection and mean temperature at which structure will be when completed and in service.
- E. Splice members only where indicated.
- F. Remove erection bolts on welded structural steel; fill holes with plug welds; and grind smooth at exposed surfaces.
- G. Do not use thermal cutting during erection.
- H. Do not enlarge unfair holes in members by burning or by using drift pins. Ream holes that must be enlarged to admit bolts.
- I. Corrosion Protection: Coat steel surfaces which will be in contact with grout, concrete, or dissimilar metals, with a heavy coat of bituminous paint. Prior to paint application, clean galvanized surfaces with concentrated, water reducible

February 27, 2026

phosphoric acid detergent blend, MPI #25, so surface is free of oil and surface contaminants and surface is lightly etched to enhance paint adhesion.

3.04 FIELD CONNECTIONS

- A. Unless noted otherwise, all bolted connections shall be made with ASTM F3125/F3125M high-strength bolts, galvanized.
- B. All bolted connections are "snug-tightened joints" as defined in RCSC's "Specification for Structural Joints Using High-Strength Bolts".
- C. Weld Connections: Comply with AWS D1.1 for procedures, appearance and quality of welds, and methods used in correcting welding work.
 - 1. Comply with AISC specifications referenced in this Section for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
 - 2. Assemble and weld built-up sections by methods that will maintain true alignment of axes without warp.
 - 3. Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent surface bleeding of back-side welding on exposed steel surfaces. Grind smooth exposed fillet welds 1/2-inch and larger. Grind flush butt welds. Dress exposed welds.

3.05 FIELD QUALITY CONTROL

- A. Contractor will engage an independent testing and inspecting agency to perform field inspections and tests and to prepare test reports. Testing agency will conduct and interpret tests and state in each report whether tested work complies with or deviates from requirements.
- B. Correct deficiencies in or remove and replace structural steel that inspections and test reports indicate do not comply with specified requirements.
- C. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.
- D. In addition to visual inspection, field-welded connections will be inspected and tested according to AWS D1.1 and the inspection procedures listed below, at testing agency's option.
 - 1. Liquid Penetrant Inspection: ASTM E165/E165M.
 - 2. Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
 - 3. Radiographic Inspection: ASTM E94/E94M; minimum quality level "2-2T".
 - 4. Ultrasonic Inspection: ASTM E164.

February 27, 2026

3.06 CLEANING

A. Touchup Painting:

1. Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint. Apply paint to exposed areas using the same material as used for shop painting. Apply with brush or spray to provide a minimum dry film thickness of 1.5 mils.
2. Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on structural steel are included in SECTION 09901 - PAINTING.

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and apply galvanizing repair paint according to ASTM A780/A780M.

END OF SECTION

SECTION 05140 – DECORATIVE ALUMINUM SCREENS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Design, engineer, manufacture, and installation of decorative aluminum screen panel infills attached to steel posts.
2. Miscellaneous attachments, anchors, and fasteners as indicated on the drawings and required by system performance.
3. Applied finish of aluminum brackets and sheet.

B. Work Described Elsewhere

1. Section 05120 – STRUCTURAL STEEL
2. Section 05500 – METAL FABRICATIONS.

1.02 CODES AND STANDARDS

- A. In addition to referenced codes and standards within this specification, the work shall comply with the latest edition of the following standards. When conflicts arise between standards, the more stringent shall apply:

B. Aluminum Association:

1. Aluminum Design Manual - Specifications for Aluminum Structures

C. American Architectural Manufacturers Association (AAMA)

1. AAMA 2605, "Voluntary Specification, Performance Requirements, and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels."

D. American Society for Testing and Materials (ASTM) Publications:

1. ASTM B 117 Practice for Operating Salt Spray (Fog) Apparatus
2. ASTM B 209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
3. ASTM B 221 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bar, Rods, Wire, Profiles, and Tubes.
4. ASTM D 1187 Specification for Asphalt Base Emulsions for Use as Protective Coatings for Metal.

E. American Welding Society

1. AWS D1.2 - Structural Welding Code, Aluminum

B. National Association of Architectural Metal Manufacturers (NAAMM)

1. NAAMM MFM, "Metal Finishes Manual."

C. IFI – Industrial Fasteners Institute

D. International Building Code: IBC 2018 with Kauai County amendments

1.03 QUALITY ASSURANCE

- A. Product Options: Information on Drawings and in Specifications establishes requirements for system's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including structural analysis, preconstruction testing, field testing, and in-service performance.
- B. Manufacturer: Engage a single firm to assume undivided responsibility for engineering, fabrication, installation and total coordination of all components of the aluminum screen work. Provision of products from numerous sources for site assembly without complete single source design and supply responsibility is not acceptable.
 - 1. Firm must demonstrate at least 10 years of successful experience in the fabrication of aluminum screens, of the types required for this project.
- C. Installer qualifications: Company experienced in erecting aluminum systems and acceptable to manufacturer for installing proposed structure.
 - 1. Firm must demonstrate at least 10 years of successful experience in the installation of aluminum screens, of the types required for this project
- D. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review
- E. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.
- F. Shop Assembly: Pre-assemble 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.
- G. Qualifications of Welders: Qualify procedures and personnel according to the following:
 - 1. AWS D1.2 - Structural Welding Code, Aluminum

1.04 SUBMITTALS

- A. Submit under the provisions of Section 01330 SUBMITTAL PROCEDURES.
- B. Manufacturer's Data: Submit manufacturers product data for all manufactured products. Include color charts for all materials exposed and requiring selection of finish color.
- C. Shop Drawings: Submit complete shop drawings of all aluminum screen work to the Architect for review and approval before fabrication. Detail all members,

February 27, 2026

connections, and anchorage not specifically shown but which are required to complete the work. Shop Drawings shall be stamped by the same engineer responsible for preparing the structural analysis.

- D. Structural Analysis: Submit structural calculations showing that the aluminum screen panels and their connections meets the performance requirements set forth in this section. Calculation shall be stamped and signed by a practicing structural engineer licensed in the State of Hawaii.
- E. Material Safety Data Sheets (MSDS): Submit MSDS for all materials.
- F. Welding certificates.
- G. Samples: Submit samples of the following in the quantity indicated:
 - 1. Metal Screen: Submit three 12-inch square samples showing pattern in finish and color specified or scheduled.

1.05 SYSTEM PERFORMANCES

- A. Delegated Design: Design aluminum screen components and attachments, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. General: In engineering the aluminum screen components and attachments to withstand structural loads indicated, determine allowable design working stresses of screen materials based on the following:
 - 1. Aluminum: The lesser of minimum yield strength divided by 1.65 or minimum ultimate tensile strength divided by 1.95.
- C. Structural Performance: Structural supports, frames, plate and anchorages shall be designed and furnished by aluminum screen manufacturer/fabricator to withstand loads created by the following criteria:
 - 1. Wind Design Criteria: As indicated on the Structural Drawings
 - 2. Seismic Design Criteria: As indicated on the Structural Drawings.
- D. Thermal Movements: Design aluminum windscreen panels to allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing 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 degrees F, ambient; 185 degrees F, material surfaces.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in original sealed manufacturer's packing. Until ready for installation.
- B. Store materials in dry secure location.
- C. Store in accordance with manufacturer's written instructions.

February 27, 2026

- D. Protection: The Contractor shall use all means necessary to protect metal work before, during and after installation and to protect the installed work and materials of all other trades.
- E. Replacement: In the event of damage, the Contractor shall immediately make all repairs and replacements necessary to the satisfaction of the Architect and at no additional cost to the Owner.

1.07 COORDINATION

- A. Coordinate the fabrication and attachments design of the aluminum screen panels with the steel support post layout and spacing.

1.08 WARRANTY

- A. Submit manufacturer's warranty certifying that screen work was furnished and installed in accordance with the Contract Documents.
- B. Provide manufacturer's warranty to cover design, fabrication, and materials against defects and failure to perform. Warranty to provide for replacement of defective components.
 - 1. Warranty Period: Twenty (20) years from the date of Substantial Completion
- C. Provide paint manufacturer's warranty for coating system under Hawaiian weather conditions, provide following as a guide for expected warranty:
 - 1. Fluoropolymer paint finish shall be free from material defects and shall be warranted for 10 years from the date of Substantial Completion.
 - 2. Warranty shall cover paint finish system against peeling, chipping, cracking or color change in excess of 5 NBS units when tested according to ASTM D 2244 during the term of this warranty.
 - 3. In the event that the above paint system fails under normal wind and weathering conditions within the warranty period, the manufacturer/supplier shall replace or repair as necessary any panels whose factory color finish that fails.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. Basis of Design Product: The design is based upon decorative aluminum panels as manufactured by Parasoleil. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:
 - 1. Hendrick Architectural
 - 2. McNichols Co.
 - 3. Syr-Tech Perforated & Rolled Formed Metal
 - 4. Accurate Alloys, Inc.

February 27, 2026

2.02 MATERIALS

- A. Aluminum: Provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with strength and durability properties for each aluminum form required not less than that of alloy and temper designated below.
 - 1. Aluminum Plate: ASTM B 209, Alloy 5052-H32.
 - a. Sheet Thickness: As required by the structural analysis but not less than 1/4-inch
 - b. Sheet Size: Refer to drawings.
 - c. Shape: Formed panel edges per design details.
 - d. Pattern: Custom pattern as indicated on the Drawings.
 - e. Panel Margins: 1-1/2-inch minimum all around.
- B. Mounting Brackets: Screen manufacturer's aluminum mounting brackets; PBI Series Bracket.
 - 1. Aluminum Alloy: 5052
 - 2. Metal Thickness: 3/16-inch
 - 3. Stainless Steel flush mount 1/4-inch – 20 X 1/2-inch-long studs
 - 4. Stainless steel barrel nuts with EPDM washers.

2.03 FASTENERS, ANCHORS AND ADHESIVES

- A. Fasteners shall be Type 316 non-magnetic stainless steel unless otherwise noted.
 - 1. Use types, gages, and lengths to suit unit installation conditions.
 - 2. Use Phillips flat-head machine screws for exposed fasteners, unless otherwise indicated.
- B. Exposed Fasteners: Where indicated or required provide flat-head fasteners with exposed heads finished to match exposed aluminum components.

2.04 MISCELLANEOUS MATERIALS

- A. Bituminous Paint: SSPC-Paint 12 (cold-applied asphalt mastic).
- B. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.05 FABRICATION

- A. General: Fabricate metal screens to design, dimensions and details shown. Provide members in sizes and profiles indicated, with supporting members and brackets of size and spacing shown, but not less than required to comply with requirements indicated for structural performance and delegated structural analysis.

February 27, 2026

- B. 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.
- C. Fabricate joints that will be exposed to weather in a manner to exclude water.
- D. Use materials of size and thickness shown but not less than what is required by the delegated structural analysis. Work to dimensions shown or accepted on shop drawings, using proven details of fabrication and support. Use type of materials shown or specified for various components of work.
- E. Miscellaneous Framing and Supports:
 - 1. Provide miscellaneous framing and supports as required to complete the screen work.
 - 2. Fabricate miscellaneous units to sizes, shapes and profiles shown or, if not shown, of required dimensions to receive adjacent other work to be retained by framing. Cut, drill and tap units to receive hardware and similar items.
- F. Aluminum Screen Panels: Fabricate screen from aluminum sheet have the thickness required by the structural analysis but not less than 1/4-inch thick with custom pattern as indicated on the Drawings. Cut out pattern as detailed with laser cutting or abrasive water jet tool.
- G. Aluminum Attachment Clips: Fabricated aluminum attachment clips to the shapes and sizes indicated on the approved shop drawings and as required to accommodate and withstand the loads as determined and indicated in the structural analysis. Clips to be located and fastened in accordance to the structural analysis to the screen panels. Provide protection of dissimilar metals where aluminum clip come in contact with steel posts.

2.06 METAL FINISH

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
 - 1. Aluminum Finishes: Finish designations prefixed by AA comply with system established by the Aluminum Association for designating aluminum finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment.
- C. Aluminum and Steel Finish: Electrostatically applied colored polyester powder coating heat cured to chemically bond finish to metal substrate. Comply with AAMA 2604.
 - 1. Minimum hardness measured in accordance with ASTM D3363: 2H.
 - 2. Direct impact resistance tested in accordance with ASTM D2794. Withstand 160 inch-pounds.
 - 3. Salt spray resistance tested in accordance with ASTM B117: No undercutting, rusting, or blistering after 500 hours in 5 percent salt spray at 95 degrees F and 95 percent relative humidity and after 1000 hours less than 3/16- inch undercutting.

February 27, 2026

4. Weatherability tested in accordance with ASTM D822: No film failure and 88 percent gloss retention after 1 year exposure in South Florida with test panels tilted at 45 degrees.
- D. Colors: **MTL-03** - As scheduled on the Drawings.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as anchor bolts, and miscellaneous items having integral anchors, which are to be embedded in concrete as masonry construction. Coordinate delivery of such items to project site.
- B. 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.
- C. The Contractors shall make all required measurements in the field to ensure proper and adequate fit of metal screen panels and gate.
- D. Examine the areas and conditions under which aluminum screens and awnings will be installed and correct conditions detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected and approved by the Architect.

3.02 INSTALLATION, GENERAL

- A. Locate and place aluminum screen units plumb, level, and in proper alignment with adjacent work.
- B. Fastening to In Place Construction: Provide anchorage devices and fasteners where necessary for securing screens to in place construction, which will develop anchorage meeting or exceeding all system performance requirements.
- C. Fit exposed connections accurately together to form tight, hairline joints.
- D. Cutting, Fitting and Placement: Perform cutting, drilling, and fitting required for installation of aluminum screen structure. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels.
- E. Align aluminum screen panel units so that variations from level for horizontal edges, parallel for aligned members shall not exceed 1/8 inch in 12 feet.
- F. Repair finishes damaged by cutting and grinding operations required for fitting and jointing. Restore finishes so there is no evidence of corrective work. Return items which cannot be refinished in field to shop, make required alterations and refinish entire unit, or provide new units.
- G. Protect galvanized and nonferrous metal surfaces from corrosion or galvanic action by application of a heavy coating of bituminous paint on surfaces which will be in contact with concrete, masonry, or dissimilar metals.

February 27, 2026

- H. Screen panels shall be attached to support posts with the appropriate type fastener. Fastener heads exposed to view shall receive the seam finish and color as the aluminum screen panel and attachment clips.

3.03 TOLERANCES

- A. All parts of the work, when completed, shall be within the following tolerances:
 - 1. Maximum variation from plane or location shown on approved shop drawings: 1/8-in. per 12-ft. length, or 1/2-in. in total length.
 - 2. Maximum offset from true alignment between two members abutting end-to-end, edge-to-edge in line or separated by less than 3-in.: 1/32-inch.

3.04 ADJUST AND TOUCH-UP

- A. Touch-Up Painting: Immediately after erection, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.
- B. For Galvanized Surfaces: Clean bolted connections and abraded areas and apply galvanizing repair paint to comply with ASTM A 780.

3.05 PROTECTION

- A. Protect finishes of the aluminum construction from damage during construction period by use of temporary protective coverings approved by aluminum screen manufacturer. Remove protective covering at time of Substantial Completion.
- B. Restore finishes damaged during installation and construction period so that no evidence remains of correction work. Return items which cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units as required.

3.06 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. At the end of each workday, and as directed by the Architect and at the completion of the work, 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 to the satisfaction of the Architect

END OF SECTION

SECTION 05310 - STEEL DECK

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes roof deck.

1.02 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency qualified according to ASTM E329 for testing indicated.
- B. Welding: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code - Sheet Steel".
- C. Fire-Test-Response Characteristics: Where indicated, provide steel deck units identical to those tested for fire resistance per ASTM E119 by a testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Fire-Resistance Ratings: Indicated by design designations of applicable testing and inspecting agency.
 - 2. Steel deck units shall be identified with appropriate markings of applicable testing and inspecting agency.
- D. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members".

1.03 SUBMITTALS

- A. Submit under the provisions of Section 01330 – SUBMITTAL PROCEDURES.
- B. Product Data: Submit product data for each type of deck, accessory, and product indicated.
- C. Shop Drawings: Submit shop drawings showing layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.
- D. Product Certificates: Submit product certificates for each type of steel deck, signed by product manufacturer.
- E. Certificates: Submit welding certificates.
- F. Reports: Submit field quality-control test and inspection reports.
- G. Product Test Reports: Submit product test reports based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that the power-actuated mechanical fasteners complies with requirements.
- H. Research/Evaluation Reports: Submit research/evaluation reports for steel deck.

February 27, 2026

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.01 ROOF DECK - REGULAR SPAN

- A. Steel Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck", in SDI Publication No. 30, and with the following:
 - 1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS), Grade 33, G90 zinc coating.
 - 2. Profile: As indicated on the drawings.
 - 3. Span Condition: Triple span or more, unless otherwise indicated.
 - 4. Side Laps: Interlocking seam.

2.02 ACCESSORIES

- A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
- B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or puddle welds. See drawings for requirements.
- C. Side-Lap Fasteners: Verco PunchLok, ASC Delta Grip, or accepted equivalent. See plans for requirements.
- D. Flexible Closure Strips: Paintable vulcanized, closed-cell, synthetic rubber, or neoprene.
- E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
- F. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.
- G. Galvanizing Repair Paint: ASTM A780/A780M, SSPC-Paint 20 or DOD-P-21035, with dry film containing a minimum of 94 percent zinc dust by weight.
- H. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.

3.02 INSTALLATION, GENERAL

- A. Install deck panels and accessories according to applicable specifications and commentary in SDI "Manual of Construction with Steel Deck (MOC3)", manufacturer's written instructions, and requirements in this Section.
- B. Install temporary shoring before placing deck panels, if required to meet deflection limitations.
- C. Locate deck bundles to prevent overloading of supporting members.
- D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.
- E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
- F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.
- G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.
- H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.
- I. See drawings for the required fastening type, size, spacing, configuration, etc.

3.03 ROOF-DECK INSTALLATION

- A. Fasten roof-deck panels to steel supporting members: See drawings for type, size, spacing, configuration etc. of connectors.
- B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports as required on drawings.
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 2-inches, with end joints as follows:
 - 1. End Joints: Lapped 2-inches minimum.
- D. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld or mechanically fasten to substrate to provide a complete deck installation. Weld cover plates at changes in direction of roof-deck panels, unless otherwise indicated.

February 27, 2026

- E. Flexible Closure Strips: Install flexible closure strips over partitions, walls, and where indicated. Install with adhesive according to manufacturer's written instructions to ensure complete closure.

3.04 FIELD QUALITY CONTROL

- A. Field welds and other deck fastening will be subject to inspection by the Special Inspector hired by the Contractor.
- B. Special Inspector will report inspection results promptly and in writing to Contractor and Contracting Officer.
- C. Remove and replace work that does not comply with specified requirements.
- D. Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.05 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A780/A780M and manufacturer's written instructions.
- B. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of project acceptance.

END OF SECTION

SECTION 05400 - COLD FORMED METAL FRAMING

PART 1 -GENERAL

1.01 SUMMARY

A. Section Includes:

1. Delegated engineering, cold-formed metal framing, and accessories indicated, specified, or required to complete installation of non-load bearing system for framed walls at behavioral health windows with and exterior DEFS soffits.

B. Related sections:

1. Section 06100 – ROUGH CARPENTRY
2. Section 06160 – EXTERIOR GYPSUM SHEATHING
3. Section 07421 – DIRECT-APPLIED EXTERIOR FINISH SYSTEM
4. Section 08565 – BEHAVIORAL HEALTH WINDOWS

1.02 REFERENCES

A. American Society for Testing and Materials, ASTM.

1. ASTM A 653 Specification for General Requirements for Steel Sheet Zinc-Coated (Galvanized) by the Hot-Dip Process.
2. ASTM A 780 Practice for Repair of Damaged Hot-Dip Galvanized Coatings.
3. ASTM A 1008 Specification for Steel, Cold-Rolled, Sheet, Carbon, Structural.

B. SSMA, Steel Stud Manufacturers Association.

C. American Iron and Steel Institute, AISI: Specification for Design of Cold-Formed Steel Structural Members.

1.03 DELEGATED ENGINEERING REQUIREMENTS

A. Contract Documents: Concept of work specified by this Section is expressed on Drawings and in Specifications however, they may not indicate or specify full extent of work that may be required.

B. Delegated Engineering Responsibility: Require manufacturer to employ a delegated engineering professional to provide engineering for work of this Section to comply with concept expressed in Contract Documents.

1. Engineer to withstand structural design loads within limits and under conditions indicated, specified, or required, without material failure or permanent deformation of building structural frame or work specified according to following:
 - a. Authorities having jurisdiction.
 - b. ASCE 7 or the more stringent Building Code requirements.

February 27, 2026

- c. Applicable local building codes.
 - d. Criteria indicated in Contract Documents.
- 2. Comprehensively analyze location, type, magnitude, and direction of loads imposed on building structural frame.
- 3. Prepare engineering calculations, shop drawings, and other submittals and affix professional seal according to respective jurisdictional licensing regulations.
- 4. Inspect work as specified under PART 3 "Field Quality Control" Article.
- C. Coordination of Contract Documents and Work:
 - 1. Allowable Adjustments:
 - a. Minor adjustments may be made in interest of fabrication or installation methods, techniques, or ability to satisfy concept expressed in Contract Documents, provided concept is maintained as determined by Exterior Wall Consultant through Architect.
 - b. Proposed deviations shall include a detailed analysis of impact to adjacent substrates or other building systems, including additional design and construction costs.
- D. Delegated Engineering Assumptions:
 - 1. Allowable working stress no more than yield stress of material.
 - 2. Wind Design Criteria: As indicated on the Structural Drawings
 - 3. Corners and Wind Pressures:
 - a. Corners in Typical Wind Load Zones: Both surfaces shall be assumed to experience inward and outward design pressures simultaneously.
 - b. Corners in Corner Wind Load Zones: Simultaneous occurrence of inward design pressure on one surface, and outward design pressure on adjoining surface is not required.
 - 4. A 1/3 increase in allowable working stress for wind or seismic loads not acceptable.
 - 5. Sealants and interior finishes shall not contribute to framing member strength, stiffness or lateral stability.
 - 6. Compression flanges of flexural members may be assumed to receive effective lateral bracing only from anchors to building structure and horizontal glazing rails or interior trim, which are in contact with compression flange. Points of contraflexure shall not be regarded as lateral braces or as end points of an unbraced length; unbraced length shall be actual distance between effective lateral braces.
 - 7. Where a framing member runs continuously past a deflecting support, the support deflection shall be considered in the analysis.
 - 8. Properly brace assembly anchors in 3 orthogonal directions (vertical, transverse, and longitudinal) to resist loads from any direction, including, but not limited to, inward positive and outward negative wind pressures.

February 27, 2026

9. Following transfers of loads onto building structure not acceptable:
 - a. Application of moments to floor slab edge.
 - b. Application of lateral or torsional loads to steel beams and columns.
- E. Safety Factors: Engineer to withstand following load effects without exceeding allowable working stress by following safety factors:
 1. Concrete Inserts: 3.
 2. Structural Steel: As determined by delegated engineering professional consistent with engineering quality standards.
 3. Welded Headed Studs: 2.
 4. Cold-Formed Steel: As determined by delegated engineering professional consistent with engineering quality standards.
 5. Cold-Formed Stainless Steel: As determined by delegated engineering professional consistent with engineering quality standards.
 6. Post-Installed Anchors in Concrete: 5 according to ASTM E 488.
 7. Post-Installed Anchors in Masonry: 6 according to ASTM E 488.
 8. Cast-in-Place Concrete Inserts: 4 according to ASTM E 488.
 9. Drilled expansion or wedge type anchors: 4
- F. Engineering Quality Standards: Determine allowable working stresses of products according to following unless other standards are required by authorities having jurisdiction or applicable local building codes:
 1. Cold-formed Metal Framing:
 - a. AISI - Specification for the Design of Cold-Formed Steel Structural Members
 - b. CCFSS Center for Cold-Formed Steel Structures. Technical Bulletin, Vol. 2, No. 1, February 1993 "AISI Specification Provisions for Screw Connections."
 2. Concrete: ACI 318 – Building Code Requirements for Structural Concrete.
 3. Structural Steel:
 - a. AISC – Manual of Steel Construction.
 - b. AISC 303 – Code of Standard Practice for Steel Buildings and Bridges.
 - c. AISC 360 – Specification for Structural Steel Buildings.
 - d. AISC 341 – Seismic Provision for Structural Steel Buildings, including Supplement No.1.
 - e. AISC – Manual of Steel Construction, Load Resistance Factor Design Specification for Structural Steel Buildings.
 4. Welding:
 - a. ANSI/AWS – D1.1 – Structural Welding Code – Steel.
 - b. ANSI/AWS – D1.3 – Structural Welding Code – Sheet Steel.

5. Slotted Channel Framing: MFMA-4.

1.04 PERFORMANCE REQUIREMENTS

- A. Changes to Building Structural Frame: If required by delegated engineering, submit request for changes to building structural frame to Architect. Construction cost associated with change, shall be at no additional cost to Owner.
- B. Building Structural Frame Movement Design Criteria: Obtain necessary projected data from Structural Engineer and make such provision in the work as may be necessary. Identify movement compliance on Shop Drawings.
 - 1. Floor Live Load Vertical Deflection: $3/4$ in
 - 2. Lateral Deflection
 - 3. Interstory Drift: $L/400$
 - 4. Shrinkage and Creep
 - 5. Thermal movement.
 - 6. Differential foundation settlement: $1/4$ in
- C. Wind Resistance Criteria: Withstand load effects of 150 percent (safety load) of inward positive, outward negative and uplift pressures as determined in the delegated engineering calculations, acting inward and outward normal to plane of wall according to ASTM E 330.
 - 1. Net permanent deformation of structural members not more than 0.2 percent or $L/1000$.
 - 2. No failure or gross permanent distortion of framing members, anchors or connections, or any other portion of system.
 - 3. Not more than $1/8$ in movement in any direction nor more than $1/16$ in set after load is removed under following conditions:
 - a. Combined movement of anchor relative to building structural frame.
 - b. Framing member relative to building structural frame.
 - c. Framing member relative to anchor.
- D. Deflection Criteria:
 - 1. Deflection Perpendicular to Wall or Soffit Plane:
 - a. Delegated Engineering Quality Standards: AAMA TIR-A11.
 - b. Definition of Span:
 - 1) Clear: Distance between centerlines of adjacent anchors.
 - 2) Cantilever: Not more than 2 times distance between centerline of anchor and end of cantilever.
 - c. Criteria:
 - 1) Net deflection of wall framing members supporting shall not exceed $L/240$, or $1/2$ in, whichever is less.

February 27, 2026

- 2) Net deflection of soffit framing members supporting shall not exceed $L/360$, or $3/8$ in, whichever is less.
 2. Deflection Parallel to Wall Plane:
 - a. Framing Members:
 - 1) Withstand $1/8$ in including horizontal member sag due to dead load.
 - 2) Withstand 1-degree twist of horizontal member due to dead load.
 3. Cantilever Deflection: Withstand not more than 2 times length of cantilevered member divided by 175.
 4. Anchor Movement: Withstand not more than $1/8$ in in any direction for combined movement of anchor relative to building structural frame and framing member relative to anchor.
- E. Lateral Displacement Resistance Criteria: Withstand following earthquake movements:
1. Elastic Seismic: Withstand up to $3/4$ in or 0.004 times the greater of adjacent floor-to-floor heights, whichever is more, parallel and perpendicular to plane of wall.
 - a. At this drift level the wall shall not experience any failure or permanent deformation of materials, sealants, anchorage of any kind and shall be fully functional both air and watertight as well as structural.
 2. Inelastic Seismic: Withstand up to 4 in or 0.025 times the greater of adjacent floor-to-floor heights, whichever is more, parallel and perpendicular to plane of wall
 - a. At this level of displacement the wall may experience localized material failures, sealant may tear, cracking of the cement plaster system, tearing of sealants framing elements may warp and buckle. however, no anchor shall fail nor shall any portion of the wall systems experience catastrophic failure by falling from the building.
- F. Thermal Movement Resistance Criteria:
1. Withstand expansion and contraction movement of framing members and components without excessive thermal movement according to AAMA 501.5.
 2. Base calculations on actual surface temperatures due to both solar heat gain and nighttime sky heat loss.
 - a. Ambient Temperature Range: Plus 170 deg F to 40 deg F
 - b. Surface Temperature: 180 deg F

1.05 SUBMITTALS

- A. Product Data: Manufacturer's technical literature for each product indicated, specified, or required; include following:
 1. Manufacturer's written installation instructions.

February 27, 2026

2. Material descriptions, individual components, profiles, accessories, and finishes.
 3. Manufacturer's written instructions for evaluating, preparing, and treating substrate onto which work will be applied.
- B. Shop Drawings: Prepared by manufacturer, not fabricator, detailed plans, elevations, sections, and large-scale details of products; include following:
1. Seal of delegated engineering professional.
 2. Adjacent and adjoining exterior walls and building structural frame.
 3. Descriptions, types, sizes, and profiles of products.
 4. Manufacturers, products, types, sizes, lengths, spacings, embedment, and edge distances of anchors, fasteners, and attachment devices.
 5. Delegated engineering values for attachments to building structural frame including, but not limited to, following:
 - a. Direction and magnitude of loads imposed by anchors, fasteners, and attachment devices.
 - b. Direction and magnitude of each movement type specified under performance requirements.
 6. Types of welded connections using AWS welding symbols.
 7. Loose, cast-in, and field-set hardware, inserts, and connections.
 8. Provisions for expansion and contraction, including dimension limits of movement for moving joints.
 9. Material descriptions, types, sizes, and profiles for isolation between dissimilar surfaces.
- C. Delegated Engineering Calculations: Engineering calculations, sealed by delegated engineering professional, for portion of work designated as delegated engineering. Test reports not acceptable substitute for calculations.
- D. Delegated Engineering Calculations for Deviated Condition: In the event of a deviation due to, caused by, or required by conditions that varies from Contract Documents or previously approved submittals, new or revised engineering calculations, sealed by delegated engineering professional.
- E. Warranty: Copy of specified warranty.
- F. Welding Certification: Qualification certificates specified in PART 1 "Quality Assurance" Article; include names of firms and personnel certified.
- G. Delegated Engineering Field Inspection Certification: Statement, sealed by delegated engineering professional, specified in PART 3 "Field Quality Control" Article.
- H. Fastener and Anchor Test Reports: Certified reports of last completed set of mechanical tests for each device.
- I. Field Quality Control Test Reports: Reports of testing and inspection specified in PART 3 "Field Quality Control" Article.

February 27, 2026

- J. Installer Qualifications: Data for company, principal personnel, experience, and training specified in PART 1 "Quality Assurance" Article.
- K. Record Shop Drawings: Record actual installation that varies from that shown originally, giving particular attention to concealed components that would be difficult to identify later; comply with appropriate Division 01 Section.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company with not less than 10 years experience in manufacturing products similar to scope of this Project with a record of successful in-service performance.
- B. Installer Qualifications: Company with not less than 10 years experience in performing specified work similar in design, products, and extent to scope of this Project; with a record of successful in-service performance; and with sufficient production capability, facilities, and trained and skilled personnel.
- C. Welding Qualifications: Qualify personnel according to AWS procedures and performance qualifications within previous 3 years.
- D. Delegated Engineering Professional Qualifications: Professional engineer legally authorized to practice in jurisdiction where Project is located and experienced in providing engineering services of kind indicated that have resulted in work similar to this Project, and, who has a record of successful in-service performance.
- E. Pre-Installation Conference: Before beginning work of this Section, conduct conference at Project to comply with requirements of appropriate Division 01 Sections and corresponding Specification Sections for the EIFS, metal panel cladding, fiber cement siding, linear polymer plank soffit and aluminum framed glazed systems.
- F. Fire-Test-Response Characteristics: Where indicated, provide cold-formed metal framing identical to that of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Fire-Resistance Ratings: As indicated by design designations listed in UL "Fire Resistance Directory", or by Warnock Hersey or another testing and inspecting agency acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Store materials protected from exposure to rain, snow or other harmful weather conditions, at temperature and humidity conditions per manufacturer's recommendations.

1.08 COORDINATION

- A. Soffit Framing Coordination: Prior to the installation of soffit framing, coordinate the intended direction of the soffit planks so that soffit framing is installed in the same direction and perpendicular to the soffit plank carrier channels.

1.09 WARRANTY

February 27, 2026

- A. Performance Special Warranty: Furnish repair and replacement warranty for a period of 5 years from date of substantial completion agreeing to repair or replace defects, faulty work and failures, signed by authorized representatives of Contractor, Installer, and Manufacturer.
 - 1. Warranty to include exploratory work to determine the cause of defective work during the guarantee period, at no additional cost.
 - 2. Continuing corrections to defective work beyond the 5 year guarantee period are required if initial corrective measures were executed per the requirements as noted above but later found to be inadequate and/or not acceptable after the specified 5 year guarantee period.
 - 3. Exterior Wall Contractor is responsible for damage to the building and furnishings occasioned by defective materials or workmanship or damage due to repair work.
- B. Defects, Faulty Work, and Failures: Include, but not limited to, following:
 - 1. Structural failure of components resulting from specified forces and loads.
 - 2. Deflection exceeding specified limits.
 - 3. Loosening or weakening of fasteners, anchors, and other components.
 - 4. Collapse of thermal insulation or fire containment system.
 - 5. Failure of fasteners, anchors, and attachment metals due to electrolytic damage, deterioration of protective coatings, or oxidation.
- C. Exceptions: Warranty does not cover damage resulting from vandalism, acts of nature exceeding performance criteria, failure of the supporting structure and other causes beyond the Exterior Wall Contractor's control.
- D. This warranty and its enforcement shall not deprive the Owner of other action right or remedy available to him.

PART 2 -PRODUCTS

2.01 PRODUCTS, GENERAL

- A. Single Source Responsibility: Furnish each type of product through one source from single manufacturer.

2.02 MANUFACTURERS

- A. Acceptable Manufacturers: Subject to compliance with requirements of Contract Documents, provide product by one of manufacturers named alphabetically below. If not named, submit as substitution according to Conditions of the Contract and appropriate Division 01 Sections.
 - 1. CEMCO
 - 2. Dale/Incor Industries of Florida
 - 3. Clark Dietrich Building Systems, LLC.

2.03 EXTERIOR NON-LOAD BEARING WALL FRAMING

HAWAII HEALTH SYSTEMS CORPORATION – KAUAI DIVISION
Samuel Mahelona Memorial Hospital
Behavioral Health New Patient Facility
Project No. 221093-01

Cold-Formed Metal Framing
05400-8

February 27, 2026

- A. Galvanized-Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
 - 1. Coating Designation: G90
 - 2. Grade: As required by structural performance.
- B. Steel Track: Manufacturer's standard U-shaped steel track, unpunched, of web depths indicated, with straight flanges, complying with ASTM A653 and the following:
 - 1. Design Uncoated –Minimum Steel Thickness: As required by structural performance but not less than 0.043-inch.
 - 2. Flange Width: As required by structural performance but not less than 1-1/2-inches.
- C. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths, indicated on Drawings, punched, with stiffened flanges and as follows:
 - 1. Design Uncoated – Minimum Steel Thickness: As required by structural performance but not less than 0.043-inch.
 - 2. Flange Width: As required by structural performance but not less than 1-5/8-inches.

2.04 SOFFIT FRAMING

- A. Galvanized-Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
 - 1. Coating Designation: G90
 - 2. Grade: As required by structural performance
- B. Exterior Soffit Frame: Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges, and as follows:
 - 1. Design Uncoated – Minimum Steel Thickness: As required by structural performance but not less than 0.043-inch.
 - 2. Flange Width: As required by structural performance but not less than 1-5/8-inches.

2.05 FRAMING ACCESSORIES

- A. Fabricate steel-framing accessories of the same material and finish used for framing members, with a minimum yield strength of 33,000 psi unless otherwise noted.
- B. Where required to complete each installation to meet structural performance, provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
 - 1. Supplementary framing.
 - 2. Bracing, bridging, and solid blocking.
 - 3. Web stiffeners.
 - 4. Anchor clips.

February 27, 2026

5. End clips.
6. Foundation clips.
7. Gusset plates.
8. Stud kickers, knee braces, and girts.
9. Hole reinforcing plates.
10. Backer plates

2.06 FASTENERS AND ANCHORS

A. Selection Criteria:

1. Only domestically manufactured anchors and fasteners are acceptable.
2. Diameter, material thicknesses, and lengths as determined by delegated engineering, and as indicated below, sufficient to attach or anchor item to substrate indicated without failure.
3. Include separators and isolators as required to prevent metal corrosion and electrolytic deterioration.
4. Grade A fasteners that are zinc plated shall not be used.

B. Cast-in-Place Concrete Inserts:

1. Finish inserts, T-Bolts, washers and nuts with mechanically deposited ASTM B695 or hot-dip zinc coating ASTM A153. Thickness not less than 0.002 in Channels per ASTM A 283 / ASTM A 1011.
2. Acceptable Manufacturers:
 - a. Halfen Anchoring Systems.
 - b. Unistrut Corp.

C. Cap Screws/Bolts/Threaded Rods, Nuts, and Washers: Match material and finish when bolts, washers and nuts are used together.

1. Coated Carbon Steel Product Quality Standards:
 - a. Bolts: One of following, Grade 8 is not acceptable:
 - 1) SAE J429, Grade 2 or ASTM A 307, Grade A.
 - 2) SAE J429, Grade 5 or ASTM A 449, Type 1.
 - b. Washers: ASTM F 436, Type 1 (ASTM F 436M, Type 1), flat; lock washers not acceptable.
 - c. Nuts: ASTM A 563, Type 1 (ASTM A 563M, Type 1), with nylon inserts.
 - d. Finish: Mechanically deposited ASTM B695 or hot-dip zinc coating ASTM A153. Thickness not less than 0.002 in

D. Post-Installed Expansion Anchors:

1. Product Quality Standards: ACI 318, D.1 and ICC-ES AC193; approved for cracked concrete conditions when used in concrete that is cracked or may become cracked under connected load.

February 27, 2026

2. Finish: Mechanically deposited ASTM B695 or hot-dip zinc coating ASTM A153 Thickness not less than 0.002 in
 3. Material and Finish: ASTM F 593, Group 1, Alloy 304 or 316 stainless steel.
 4. Acceptable Manufacturers and Products:
 - a. ITW; Redhead Truebolt Wedge Anchor.
 - b. Powers; Bull Wedge Anchor.
 - c. Simpson; Strong-Bolt Wedge Anchor.
 5. Not Acceptable: Chemical type anchors for overhead dead load connections.
- E. Threaded Concrete Anchors:
1. Condition of Use: Can only be used under shear load.
 2. Material and Finish: Carbon steel with corrosion resistant coating with not less than 800 hours of salt-spray resistance according to ASTM B 117.
 3. Basis of Design: DeWalt; Aggre-Gator with Silver Stalgard finish.
 4. Not Acceptable: Self-drilling self-threading fasteners, screw in plugs, and powder actuated fasteners are not permitted in concrete.
- F. Screws, General:
1. Product Quality Standard: Following standards applicable for screw size, head and drive type, shank threading, and point configuration required by application:
 - a. ASME for dimensional properties.
 - b. SAE for material and mechanical properties.
- G. Self-Drilling and Self-Tapping Drill Screws:
1. Product Quality Standard: SAE J429, Grade 5 and ASTM A 449.
 2. Material and Finish: Carbon steel with corrosion resistant coating with not less than 800 hours of salt-spray resistance according to ASTM B 117.
 3. Acceptable Manufacturers and Products:
 - a. DeWalt; Dril-Flex Structural Fasteners with Silver Stalgard finish.
 - b. Hilti, Inc.; Kwik-Flex Self-Drilling Fasteners with Kwik-Cote finish.

2.07 ACCESSORIES

- A. Ferrous Metal Paint: SSPC-SP COM, rust inhibitive enamel or paint, either air dried or baked.
- B. Galvanizing Repair Paint:
1. Product Quality Standard: SSPC-Paint 20 or DOD-P-21035.
 2. Description: Dry film containing not less than 93 percent zinc dust by weight.

3. VOC Content for Field-Applied Zinc-Rich Repair Paint: Provide products that comply with the following limits for VOC content when calculated according to the California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, or the South Coast Air Quality Management District (SCAQMD) Rule 1113, effective June 3, 2011.
 - a. VOC not more than 100 g/L.
- C. Bituminous Paint: ASTM D 1187, cold applied asphalt mastic paint formulated for 30 mil thickness for each coat.
- D. Nonmetallic, Non-shrink Grout: Premixed, nonmetallic, noncorrosive, non-staining grout containing selected silica sands, Portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents, complying with ASTM C 1107, with fluid consistency and 30-minute working time.
- E. Shims: Load bearing, high-density multi-monomer plastic, non-leaching; or of cold-formed steel of same grade and coating as framing members supported by shims.
- F. Welding Electrodes: According to AWS Standards.

2.08 FABRICATION

- A. Fabricate cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.
- B. Fabricate framing assemblies using jigs or templates.
- C. Cut framing members by sawing or shearing; do not torch cut.
- D. Fasten cold-formed metal framing members by welding, screw fastening; clinch fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
- E. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
- F. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads.
- G. Fasten other materials to cold-formed metal framing by welding, bolting, or screw fastening, according to approved Shop Drawings.
- H. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.
- I. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8-inch in 10-feet and as follows:
- J. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
- K. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch.

PART 3 -EXECUTION

3.01 EXAMINATION

- A. Acceptance of Surfaces and Conditions:
 - 1. Examine substrates to receive cold-formed metal framing work for compliance with requirements and other conditions affecting performance.
 - 2. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents.
 - 3. Starting work within a particular area will be construed as acceptance of surface conditions.

3.02 PREPARATION

- A. Grout bearing surfaces uniform and level to ensure full contact of bearing flanges or track webs on supporting concrete or masonry construction.

3.03 INSTALLATION, GENERAL

- A. Installation Quality Standards: In addition to standards specified elsewhere, perform work according to following, unless otherwise specified:
 - 1. Delegated engineering.
 - 2. Respective manufacturer's written instructions, specifications, and recommendations.
 - 3. Approved submittals.
 - 4. Contract Documents.
- B. Cold-formed metal framing may be shop or field fabricated for installation, or it may be field assembled.
- C. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened.
- D. Cut framing members by sawing or shearing; do not torch cut.
- E. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
- F. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
- G. Locate mechanical fasteners and install according to approved Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.
- H. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.
- I. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting

February 27, 2026

structure has been completed and permanent connections to framing are secured.

- J. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.
- K. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.
- L. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
- M. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.04 EXTERIOR NON-LOAD BEARING WALL INSTALLATION

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.
- B. Fasten both flanges of studs to top and bottom track, unless otherwise indicated.
- C. Stud Spacing: Maximum 16-inches on center unless otherwise noted
- D. Set studs plumb, except as needed for diagonal bracing or required for non-plumb walls or warped surfaces and similar requirements.
- E. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
- F. Connect drift clips to cold formed metal framing and anchor to building structure.
- G. Provide permanent bracing in the form of steel strapping 1-1/2-inch x 20 gauge minimum with strapping running horizontally on both sides of studs, attached to each flange, and spaced at 4'-0" vertically to align with sheathing panel edges. Solid blocking channels that are aligned with strapping shall be provided between studs at each end of wall and adjacent to openings.
- H. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, fasteners, and stud girts, to provide a complete and stable wall-framing system.

3.05 SOFFIT FRAMING INSTALLATION

- A. Install perimeter track sized to match soffit framing. Align and securely anchor or fasten track to supporting structure at corners, ends, and spacings indicated on Shop Drawings.
- B. Install soffit framing bearing in supporting tracks, level, straight, and plumb; adjust to final position, brace, and reinforce. Fasten joists to both flanges of joist track.
- C. Provide drop down framing fastened to structure above as required by delegated design to support spans and stiffen for wind uplift loads.

February 27, 2026

- D. Solid Bridging: Provide track solid blocking of width and thickness and spacing as required by delegated design, secured to framing webs.
- E. Install miscellaneous soffit framing and connections, including web stiffeners, closure pieces, clip angles, continuous angles, hold-down angles, anchors, and fasteners, to provide a complete and stable soffit-framing assembly.
- F. Prior to the installation of soffit framing, coordinate the intended direction of the soffit planks so that soffit framing is installed in the same direction and perpendicular to the soffit plank carrier channels.

3.06 REPAIRS/RESTORATION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

3.07 FIELD QUALITY CONTROL

- A. Delegated Engineering Field Inspection:
 - 1. Inspection: Delegated engineering professional shall inspect work, including connection and attachment to building structural frame, for compliance with delegated engineering, and direct deficiencies to be corrected.
 - 2. Certification: Upon resolution of deficiencies, certify work complies with delegated engineering, authorities having jurisdiction, applicable local building codes, specified requirements, and is in keeping with generally accepted engineering practices.

3.08 PROTECTION

- A. General Requirements: Provide protection and maintain conditions, in a manner acceptable to manufacturer and installer, which cold-formed metal framing will be without damage or deterioration at time of substantial completion.

END OF SECTION

SECTION 05500 – METAL FABRICATIONS

PART 1 - GENERAL

1.01 SUMMARY

- A. Metal fabrications include items made from iron and steel and aluminum plates, bars, strips, tubes, pipes and castings which are not a part of structural steel or other metal systems specified elsewhere.
- B. Extent of metal fabrications is indicated on drawings and schedules.
- C. Types of work in this section include metal fabrications for:
 - 1. Rough hardware.
 - 2. Miscellaneous framing and supports.
- D. Related Work Described Elsewhere:
 - 1. Section 06100 – ROUGH CARPENTRY

1.02 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.

1.03 SUBMITTALS

- A. General: Submit under provisions of Section 01330 – SUBMITTAL PROCEDURES.
- B. Product Data: Submit manufacturer's specifications, anchor details and installation instructions for products used in miscellaneous metal fabrications, including paint products.
- C. Shop Drawings: Submit shop drawings for fabrication and erection of miscellaneous metal fabrications. Include plans, elevations and details of sections and connections. Show anchorage and accessory items. Provide templates for anchor and bolt installation by others.
- D. Where materials or fabrications are indicated to comply with certain requirements for design loadings include structural computations, material properties and other information needed for structural analysis.
- E. Samples: Submit 2 sets of representative samples of railing materials and finished products as may be requested by Architect.

1.04 WARRANTY

- A. Manufacturer's Warranty (Aluminum Decorative Screens): Submit written warranty (2 copies) before Substantial Completion signed by screen manufacturer/fabricator agreeing to repair or replace defective materials or components that fail in materials or workmanship during the warranty period.

February 27, 2026

1. The warranty shall include extrusions, decorative cut screen plate, trim, fasteners and all other accessories.
 2. This warranty shall cover all on-site labor to repair or replace all defective parts for the entire warranty period.
 3. Warranty Period: 10 years after the Substantial Completion date.
- B. Finish Paint Warranty (Aluminum Decorative Screens): Provide paint manufacturer's warranty for coating system under Hawaiian weather conditions, provide following as a guide for expected warranty:
1. TGIC polyester paint finish shall be free from material defects and shall be warranted for 5 years from the date of Substantial Completion.
 2. Warranty shall cover paint finish system against peeling, chipping, cracking or color change in excess of 5 NBS units when tested according to ASTM D 2244 during the term of this warranty.
 3. In the event that the above paint system fails under normal wind and weathering conditions within the warranty period, the manufacturer/supplier shall replace or repair as necessary any panels whose factory color finish that fails.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Asbestos Prohibition: No asbestos containing materials or equipment shall be used in this section. The Contractor shall ensure that all materials and equipment incorporated in the project are asbestos-free.
- B. Ferrous Metals:
1. Metal Surfaces, General: For fabrication of miscellaneous metal work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.
 2. Structural Steel Plates, Channels, Angles and Bars: ASTM A 36/A 36M.
 3. Welding Rods and Bare Electrodes: Select according to AWS specification for the metal alloy to be welded.
- C. Aluminum: Provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with strength and durability properties for each aluminum form required not less than that of alloy and temper designated below.
1. Aluminum Plate: ASTM B 209, Alloy 5052-H32.
 2. Extruded Bars and Shapes: ASTM B 221, Alloy 6063-T5/T52
- D. Fasteners:
1. Any fasteners in wet or exposed areas of the wall shall be series 300, non-magnetic stainless steel. All other fasteners shall be hot-dipped galvanized unless otherwise noted.

February 27, 2026

- a. Use types, gages, and lengths to suit unit installation conditions.
 - b. Use Phillips flat-head machine screws for exposed fasteners, unless otherwise indicated.
 2. Exposed Fasteners: Where indicated or required provide flat-head fasteners with exposed heads finished to match exposed aluminum components.
 - a. Provide fasteners with tamper-resistant heads.
 3. Screws: ANSI B18.2.1, ANSI B18.6.2, and ANSI B18.6.3.
 4. Plain Washers: Round, carbon steel, ANSI B18.22.1, except where specified of stainless steel.
 5. Threaded Concrete and Masonry Anchors:
 - a. Material and Finish: Bi-Metal, 300 Series Stainless Steel head and shank fused to harden steel tapping threads and point with corrosion resistant coating with not less than 800 hours of salt-spray resistance according to ASTM B 117.
 - b. Basis of Design: Elco Industries, Inc.; Aggre-Gator; Hex Washer Head with Silver Stalgard finish.
 - c. Not Acceptable: Self-drilling fasteners, screw in plugs, and powder actuated fasteners are not permitted in concrete
 6. Toggle Bolts: ANSI B18.2.1 as required.
 7. Lock Washers: Helical spring type carbon steel, ANSI B18.21.1.
 8. Self-drilling fasteners shall be Drill-Flex as manufactured by DeWalt. or Kwik-Flex as manufactured by Hilti, Inc. No substitutions accepted. Self-drilling fasteners used in wet areas shall include Dewalt Stal-Guard SUB finish or Hilti's Kwik-Cote finish respectively.
 9. Self-piercing fasteners shall be TruGrip Metal-to-Wood fasteners as manufactured by ITW Buildex. or approved equal. Self-piercing fasteners used in wet areas shall include ITW Buildex's Climseal finish.
- E. Miscellaneous Steel Backing Plates: Provide adequate steel backing plates as required by architectural and mechanical drawings for the attachment of items such as fixtures, toilets, sinks, railings, equipment, and other items. Securely fasten all plates in precise position to supporting members.
- F. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187

2.02 FABRICATION, GENERAL

- A. Workmanship: Use materials of size and thickness indicated or, if not indicated, as required to produce strength and durability in finished product for use intended. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of work.
- B. Fabricate metal fabrications to design, dimensions and details shown. Provide members in sizes and profiles indicated, with supporting members and brackets

- of size and spacing shown, but not less than required to comply with requirements indicated for structural performance and delegated structural analysis
- C. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32-inch unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
 - D. Welded Connections: Use welding method which is appropriate for metal and finish indicated and that develops strength required to comply with structural performance criteria. Finish exposed welds and surfaces complying with NOMMA Joint Finishes; "Finish #1 – No Evidence of Welded Joint". Weld all around at connections, including at fittings. Perform welded connections prior to finishing.
 - E. 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 flathead (countersunk) screws or bolts.
 - F. Provide for anchorage of type shown, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.
 - G. Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware and similar items.
 - H. Galvanizing: Provide a zinc coating for those items shown or specified to be galvanized, as follows:
 - 1. ASTM A 153 for galvanizing iron and steel hardware.
 - 2. ASTM A 123 for galvanizing rolled, pressed and forged steel shapes, plates, bars and strip 1/8-inch thick and heavier, and for assembled steel products.
 - 3. Coating thickness shall be not less than G90 designation.
 - I. Fabricate joints which will be exposed to weather in a manner to exclude water or provide weep holes where water may accumulate.
 - J. Surface Preparation: Prepare ferrous metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:
 - 1. Exteriors (SSPC Zone 1B): SSPC-SP6 "Commercial Blast Cleaning".
 - 2. Interiors (SSPC Zone 1A): SSPC-SP3 "Power Tool Cleaning".

2.03 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 metal fabrications.
- B. Fabricate items of sizes, shapes and dimensions required. Furnish steel washers.

2.04 MISCELLANEOUS FRAMING AND SUPPORTS

- A. Provide miscellaneous steel framing and supports which are not a part of structural steel framework reinforcement, and other members as required to complete work.
- B. Fabricate miscellaneous units to sizes, shapes and profiles indicated or, if not indicated, of required dimensions to receive adjacent other work to be retained by framing. Except as otherwise shown, fabricate from structural steel shapes, plates, and steel bars, for supports, of welded construction using mitered joints for field connection. Cut, drill and tap units to receive hardware and similar items.
- C. Galvanize all miscellaneous frames and supports.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Examine the areas and conditions under which metal fabrications will be installed and correct conditions detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected and approved by the Architect.
- B. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible, do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.
- C. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

3.02 INSTALLATION , GENERAL

- 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, and other connectors as required.
- B. All welding shall be done by skilled mechanics qualified or licensed in accordance with local building regulations and shall conform to the recommended practices of the American Welding Society. All welds or damage to structural steel coating must be prepared and touched up with zinc-rich primer as described herein.
- C. Use welding method which is appropriate for metal and finish indicated and that develops strength required to comply with structural performance criteria. Finish exposed welds and surfaces complying with NOMMA Joint Finishes; "Finish #1 – No Evidence of Welded Joint". Weld all around at connections, including at fittings.

- D. Do not weld or abrade surfaces of components that have been coated or finished after fabrication and are intended for field connection by mechanical or other means without further cutting or fitting
- E. 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 of 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.
- F. Fit exposed connections accurately together to form tight hairline joints.
- G. Align screen units so that variations from level for horizontal members, parallel for aligned members shall not exceed 1/8-inch in 12-feet.
- H. Repair finishes damaged by cutting, welding, soldering, and grinding operations required for fitting and jointing. Restore finishes so there is no evidence of corrective work. Return items which cannot be refinished in field to shop, make required alterations and refinish entire unit, or provide new units
- I. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.

3.03 CONNECTIONS

- A. Nonwelded Connections: Use manufacturer's standard mechanical joints for permanently connecting components. Use wood blocks and padding to prevent damage to screen and awning members and fittings. Seal recessed holes of exposed locking screws using plastic filler cement colored to match finish of the screen and awning.
- B. Welded Connections: Use welding method which is appropriate for metal and finish indicated and that develops strength required to comply with structural performance criteria. Finish exposed welds and surfaces smooth, flush, and blended to match adjoining surfaces complying with NOMMA Joint Finishes; "Finish #1 – No Evidence of Welded Joint". Weld all around at connections, including at fittings. Cope or butt components to provide 100 percent contact or use manufacturer's standard fittings designed for this purpose.

3.04 ADJUST AND CLEAN

- A. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.
- B. For Galvanized Surfaces: Clean field welds, bolted connections and abraded areas and apply galvanizing repair paint to comply with ASTM A 780.

END OF SECTION

DIVISION 6 - WOOD AND PLASTICS

SECTION 06070 - WOOD TREATMENT

PART 1- GENERAL

1.01 SUMMARY

A. Work Includes:

1. Plant preservative and insecticide treatment of lumber and other wood products specified in other Sections of this Specification by pressure and dip methods.
2. Field treatment of field cut or drilled lumber.
3. Fire retardant treated lumber and plywood.

B. Related Sections:

1. Section 06100 - ROUGH CARPENTRY: Lumber products needed to receive preservative and insecticide treatment of lumber products.

1.02 REFERENCES

A. American Wood-Preservers' Association

1. AWP A P5: Standard for Waterborne Preservatives.
2. AWP A P9: Standards for Solvents and Formulations for Organic Preservative Systems.
3. AWP A U1: Use Category System: User Specification for Treated Wood.
4. AWP A T1: Use Category System: Processing and Treatment Standard
5. AWP A M4-02: Care of Preservative-Treated Wood Products.

1.03 SUBMITTALS

A. Submit in accordance with SECTION 01330 – SUBMITTAL PROCEDURES.

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.

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.

February 27, 2026

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

1.04 REGULATORY REQUIREMENTS

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

1.05 QUALITY ASSURANCE

- A. Treatment methods shall be approved by ICBO. Preservatives shall be EPA registered.
- B. Do not use preservatives containing arsenic or other EPA banned chemicals.
- C. Do not use Perma-Clear 65 or other zinc naphthanate and permethrin products.

1.06 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.

1.07 WARRANTY

- A. The Contractor shall issue to the Owner a written warranty that he will replace all treated wood in new buildings and additions which is attacked by subterranean termites within a period of five years from the date of Substantial Completion (unless a longer period of time is standard with the manufacturer) up to a total cost of \$5,000.00 (unless higher amount standard with the manufacturer) or is attacked by dry wood termites or deteriorates due to dry rot within the first five years of the date of Substantial Completion.

PART 2- PRODUCTS

2.01 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.

2.02 PRESSURE TREATMENT WITH WATER-BORNE PRESERVATIVES

- A. Inorganic Boron (SBX): Products shall conform to AWPA Standard P5 – "Standards for Waterborne Preservatives". Preservatives shall be EPA registered.
 - 1. Acceptable Products:
 - a. Advance Guard Brand Borate; Koppers, Inc.
 - b. Hi-Bor SBX; Koppers, Inc.

February 27, 2026

- c. Tim-Bor SBX or Tim-Bor DPT; Nisus Corp.
 - d. Or Approved Equal.
 - 2. Pressure treated lumber and plywood, shall conform to AWPAs Standard U1. Treating solution retention shall be a minimum of 0.28 pounds per cubic foot (equivalent to 0.42 DOT).
- B. Copper Azole, CA-C: Products shall conform to AWPAs Standard P48 – “Standards for Copper Azole Type C”. Preservatives shall be EPA registered.
 - 1. Acceptable Products:
 - a. NatureWood CA; Koppers, Inc.
 - b. Wolman E; Arch Treatment Technologies, Inc.
 - c. Preserve CA-C; Viance, LLC.
 - d. Or Approved Equal.
 - 2. Pressure treated lumber and plywood, shall conform to AWPAs Standard U1, UC3B. Treating solution retention shall be a minimum of 0.060 pounds per cubic foot.
- C. Drying:
 - 1. Before Treatment:
 - a. CA-C Treatment: Wood shall be air dried or kiln-dried before treatment to an average moisture content of 28 percent or less per AWPAs standards.
 - b. SBX Treatment: Wood having a moisture content higher than 28 percent is acceptable when treated 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.

2.03 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 AWPAs 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 AWPAs standards.
 - 2. After Treatment: Wood shall be thoroughly dried and virtually odor-free prior to installation.

2.04 FIRE RETARDANT TREATMENT

- A. Fire retardant preservative for interior use shall be DRICON FRT as manufactured by Arch Wood Protection, FirePro HT by Koppers Company, Inc., Pyro-Guard by Hoover Universal Wood Preserving Division, or approved equal.
 - 1. Preservatives must be certified as resistant to attack by termites, rot, corrosiveness, and hydroscopicity.
 - 2. Preservative shall comply with the requirements of UL 723, ASTM E 84, NFPA 255.
 - 3. Moisture content shall be in accordance with the following:
 - a. Lumber and Plywood: AWPAC Standard U1 "Commodity Specification H - Fire Retardants".

2.05 FIELD TREATMENT

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

PART 3 – EXECUTION

3.01 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-C 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. 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 lumber shall be used for concealed framing lumber, blocking, furring strips, nailers, roof cants and nailers, sills, plates and other general use lumber and plywood that will be concealed in the finished work.
 - d. CA-C treated lumber shall be used for framing lumber and plywood used in exposed exterior construction not in contact with the ground not requiring an exterior coating but may be finished to achieve desired aesthetic appearance.
 - 2. Fire Retardant Treatment
 - a. All lumber and plywood as required by Code or specifically indicated on the Drawings shall be treated with fire retardant preservative in accordance with AWPAC Standard U1 "Commodity Specification H - Fire Retardants".

February 27, 2026

Pressure-impregnate with fire retardant chemicals to meet the following criteria:

- i. Flame Spread Rating: 25 or less; UL 723, ASTM E 84, or NFPA 225
- ii. The finished product must be stainable or paintable, and not adversely affect the bond or color of final finish.
- b. Each piece of fire-retardant treated lumber or plywood shall be provided with a UL label. Material to be used in exposed finish work shall be labeled with a pressure sensitive tag or otherwise identified as fire-retardant treated material. Do not mark or stamp material to be exposed 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

1.01 SUMMARY

- A. Work Includes:
 - 1. Wood framing, furring, grounds, nailers, and blocking.
- B. Related Work Described Elsewhere:
 - 1. Section 06070 – WOOD TREATMENT
 - 2. Section 06200 – FINISH CARPENTRY

1.02 REFERENCES

- A. American Plywood Association's "Design/Construction Guide, Residential and Commercial" (APA).
- B. U.S. Department of Commerce, National Institute of Standards and Technology.
 - PS 1 US Product Standard for Construction and Industrial Plywood.
 - PS 2 Performance Standard for Wood-Based Structural-Use Panels.
 - PS 20 American Softwood Lumber Standard (ASLS).
- C. American Society for Testing and Materials (ASTM).
- D. American Wood Preservers' Association's Standards (AWPA).
- E. International Building Code, 2018.

1.03 DEFINITIONS

- A. Rough carpentry: Carpentry work not specified in other sections and not exposed, unless otherwise indicated.
- B. Exposed framing: Dimension lumber not concealed by other construction and indicated to receive a transparent finish.

1.04 SUBMITTALS

- A. Submit the following:
 - 1. Product data and ICC evaluation reports: Engineered wood products, underlayments, insulating sheathing, air-infiltration barriers, metal framing anchors, and construction adhesives.
 - 2. Material certificates: Dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use, and design values approved by American Lumber Standard's Committee, ALSC, Board of Review.
 - 3. Material test reports: Compliance of fire-retardant-treated wood with indicated requirements.

1.05 QUALITY ASSURANCE

- A. Single-source responsibility:
 - 1. Engineered wood products: Obtain each type of product from one source and by a single manufacturer.
 - 2. Fire-retardant-treated wood products: Obtain each type of product from one source and by a single manufacturer.
- B. Wood products: Bear grade stamp or trademark as follows.
 - 1. Dimension lumber: Grade stamped by an agency certified by the Board of Review of the American Lumber Standards Committee and manufactured in accordance with PS-20.
 - 2. Plywood: Trademark of the American Plywood Association.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Observe manufacturers' instructions and precautions for the safe transportation, storage and handling of potentially harmful or hazardous materials.
- B. Keep materials under cover and dry.
 - 1. Protect from weather and contact with damp or wet surfaces.
 - 2. Stack lumber, plywood and other panels; place spacers between each bundle to provide air circulation.
 - 3. Provide air circulation around stacks and under temporary coverings.
- C. Pressure treated lumber and plywood: Place spacers between each bundle to provide air circulation.

PART 2 - PRODUCTS

2.01 LUMBER

- A. General:
 - 1. Lumber standards: Comply with PS 20 and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.
 - a. WCLIB: West Coast Lumber Inspection Bureau.
 - b. WWPA: Western Wood Products Association.
 - 2. Grade stamps:
 - a. Factory-mark each piece of lumber with type, grade, mill, and grading agency.
 - b. Exposed lumber: Apply grade stamps to ends or back of each piece of exposed lumber or omit grade stamps and issue certificate of grade compliance from inspection agency.
 - 3. Dimensions:
 - a. Nominal sizes are indicated, except as shown by detail dimensions.

February 27, 2026

Provide actual sizes as required by PS 20, for moisture content specified for each use.

b. Provide dressed lumber, S4S, unless otherwise indicated.

4. Seasoning: Provide seasoned lumber with 15% maximum moisture content at time of dressing, unless otherwise indicated.

B. Miscellaneous Lumber:

1. Wood for support or attachment of other work including bucks, nailers, blocking, furring, grounds, stripping and similar members shall be fire-retardant treated as specified in Section 06070 – WOOD TREATMENT.

2. Grade and Species: For dimension lumber sizes, provide No. 3 or Standard grade lumber per ALSC's NGRs of any species. For board-size lumber, provide No. 3 Common or Standard grade per WWPA of any species.

2.02 PLYWOOD

A. Standards: Comply with U.S. Product Standard PS 1 for softwood plywood panels. Comply with APA "Performance Standard and Policies for Structural-Use Panels" for products not manufactured under PS 1. Factory-mark each construction panel with APA.

B. Manufacture plywood panels with an exterior-type adhesive complying with ASTM D 2559 and containing no urea formaldehyde.

C. Performance-rated panels: APA Performance-Rated Panels complying with indicated requirements where used for the following concealed applications.

1. Backing Panels: APA 5/8-inch, A-C Exterior Grade, 4-foot by 8-foot plywood. Treat with fire retardant treatment as specified in Section 06070 – WOOD TREATMENT.

2.03 FASTENERS

A. General: Provide fasteners of size and type indicated, that comply with specified requirements.

B. Where rough carpentry work is exposed to weather, in ground contact, or in areas of high relative humidity, provide fasteners with hot-dip, zinc-coating per ASTM A153.

C. Nails, Wire, Brads, and Staples: FS FF-N-105B.

D. Wood Screws: ASME B18.6.1.

E. Lag Bolts: ASME B18.2.1.

F. Bolts: Steel bolts complying with ASTM A307, Grade A with ASTM A563 hex nuts and, where indicated, flat washers.

2.04 MISCELLANEOUS MATERIALS

A. Building Paper: ASTM D 226, Type I, asphalt saturated felt, non-perforated, 30-lb type.

B. Construction Adhesive: Formulation complying with ASTM D 3498 that is approved

February 27, 2026

for use indicated by adhesive manufacturer.

PART 3 – EXECUTION

3.01 INSPECTION

- A. Examine areas to receive rough carpentry work and verify following:
 - 1. Complete installation of building components to receive rough carpentry work.
 - 2. That surfaces are satisfactory to receive work.
 - 3. That spacing, direction, and details of supports are correct to accommodate installation of blocking, backing, stripping, furring, and nailers.

3.02 INSTALLATION

- A. General:
 - 1. Discard material with defects which might impair quality of work, and units which are too small to use in fabricating work with minimum joints or optimum joint arrangement.
 - 2. Set carpentry work to required levels and lines, with members plumb and true to line and cut and fitted.
 - 3. Fit rough carpentry to other construction; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other construction.
 - 4. Apply field treatment complying with AWP A M4 to cut surfaces of preservative-treated lumber and plywood
 - 5. Securely attach carpentry work to substrate by anchoring and fastening as shown and as required by the following:
 - a. IBC Table 2304.9.1, "Fastening Schedule."
 - b. Published requirements of the metal framing anchor manufacturer.
 - c. CABO NER-272 for power-driven fasteners.
 - 6. Countersink nail heads on exposed carpentry work. Fill holes.
 - 7. Use common wire nails, except as otherwise indicated. Use finishing nails for finish work. Select fasteners of size that will not 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. Pre-drill as required.
 - 8. At concealed connections, countersink bolts and screws as noted on drawings. Cover hole with wood plug. Species, color and grain as required to closely match main wood member.
- B. Grounds, Nailers, Blocking and Sleepers:
 - 1. Provide wherever shown and where required for screeding or attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached. Coordinate location with other work involved.

February 27, 2026

2. Attach to substrates as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise indicated. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement.

3.03 INSTALLATION OF CONSTRUCTION PANELS

- A. Comply with applicable recommendations contained in "APA Design/Construction Guide - Residential & Commercial," for types of construction panels and applications indicated.
- B. Fastening methods:
 1. Plywood backing panels: Nail to supports.

3.04 PROTECTION

- A. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION

SECTION 06160 - EXTERIOR GYPSUM SHEATHING

PART 1 -GENERAL

1.01 SUMMARY

- A. Section Includes: Fiberglass-mat faced, moisture resistant gypsum sheathing, and accessories indicated, specified, or required to complete installation.

1.02 DEFINITIONS

- A. Gypsum Board Construction Terminology Standard: ASTM C11 and Gypsum Association Publication GA 253 for definitions of terms for gypsum board construction not otherwise defined in this Section or other referenced standards.

1.03 CODES AND STANDARDS

- A. In addition to referenced codes and standards within this specification, the work shall comply with the latest edition of the following standards. When conflicts arise between standards, the more stringent shall apply.
 - 1. ASTM 1278, Standard Specification for Fiber-Reinforced Gypsum Panel
 - 2. ASTM C473 Standard Test Methods for Physical Testing of Gypsum Panel Products.
 - 3. ASTM C518 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
 - 4. ASTM E72 Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.

1.04 SUBMITTALS

- A. Product Data: Manufacturer's technical literature for each product indicated, specified, or required.
- B. Installer Qualifications: Data for company, principal personnel, experience, and training specified in PART 1 "Quality Assurance" Article.
- C. Warranty: Copy of specified warranty.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company with not less than 10 years' experience in manufacturing products similar to scope of this Project with a record of successful in-service performance.
- B. Installer Qualifications: Company with not less than 5 years' experience in performing specified work similar in design, products, and extent to scope of this Project; with a record of successful in-service performance; and with sufficient production capability, facilities, and trained and skilled personnel.
- C. All shop and field materials as well as workmanship are subject to inspection by the Owner, Architect or Exterior Wall Consultant at all times. Such inspections

do not relieve the Exterior Wall Contractor from obligations to comply with all requirements of the Contract Documents.

1.06 DELEGATED ENGINEERING REQUIREMENTS

- A. Contract Documents: Concept of work specified by this Section is expressed on Drawings and in Specifications. However, they may not indicate or specify full extent of work that may be required.
- B. Delegated Engineering Responsibility: Gypsum Sheathing to withstand structural design loads within limits and under conditions indicated, specified, or required, without material failure or permanent deformation of building structural frame or work specified.
- C. Delegated Engineering Assumptions:
 - 1. Coordinate with Specification Section 05400 – COLD-FORMED METAL FRAMING.

1.07 PERFORMANCE REQUIREMENTS

- A. Building Structural Frame Movement Design Criteria: Obtain necessary projected data and make such provision in the work as may be necessary.
 - 1. Coordinate with Specification Section 05400 – COLD-FORMED METAL FRAMING.
- B. Wind Resistance Criteria: Withstand load effects of 150 percent (safety load) of inward positive and outward negative design wind load design pressures, as indicated in Contract Documents, acting inward and outward normal to plane of wall according to ASTM E 330.
 - 1. Net permanent deformation of structural members not more than 0.2 percent or L/1000.
 - 2. No failure or gross permanent distortion of framing members, anchors or connections, or any other portion of system.
 - 3. Not more than 1/8-inch movement in any direction or not more than 1/16-inch set after load is removed.
- C. Deflection Criteria:
 - 1. Deflection Perpendicular to Wall Plane: Net deflection of framing members supporting Exterior Gypsum Sheathing shall not exceed L/240.
 - 2. Delegated Engineering Quality Standards: AAMA TIR-A11.
- D. Thermal Movement Resistance Criteria:
 - 1. Withstand expansion and contraction movement of framing members and components without excessive thermal movement according to AAMA 501.5.
 - 2. Base calculations on actual surface temperatures due to both solar heat gain and nighttime sky heat loss.
 - a. Ambient Temperature Range: Plus 170 deg F to minus 10 deg F
 - b. Surface Temperature: 180 deg F.

February 27, 2026

E. Fire-Test-Response Characteristics:

1. Fire Rated Assembly Design:
 - a. As required by code.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. General Requirements: Deliver, store and handle products to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.
- B. Store materials inside under cover and off of floor. Neatly stack gypsum sheathing boards flat on leveled supports off the ground under protective covering.
- C. Protect from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other effects causing damage or deterioration.
- D. Handle gypsum sheathing board to prevent damaging edges, ends, backs, or faces.

1.09 FIELD CONDITIONS

- A. Weather Condition Limitation: Proceed with work only when existing and forecasted weather conditions will permit installation according to manufacturers' instructions and warranty requirements, including, but not limited to, temperature, humidity, precipitation, and wind conditions are favorable.
 1. Do not leave boards exposed to the weather for longer than 1 month.

1.10 WARRANTY

- A. Manufacturers Special Warranty: Furnish labor and material warranty to fully replace work and covering construction for a period of 5 years from date of substantial completion agreeing to repair or replace defective material, signed by an authorized representative using manufacturer's standard form.

PART 2 -PRODUCTS

2.01 PRODUCTS, GENERAL

- A. Single Source Responsibility: Furnish each type of product through one source from a single manufacturer.

2.02 MANUFACTURERS AND PRODUCTS

- A. Basis of Design: Contract Documents are based on manufacturer and product named below to establish a standard of quality. Other acceptable manufacturers with products having equivalent characteristics may be considered, provided deviations are minor and do not change concept as expressed in Contract Documents as judged by Exterior Wall Consultant through Architect.
 1. Basis of Design Product Selections:

February 27, 2026

- a. Manufacturer: Georgia-Pacific Gypsum LLC
 - b. Product: DensGlass Fiberglass-Mat Faced Gypsum Sheathing
 - c. Quality Standard: ASTM C1177.
 - d. Thickness: 5/8 in
 - e. Surfacing: Coated fiberglass mat on face, back, and long edges.
2. (If required) Fire-Rated Fiberglass-Mat Faced Gypsum Sheathing: ASTM C1177, Type X:
- a. Thickness: 5/8 inch.
 - b. Width: 4 feet.
 - c. Length: 8 feet.
 - d. Weight: 2500 pounds per M square feet.
 - e. Edges: Square.
 - f. Surfacing: Coated fiberglass mat on face, back, and long edges.
 - g. Racking Strength (Ultimate, not design value) (ASTM E72): Not less than 654 pounds per square foot, dry.
 - h. Flexural Strength, Parallel (ASTM C1177): 100 lbf, parallel.
 - i. Humidified Deflection (ASTM C1177): Not more than 1/8 inch.
 - j. Permeance (ASTM E96): Not more than 12 perms.
 - k. R-Value (ASTM C518): 0.67.
 - l. Acceptable Products:
 - i. 5/8-inch DensGlass Gold Fireguard, Georgia-Pacific Gypsum.

2.03 FASTENERS

- A. General: Screws as recommended by gypsum sheathing manufacturer.
- B. Quality Standard: ASTM C 1002 for steel framing substrates less than 0.03 in thick
- C. Quality Standard: ASTM C 954 for steel framing substrates from 0.033 in to 0.112 in thick
- D. Description: Type S steel drill screws, self-tapping, 1 in long, with corrosion protective coating having a salt-spray resistance of more than 800 hours per ASTM B117.

2.04 ACCESSORY MATERIALS

- A. Water-resistant barrier:
 1. As specified in Section 07241 – DIRECT-APPLIED EXTERIOR FINISH SYSTEM.
- B. Joint Tape:
 1. As required by Sheathing Manufacturer.

PART 3 -EXECUTION

3.01 EXAMINATION

A. Acceptance of Surfaces and Conditions:

1. Examine substrates to receive gypsum sheathing for compliance with requirements and other conditions affecting performance.
2. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents.
3. Starting work within a particular area will be construed as acceptance of surface conditions.

3.02 INSTALLATION

A. Installation Quality Standards: In addition to standards listed elsewhere, perform work according to following, unless otherwise specified:

1. ASTM C 1280
2. GA-253 Application of Gypsum Sheathing
3. Manufacturer's written installation instructions.
4. Approved submittals.
5. Contract Documents.

B. Vertical Installation:

1. Install plumb, level, true, located and in alignment with established lines and floor levels.
2. Allow for expansion and contraction movements due to thermal and building movement conditions.
 - a. Cut and space edges of gypsum sheathing to match spacing of structural support elements.
3. Mechanically support 4 edges of sheathing board over framing or substrate. Install board edge over flanges of steel studs.
 - a. Fasteners not more than 1 in from edges and not less than 3/8 in from the ends and edges of boards.
 - b. Fasteners spaced approximately 8 in on center.
 - c. Cut boards at penetrations and other obstructions of the work. Seal all holes and fasteners penetrations.
4. Fit tightly against abutting construction, except provide a 3/8 in sealant joint where non-load-bearing construction abuts structural elements.
5. Do not countersink fasteners. Apply fasteners so that screw heads bear tightly against face of gypsum sheathing boards.

3.03 WATER-RESISTANT BARRIERS

A. As specified in Section 07241 – DIRECT-APPLIED EXTERIOR FINISH

February 27, 2026

SYSTEM.

3.04 PROTECTION

- A. Protect gypsum sheathing from damage and excessive weathering until installation of overlying materials. Repair damaged material.

END OF SECTION

February 27, 2026

SECTION 06200 - FINISH CARPENTRY

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Provide all finish carpentry work, complete, including, but not limited to, the following items.
 - 1. Plastic Laminate Casework and Countertops
 - 2. High Pressure Decorative Laminate Wall Panels with Metal Trims
 - 3. All finish carpentry work, blocking, etc.
- B. Related Work Specified Elsewhere:
 - 1. Section 06100 - ROUGH CARPENTRY - Wood blocking and concealed framing.

1.02 REFERENCES

- A. Architectural Woodwork Institute, AWI: Architectural Woodwork Quality Standards, Guide Specifications and Quality Certification Program, current edition.

1.03 QUALITY ASSURANCE

- A. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements
- B. Grading Marks: Factory mark each piece of lumber and plywood with type, grade, mill, and grading agency identification. Certificate of inspection and grading by a recognized agency may be submitted with each shipment in lieu of factory marking, at Contractor's option.
- C. Qualifications of Manufacturer: Millwork and casework specified in this section shall be produced by manufacturers or custom millwork shops regularly engaged in the manufacturing of similar items and with a minimum 5-year history of successful production acceptable to the Architect.
- D. Qualifications of Installers: Use only a firm which can demonstrate successful experience in installing items similar in type and quality to those specified for this project.

1.04 SUBMITTALS

- A. Submit under the provisions of Section 01330 – SUBMITTAL PROCEDURES.
- B. Product Data: Submit descriptive data which provides narrative written verification of all types of construction materials and finishes, methods of construction, etc. not clearly illustrated on the submitted shop drawings. Data shall provide written verification of conformance with AWI Quality Standards for the quality indicated to include materials, tolerances, and types of construction.

February 27, 2026

- C. Shop Drawings: Submit shop drawings showing all fabricated wall paneling, millwork and casework items in plan view, elevations and cross-sections to accurately indicate materials used, details of construction, dimensions, methods of fastening and erection, and installation methods proposed.
 - 1. Shop drawing casework items shall be clearly cross-referenced to casework items located on the project drawings.
 - 2. Shop drawings shall include a color schedule of all casework items to include all countertop, exposed, and semi-exposed cabinet finishes including finish material manufacturer, pattern, and color.
 - 3. Shop Drawings for wall paneling shall include panel layout plans and elevations.
- D. Samples:
 - 1. For each type of plastic laminate submit (3) 12-inch square samples.
 - 2. Exposed cabinet hardware, one unit of each type and finish.
 - 3. Cabinet liner.
 - 4. On full-size wood veneer wall panel in specified wood species and finish.
- E. Certificates: Provide a certificates showing compliance with the specifications.
- F. Material Safety Data Sheet (MSDS): Submit MSDS for each material.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Protect finish carpentry products with appropriate heavy duty wrapping materials prior to shipment. Mark each unit with appropriate identification required for installation
- B. Protect finish carpentry products and materials during transit, delivery, storage and handling to prevent damage, soiling and deterioration.
- C. Do not deliver finish carpentry materials, until painting, wet work, grinding and similar operations which could damage, soil or deteriorate woodwork have been completed in installation areas. If, due to unforeseen circumstances, finish carpentry materials must be stored in other than installation areas, store only in areas meeting requirements specified for installation areas.
- D. Store materials away from threat of termite or other insect infestation.

1.06 PROJECT CONDITIONS

- A. Field measurements: Where casework and millwork are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed, and indicate measurements on Shop Drawings.
- B. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating casework

February 27, 2026

and millwork without field measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

C. Environmental Requirements:

1. Do not install finish carpentry until required temperature and relative humidity have been stabilized and will be maintained in installation areas.
2. Condition spaces for a minimum of 48 hours within occupant usage temperature and humidity ranges during the remainder of work.

1.07 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior finish carpentry can be supported and installed as indicated.

PART 2 - PRODUCTS

2.01 WOOD PRODUCT QUALITY STANDARDS

- A. Softwood Lumber Standards: Comply with U.S. Department of Commerce PS 20 and with applicable grading rules of the respective grading and inspection agency for the species and product indicated.
- B. Hardwood Lumber Standard: Comply with National Hardwood Lumber Association (NHLA) rules.
- C. Architectural Woodwork Quality Standards: Comply with AWI Quality Standards, Guide Specifications and Quality Certification Program, latest edition or WIC Manual of Woodwork, latest edition.

2.02 MATERIALS

- A. General:
1. Nominal sizes are indicated, except as shown by detailed dimensions. Provide dressed or worked and dressed lumber, as applicable, manufactured to the actual sizes as required by PS 20 or to actual sizes and pattern as shown, unless otherwise indicated.
 2. Moisture Content of Softwood Lumber: Provide kiln-dried lumber having a moisture content from time of manufacture until time of installation not greater than values required by the applicable grading rules of the respective grading and inspecting agency for the species and product indicated.
 3. Moisture Content of Hardwood Lumber: Provide kiln-dried lumber having a moisture content from time of manufacture until time of installation within a range of 8% to 13% for individual pieces, and an average of 11% for the entire lot.
 4. Solid lumber stock: Comply with AWI Quality Standard Section 100 Lumber grading rules.

February 27, 2026

- a. Softwood for concealed casework structures and supports: Custom Grade, western pine.
- 5. Plywood
 - a. Softwood plywood for concealed structures and supports: AWI Section 200-2, Custom Grade; species as selected.
 - b. Manufacture plywood panels with an exterior-type adhesive complying with ASTM D 2559 and containing no urea formaldehyde.
- 6. Moisture Resistant Medium-Density Fiberboard: ANSI A208.2, Grade MD made with binder containing no urea formaldehyde.
- B. Interior Finish Carpentry
 - 1. Wood Base Moldings: Fabricated from solid hardwood lumber, FAS, kiln dried, milled to profiles indicated on the Drawings of following species
 - a. WM-01 - Poplar.

2.03 HIGH PRESSURE DECORATIVE LAMINATE WALL PANELS

- A. High Pressure Decorative Laminate (HPDL) Wall Paneling: System shall consist of HPDL finished panels with square cut edges; Sieva Large Panel Wall System as manufactured by Marlite.
 - 1. High Pressure Decorative Laminate-Face Product: VGS Grade, 0.050-inch nominal thickness.
 - a. Color: As scheduled
 - 2. Balancing Backer: Kraft paper that does not contribute to or pose additional fire hazard.
 - 3. Core Construction: Medium-Density Fiberboard; ANSI A208.2, Grade 130, having a flame-spread index of 75 or less and a smoke-developed index of 450 or less per ASTM E 84, Class B and be listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1) Size: As indicated on the Drawings.
 - 2) Thickness: 1/2-inch.
 - 4. Perimeter and Reveal Trims:
 - a. Panel (Reveal) Trim: Aluminum profiles in 8' lengths.
 - 1) Horizontal: LP552 Narrow Reveal 0.330-inch.
 - 2) Vertical: LP553 Flat Reveal 0.500- inch.
 - b. Edge and Outside Corner
 - 1) Edge: LP570 Edge Cap 1/2-inch
 - 2) Inside Corner: LP580-A Edge Receiver and LP580-B Edge Batten 1/2-inch.
 - c. Outside Corner: LP560 Outside Corner 1/2-inch face elements.

February 27, 2026

- d. Trim Material: Aluminum - Heavy weight extruded aluminum 6063-T5 alloy and factory pre-finished, Clear satin anodized.
 - 5. Adhesives: Solvent based Low VOC adhesive.
 - a. Marlite C-109 Solvent based Adhesive.
- B. Fabrication:
 - 1. Ensure framing panels, hardware and accessories are factory finished and ready to install except for field fabrication as required at work site and perimeter conditions.
 - a. Refinish field cut panel edges in accordance with manufacturer's instruction before installation.
 - b. Drill corners for cut-outs 1/8-inch radius minimum.

2.04 MISCELLANEOUS

- A. Fasteners and Anchorages:
 - 1. Wood Screws: FS-S FF-S-111, type, size, material and finish as required for the condition of use.
 - 2. Anchors: Type, size, material and finish as required for substrate condition and adequate anchorage for the work. Provide hot-dip galvanized anchors and inserts as required for corrosion-resistance. Provide toothed steel expansion bolt devices for drilled-in-place anchors.
- B. Adhesives:
 - 1. Aliphatic-resin, polyurethane, or resorcinol wood glue recommended by manufacturer for general carpentry use.
 - 2. Multipurpose Construction Adhesive: Formulation complying with ASTM D 3498 that is recommended for indicated use by adhesive manufacturer.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for finish carpentry and framed decorative panel system installation in accordance with manufacturer's written recommendations.
- B. Ensure structural walls are finished and building is completely closed with walls thoroughly dry before starting finish carpentry installation.

3.02 PREPARATION

- A. Conditioning: Allow panels to acclimate to balanced environment in installation location for 72 hours minimum before and during installation.

February 27, 2026

1. Maintain environmental conditions of 60° to 80° F and 35% to 55% humidity in installation location for 72 hours before and during installation.

3.03 INSTALLATION, GENERAL

- A. Discard units of material which are unsound, warped, bowed, twisted, improperly treated, not adequately seasoned or too small to fabricate work with minimum of joints or optimum jointing arrangements, or which are of defective manufacturer with respect to surfaces, sizes or patterns.
- B. Install the work plumb, level, true and straight with no distortions. Shim as required using concealed shims. Install to a tolerance of 1/8" in 8'-0" for plumb and level, including tops with no variations in flushness of adjoining surfaces.
- C. Scribe and cut work to fit adjoining work, and refinish cut surfaces or repair damaged finish at cuts.
- D. Anchor finish carpentry work to anchorage devices or blocking built-in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and where prefinished matching fasteners heads are required, use fine finishing nail for exposed nailings, countersunk and filled flush with finished surface, and matching final finish where transparent finish is indicated.

3.04 INSTALLATION OF HIGH PRESSURE DECORATIVE LAMINATE WALL PANELS

- A. All panels shall be allowed to equalize to the moisture and temperature in the room environment prior to installation. To ensure product performance, a temperature range of 60°-80° F and a humidity range of 35-55% must be maintained during storage, installation and product life cycle.
- B. Install all materials in strict accordance with the manufacturer's installation instructions.
- C. Install paneling level, plumb, true, and straight with no distortions. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches. Install with no more than 1/16 inch in 96-inch vertical cup or bow and 1/8 inch in 96-inch horizontal variation from a true plane.
- D. Fasten supports and trim using #6 trim-head screws anchored into stud or other solid substrate at 16-inch centers.
 1. Where screws do not hit studs, fasten with adhesive in accordance with manufacturer's written recommendations.
 2. Pre-drill holes through members and fasten screw flush with flange on aluminum profile.
 3. Where necessary countersink for screw head to seat flush with flange.

3.05 ADJUSTMENT, CLEANING, FINISHING AND PROTECTION

- A. Perform the following operations immediately after installing resilient products:

February 27, 2026

1. Remove adhesive and surface blemishes using cleaner recommended by resilient product manufacturers
- B. Repair damaged and defective millwork wherever possible to eliminate defects functionally and visually; where not possible to repair properly, replace millwork. Adjust joinery for uniform appearance.
- C. Clean millwork on exposed and semi-exposed surfaces. Touch-up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION

SECTION 06412 – ARCHITECTURAL CASEWORK

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Provide all finish carpentry work, complete, including, but not limited to, the following items.
 - 1. All finish carpentry work, blocking, etc.
 - 2. Plastic Laminated Casework including:
 - a. Wall and Base Cabinets
 - b. Built-in Cubbies
- B. Related Work Specified Elsewhere:
 - 1. Section 06070 - WOOD TREATMENT - Preservative treatment.
 - 2. Section 06100 - ROUGH CARPENTRY - Wood blocking and concealed framing.
 - 3. Section 06615 – SIMULATED STONE COUNTERTOPS
 - 4. Section 06620 – SOLID SURFACE MATERIAL COUNTERTOPS

1.02 REFERENCES

- A. Architectural Woodwork Institute Standards (AWI).
- B. "2010 ADA Standards for Accessible Design".

1.03 QUALITY ASSURANCE

- A. Architectural Woodwork Institute Standards (AWI): Unless otherwise indicated, comply the following for grades of architectural casework indicated for construction, finishes, installation, and other requirements:
 - 1. ANSI/AWI 200 Care & Storage
 - 2. ANSI/AWI 300 Materials
 - 3. ANSI/AWI 0400-2022 Factory Finishing
 - 4. ANSI/AWI 0641-2019 Architectural Wood Casework.
- B. Plywood Standards: Comply with U.S. Department of Commerce PS 1 for softwood plywood; PS 51 for hardwood plywood.
- C. Fabricator Qualifications: Millwork and casework specified in this section shall be produced by a custom millwork shop that employs skilled workers and that is regularly engaged in the manufacturing of similar items and with a minimum 5 year history of successful production acceptable to the Architect.
- D. Installer Qualifications: Use only a firm which can demonstrate successful experience in installing items similar in type and quality to those specified for this project.

February 27, 2026

- E. Regulatory Requirements: Comply with applicable provisions in 2010 ADA Standards for Accessible Design.

1.04 SUBMITTALS

- A. Submit under the provisions of Section 01330 - SUBMITTAL PROCEDURES.
- B. Product Data: Submit descriptive data which provides narrative written verification of all types of construction materials and finishes, methods of construction, etc. not clearly illustrated on the submitted shop drawings. Data shall provide written verification of conformance with AWI Standards for the quality indicated to include materials, tolerances, and types of construction.
- C. Shop Drawings: Submit shop drawings showing all fabricated millwork and casework items in plan view, elevations, and cross-sections to accurately indicate materials used, details of construction, dimensions, locations of and clearances from adjacent building components, methods of fastening and erection, and installation methods proposed.
 - 1. Shop drawing millwork items shall be clearly cross-referenced to millwork items located on the project drawings.
 - 2. Shop drawings shall include a color schedule of all millwork items to include all, exposed, and semi-exposed millwork finishes including finish material manufacturer, pattern, and color.
- D. Samples: Submit samples of the following:
 - 1. For each type of plastic laminate submit (3) 12-inch square samples.
 - 2. Exposed cabinet hardware, one unit of each type and finish.
 - 3. Cabinet liner.
- E. 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.
- F. Sustainable Design Submittal:
 - 1. LEED v4 BD+C: Healthcare.
 - a. LEED Credit IEQ2 – Low Emitting Materials – Adhesives and Sealants.
 - 1) Provide product data, MSDS or other documentation indicating VOC content and emissions testing documents showing compliance with requirements for low-emitting materials.
 - b. LEED Credit IEQ2 – Low Emitting Materials – Composite Wood
 - 1) Provide a list of and product data sheets for each composite wood and agrifiber product installed in the building interior, to include documentation that each product does not contain any urea-formaldehyde.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Protect finish carpentry materials during transit, delivery, storage and handling to prevent damage, soiling and deterioration.

February 27, 2026

- B. Protect casework during handling, transit and storage to prevent damage and deterioration. Store in a conditioned space complying with environmental requirements of this specification. Stack only in accordance with manufacturer's instructions.
- C. Do not deliver casework materials, until painting, wet work, grinding and similar operations which could damage, soil or deteriorate woodwork have been completed in installation areas. If, due to unforeseen circumstances, finish carpentry materials must be stored in other than installation areas, store only in areas meeting requirements specified for installation areas.
- D. Store materials away from threat of termite or other insect infestation.

1.06 PROJECT CONDITIONS

- A. Field measurements: Where casework is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed, and indicate measurements on Shop Drawings.
- B. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.
- C. Environmental requirements
 - 1. Do not install casework until required temperature and relative humidity have been stabilized and will be maintained in installation areas.
 - 2. Condition spaces for a minimum of 48 hours within occupant usage temperature and humidity ranges during the remainder of work.

1.07 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Unless otherwise indicated, comply with ANSI/AWI 0641 for following duty level and grade of architectural cabinets indicated for construction, finishes, installation and other requirements.
- B. Structural Performance Duty Level: Duty Level 3 – Institutional.
- C. Aesthetic Performance Grade: Custom.

2.02 MATERIALS

A. General:

1. Nominal sizes are indicated, except as shown by detailed dimensions. Provide dressed or worked and dressed lumber, as applicable, manufactured to the actual sizes as required by PS 20 or to actual sizes and pattern as shown, unless otherwise indicated.
2. Moisture Content of Lumber: Provide kiln-dried lumber having a moisture content from time of manufacture until time of installation not greater than values required by AWI Standard ANSI/AWI200 for the following conditions:
 - a. Climate Zone: 3 -Damp.
 - b. Non-Climate Controlled Environment: 10% -15%
 - c. Climate Controlled Environment: 8% - 13%.

B. Solid lumber stock: Comply with AWI Standard ANSI/AWI300 - Materials for lumber grading rules.

1. Softwood Lumber: Comply with the requirements of Section 3.2.11 Softwood Materials for specified aesthetic performance grade.

C. Plywood: Comply with AWI Standard ANSI/AWI300 - Materials Section 3.3 - Panel Products for panel requirements.

1. Softwood Plywood: ANSI/HPVA HP-1; Douglas Fir.
2. Veneer-Faced Panel Products (Hardwood Plywood) for panels: HPVA HP-1, grade as specified:
 - a. Grade: A
 - b. Species and Cut: As scheduled.
3. Manufacture plywood panels with an exterior-type adhesive complying with ASTM D 2559 and containing no urea formaldehyde.

D. Moisture Resistant Medium-Density Fiberboard: Grade MR50 made with binder containing no urea formaldehyde.

E. Thermoset Decorative Panels: Medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper complying with the Composite Panel Associations Voluntary Standard.

1. Provide PVC or polyester edge banding on components with exposed or semi-exposed edges.

F. Hardboard: AHA A135.4.

G. High Pressure Decorative Laminate – HPDL (**PL-01**): All high-pressure decorative laminates shall meet the requirements of ISO 4586. ISO-4586-3 grades and nominal minimum thicknesses for HPDL shall be as indicated:

H. Exposed Surfaces:

1. Horizontal Surfaces other than Countertops: HGS Grade, 0.040-inch nominal thickness.
2. Vertical Surfaces: HGS Grade, 0.040-inch nominal thickness.

February 27, 2026

3. Edges: PVC edge banding, 0.12-inch-thick, matching laminate in color, pattern, and finish.
- I. Semi-Exposed Surfaces
 1. Interior surfaces of cabinets and shelves shall be HGS Grade, 0.040-inch nominal thickness where indicated.
 - a. Edges: PVC edge banding, 0.12-inch-thick, matching laminate in color, pattern, and finish.
 2. Drawer Sides and Backs: Thermoset decorative panels.
- J. Concealed Backs of Panels with Exposed Plastic Laminate Surfaces: High-pressure decorative laminate, Grade BKL.
- K. Fasteners and Anchorages: Provide nails, screws and other anchoring devices of the proper type, size, material and finish for application indicated to provide secure attachment, concealed where possible, and complying with applicable ANSI specification. Provide all fasteners and anchorages with a hot-dipped zinc coating (ASTM A 153). Fasteners at wet areas shall be stainless steel.
- L. Adhesives:
 1. Aliphatic-resin, polyurethane, or resorcinol wood glue recommended by manufacturers for general carpentry use.
 - a. Use wood glue that has a VOC content of 30 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 2. Multipurpose Construction Adhesive: Formulation complying with ASTM D 3498 that is recommended for indicated use by adhesive manufacturers.
 - a. Use adhesive that has a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.03 CASEWORK; PLASTIC LAMINATE

- A. Quality standard: Comply with ANSI/AWI 0641 - "Architectural Wood Casework".
- B. Plastic Laminate casework:
 1. Grade: Custom grade.
 2. Construction: Flush overlay.
 3. Exposed surfaces: Refer to Article 2.01.H.
 4. Semi-Exposed Surfaces: Interior surfaces of doors, interior of cabinet and casework shall be as specified in paragraph 2.01.I.1.
 - a. Drawer Sides and Backs: As specified in paragraph 2.01.I.2.
 - b. Drawer Bottoms: Hardboard
- C. Laminate Color, Patterns and Finishes: As scheduled on the Drawings.

February 27, 2026

2.04 HARDWARE

- A. Shelf support pins: Provide 1/4-inch self pins with rubber cushion pads; stainless steel finish.
 - 1. Hafele Shelf Support Catalog No. 282.04.739
 - 2. Rockler Woodworking and Hardware Model # 33860
 - 3. Widgetco Part No. 1-250-NIC-N-L
 - 4. or Approved Equal
- B. Cabinet hinges:
 - 1. Fully concealed adjustable hinges, BHMA A 156.9, B01602
 - a. Unless otherwise noted, all cabinet hinges shall be self-closing, full overlay and shall allow for 120-degree opening. Provide mounting plates and accessories as required.
- C. Drawer slides
 - 1. Full extension, concealed undermount, self-closing slides; 100 lbs. static load rating, zinc coated rolled-formed steel with shock absorbing piston.
- D. Pulls:
 - 1. As indicated on the Drawings.
- E. Locks:
 - 1. Cabinet Locks where indicated: Chrome plated keyed cam lock; Zephyr Lock, Model No. 10823-Z14.

2.05 FABRICATION, GENERAL

- A. Cabinet Grade: Unless otherwise indicated, provide Custom-grade cabinets complying with ANSI/AWI 0641-2019 Architectural Wood Casework.
- B. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.
- C. Fabricate casework to dimensions, profiles, and details indicated.
- D. Complete fabrication, including assembly finishing, and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting
- E. Notify Architect seven days in advance of the dates and times woodwork fabrication will be complete.
- F. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements indicated on Shop Drawings before disassembling for shipment.

February 27, 2026

1. Shop-cut openings to maximum extent possible to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
- G. Measurements: Obtain field measurements and verify dimensions and shop drawing details as required for accurate fit. Provide ample borders to allow for subsequent scribing and trimming for accurate fit when construction schedule does not allow time for field measurements.

2.06 CABINET FABRICATION

- A. Door Construction:
 1. Core: 3/4-inch moisture resistant medium density fiberboard.
 2. Finish: High pressure plastic laminate on both faces with PVC edge banding.
 - a. Interior face to match cabinet interior color.
- B. Drawer Construction
 1. Drawer Fronts: 3/4-inch- treated wood composite board with high pressure plastic-laminate-on both faces and PVC edge banding.
 2. Sides, back and sub-front: 1/2-inch Thermoset Decorative Panels with PVC edge banding.
 3. Bottoms: 1/4-inch tempered hardboard.
 4. Construction: Sides doweled and securely glued into sub-fronts and drawer backs. Sides and sub-front plowed to receive bottom. Draw face to be back screwed to sub-front from interior of drawer.
- C. Cabinet End Construction:
 1. Exposed and Semi-exposed Ends: 3/4-inch-thick plywood overlaid with high pressure plastic laminate with PVC edge banding.
 2. Drill end panel to receive adjustable shelf pins, two rows of 5-mm diameter holes spaced 1-1/4-inch on center.
- D. Cabinet Backs, Tops and Bottoms: 3/4-inch-thick plywood overlaid with high pressure plastic laminate with PVC edge banding.
- E. Shelves: Plywood overlaid with high pressure plastic laminate and front edge finished with PVC banding in the following thicknesses:
 1. Shelves spanning up to 30-inches: 3/4-inch thick.
 2. Shelves spanning 31-inches to 42-inches: 1-inch thick.
- F. Cabinet Partitions: 3/4-inch-thick plywoos overlaid with high pressure plastic laminate with PVC edge banding.
- G. Cabinet Bases: Constructed from 3/4-inch- thick plywood overlaid with high pressure plastic laminate. Heights as indicated on the Drawings.
- H. Filler and Soffit Panels: 3/4-inch- plywood with high pressure plastic-laminate-on both faces.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine the surfaces and conditions under which work of this section will be performed. Do not proceed until unsatisfactory conditions detrimental to timely and proper completion of the work have been corrected.

3.02 PREPARATION

- A. Condition casework to average prevailing humidity conditions in installation areas prior to installing.

3.03 INSTALLATION

- A. Install casework plumb, level, true and straight with no distortions. Shim as required using concealed shims. Install to a tolerance of 1/8" in 8'-0" for plumb and level, including tops with no variations in flushness of adjoining surfaces.
- B. Scribe and cut woodwork to fit adjoining work. Refinish cut surfaces or repair damaged finish at cuts.
- C. Anchor casework to anchors or blocking built-in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation.
- D. Install casework without distortion so that doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete the installation of hardware and accessory items as indicated.
- E. Fasten each individual cabinet to floor with fasteners spaced a maximum of 24-inches on center. Fasten to walls at framing or blocking. Attachment to gypsum wallboard alone is not permitted. Where required, assemble units into one integral unit with joints flush, tight, and uniform. Align similar adjoining doors and drawers to a tolerance of 1/16-inch.

3.04 SIMULATED STONE COUNTERTOP INSTALLATION

- A. For simulated stone countertop installation, comply with Section 06615 – SIMULATED STONE FABRICATIONS.

3.05 SOLID SURFACE MATERIAL COUNTERTOP INSTALLATION

- A. For solid surface material countertop installation, comply with Section 06620 – SOLID SURFACE MATERIAL COUNTERTOPS.

3.06 ADJUSTMENT, CLEANING AND PROTECTION

- A. Repair damaged and defective casework where possible to eliminate defects functionally and visually; where not possible to repair replace woodwork. Adjust joinery for uniform appearance.
- B. Clean, lubricate and adjust hardware.

February 27, 2026

- C. Clean casework on exposed and semi-exposed surfaces. Touch-up shop-applied finishes to restore damaged or soiled areas.
- D. Provide final protection and maintain conditions, in a manner acceptable to fabricator and installer, which ensures architectural woodwork being without damage or deterioration at time of substantial completion.

END OF SECTION

SECTION 06605 – FIBERGLASS REINFORCED WALL PANELS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Prefinished polyester glass reinforced plastic sheet paneling adhered to unfinished gypsum wallboard.
 - 1. Aluminum trim.
- B. Related Work Specified Elsewhere:
 - 1. Section 09250 – GYPSUM BAORD ASSEMBLIES for gypsum board substrate.
 - 2. Section 09651 – RESILIENT FLOORING for resilient wall base.

1.02 REFERENCES

- A. American Society for Testing and Materials: Standard Specifications (ASTM)
 - 1. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
 - 2. ASTM C 1629 - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels
 - 3. ASTM D 2197- Standard Test Method for Adhesion of Organic Coatings by Scrape Adhesion.
 - 4. ASTM D 3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
 - 5. ASTM D 4977 - Standard Test Method for Granule Adhesion to Mineral-Surfaced Roofing by Abrasion.
 - 6. ASTM D 5319 - Standard Specification for Glass-Fiber Reinforced Polyester Wall and Ceiling Panels.
 - 7. ASTM D 5420 - Standard Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by Means of a Striker Impacted by a Falling Weight (Gardner Impact).
 - 8. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 9. ASTM G 21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
 - 10. ASTM G 22 - Standard Practice for Determining Resistance of Plastics to Bacteria.

1.03 SUBMITTALS

- A. Product Data: Submit sufficient manufacturer's data to indicate compliance with these specifications, including:
 - 1. Preparation instructions and recommendations.

February 27, 2026

2. Storage and handling requirements and recommendations.
3. Installation methods.
- B. Shop Drawings: Submit elevations of each wall showing location and sequencing of graphic paneling and trim members with respect to all discontinuities in the wall elevation.
- C. Selection Samples: Submit manufacturer's standard color pattern selection samples representing manufacturer's full range of available colors and patterns.
- D. Samples for Verification: Submit appropriate section of panel for each finish selected indicating the color/print and finish required.
 1. Submit complete with specified applied finish.
 2. Exposed Molding and Trim: Provide samples of each type, finish, and color.

1.04 QUALITY ASSURANCE

- A. Conform to building code requirements for interior finish for smoke and flame spread requirements as tested in accordance with:
 1. ASTM E 84 (Method of test for surface burning characteristics of building Materials)
 - a. Wall Required Rating – Class A

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials factory packaged on strong pallets.
- B. Store panels and trim lying flat, under cover and protected from the elements. Allow panels to acclimate to room temperature (range 60° - 75°) for 48 hours prior to installation.

1.06 PROJECT CONDITIONS

- A. Environmental Limitations: Building are to be fully enclosed prior to installation with sufficient heat (70°) and ventilation consistent with good working conditions for finish work.
- B. During installation and for not less than 48 hours before, maintain an ambient temperature and relative humidity within limits required by type of adhesive used and recommendation of adhesive manufacturer.
 1. Provide ventilation to disperse fumes during application of adhesive as recommended by the adhesive manufacturer.

1.07 WARRANTY

- A. Furnish three (3) year guarantee against defects in material and workmanship. Guarantee period begins on date of Project Acceptance.

PART 2 - PRODUCTS

February 27, 2026

2.01 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Marlite Artizan™ Max Digitally Printed FRP Wall Panels as manufactured by Marlite or comparable product by one of the following:
1. Valto Engineered Materials
 2. Or Approved Equal

2.02 PANELS

- A. Fiberglass reinforced thermosetting polyester resin panel sheets complying with ASTM D 5319 (**WPP-06**).
1. Finishing: Digital printing resolution up to 1,000 dots per square inch (DPI) and 8 picolitre dot size with aluminum-oxide and ceramic roll-applied topcoat using controlled, low-temperature inline curing. Coatings are water-based UV cured, and ink is free of VOC .
 2. Dimensions:
 - a. Thickness: 0.090 - inch nominal
 - b. Panels Size: As indicated on the Drawings.
 3. Tolerance:
 - a. Length and Width: +/-1/8 -inch
 - b. Marlite's Artizan™ Max FRP panels are factory precision square-cut on all four sides and not to exceed 1/8 - inch for 8 foot panels or 5/32 - inch for 10 foot panels.
- B. Properties: Resistant to rot, corrosion, staining, denting, peeling, and splintering.
1. Hard Body Impact, tested to level 3 compliance, ASTM C 1629. Section 6.4
 2. Surface Abrasion, tested to level 3 compliance, ASTM C 1629 & ASTM D 4977.
 3. Indentation, tested to level 3 compliance, ASTM C 1629 & ASTM D 5420.
 4. Bacteria and Fungal Resistant, ASTM G 21 & ASTM G 22.
 5. Hoffman Scratch, tested to 10kg max load, ASTM D 2197
- C. Finishes and Graphical Design:
1. Artizan™ Max FRP digital printing for custom graphics, pictures, or designs:
 - a. Provide color and pattern of scheduled wall covering WC-01. The Manufacturer shall coordinate with the Architect on layout and panel size for proper panel sequencing and installation.
- D. Surface Finish:
1. Smooth "S" surface texture.
- E. Fire Rating Class A

2.03 MOLDINGS

HAWAII HEALTH SYSTEMS CORPORATION – KAUAI DIVISION
Samuel Mahelona Memorial Hospital
Behavioral Health New Patient Facility
Project No. 221093-01

Fiberglass Reinforced Wall Panels
06605-3

February 27, 2026

- A. Division Moldings:
 - 1. Aluminum Anodized Trim: Heavy weight extruded aluminum 6063-T5 alloy prefinished at the factory.
 - a. Color: Manufacturer's Clear Satin Anodized finish
 - 2. A551 Inside Corner, 10-feet length
 - 3. A560 Outside Corner, 10-feet length
 - 4. A565 Division, 8-feet length
 - 5. A570 Edge, 10-feet length

2.04 ACCESSORIES

- A. Fasteners: Non-staining nylon drive rivets
 - 1. Match panel colors.
 - 2. Length to suit project conditions.
- B. Adhesive: Construction adhesives complying with ASTM C 557.
 - 1. Marlite C-551 FRP Adhesive - Water- resistant, non-flammable adhesive
- C. Sealant:
 - 1. Marlite Brand MS-251 White Silicone Sealant.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Examine backup surfaces to determine that corners are plumb and straight, surfaces are smooth, uniform, clean and free from foreign matter, nails countersunk, joints and cracks filled flush and smooth with the adjoining surface.
 - 1. Verify that stud spacing does not exceed 24-inches on-center.
- B. Repair defects prior to installation.
 - 1. Level wall surfaces to panel manufacturer's requirements. Remove protrusions and fill indentations.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Comply with manufacturer's recommended procedures and installation sequence.
- B. Cut sheets to meet supports allowing 1/8-inch clearance for every 8 foot of panel.
 - 1. Cut and drill with carbide tipped saw blades or drill bits, or cut with shears.
- C. Apply panels to board substrate, in approved sequence and layout above base, vertically oriented with seams plumb and pattern aligned with adjoining panels.
 - 1. Install panels with manufacturers' recommended gap for panel field and corner joints.

February 27, 2026

- a. Adhesive trowel and application method to conform to adhesive manufacturer's recommendations.
- D. Apply panel moldings to all panel edges using silicone sealant providing for required clearances.
 - 1. All moldings must provide for a minimum 1/8 –inch of panel expansion at joints and edges, to insure proper installation.
 - 2. Apply sealant to all moldings, channels and joints between the system and different materials to assure watertight installation.

3.03 CLEANING

- A. Remove excess sealant from panels and moldings. Wipe panel down using a damp cloth and mild soap solution or cleaner.
- B. Refer to manufacturer's specific cleaning recommendations Do not use abrasive cleaners.

END OF SECTION

SECTION 06615 - SIMULATED STONE COUNTERTOPS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Quartz agglomerate countertops backsplashes.
- B. Related Sections:
 - 1. Section 06412 – ARCHITECTURAL CASEWORK
 - 2. Section 07920 – SEALANTS
 - 3. Division 15 – MECHANICAL for plumbing fixture templates

1.02 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data for each type of simulated stone material, accessory and other manufactured product required.
- B. Shop Drawings: Submit cutting and setting drawings indicating sizes, dimensions, sections and profiles of simulated stone units, arrangement and provisions for jointing, supporting, anchoring and bonding simulated stonework; and other details showing relationships with, attachment to, and reception of, related work.
- C. Samples for Verification: Submit sets of samples for each type of simulated stone material consisting of units not less than 12 inches by 12 inches. Include 2 or more units in each set of samples showing the full range of appearance characteristics to be expected in completed Work.
- D. Maintenance Data: For simulated stone fabrications, to include care and maintenance manuals. Include Product Data for simulated stone-care products used or recommended by Installer, and names, addresses, and telephone numbers of local sources for products.

1.03 QUALITY ASSURANCE

- A. Fabricator Qualifications: Engage a fabricator that employs skilled workers who custom-fabricate simulated stone countertops and who has successfully completed work similar in material, design and extent to that indicated for this project. The fabricator shall be the installer of the countertops.
- B. Cut all openings from templates for plumbing fixtures, trim, and accessories to be mounted.

1.04 DELIVERY STORAGE AND HANDLING

- A. Packaging, Shipping, Handling and Unloading: Observe manufacturer's recommendations and handle in a manner to prevent breakage. Brace parts if necessary. Transport in the near vertical position with finished face toward finished face. Do not allow finished surfaces to rub during shipping and handling.

February 27, 2026

B. Storage and Protection:

1. Store in racks in near vertical position. Prevent warpage and breakage. Store inside away from direct exposure to sunlight. Store between 25 and 130°F.

1.05 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions of countertops by field measurements before countertop fabrication is complete.

1.06 COORDINATION

- A. Coordinate locations of utilities and fixtures that will penetrate countertops.

PART 2 - PRODUCTS

2.01 SIMULATED STONE COUNTERTOPS

- A. Quartz Agglomerate Material: Solid sheets consisting of quartz aggregates bound together with a matrix of filled plastic resin and complying with ICPA SS-1, except for composition.
1. Manufacturers: Subject to compliance with requirements, provide products by the following as scheduled:
 - a. Cambria (**SS-01**)
 2. Colors and Patterns: As scheduled.
 3. Nominal Thickness: 3/4-inch minimum thickness.
 4. Edge Detail: As detailed and scheduled.
- B. Countertop Splashes: Provide 3/4-inch-thick backsplashes and end splashes, unless otherwise indicated.
1. Height: As indicated on the Drawings.
 2. Top-Edge-Detail: As Detailed.
- C. Plywood Subtop
1. Standards: Comply with U.S. Product Standard PS 1 for softwood plywood panels. Comply with APA "Performance Standard and Policies for Structural Use Panels" for products not manufactured under PS 1. Factory mark each construction panel with APA.
 2. Manufacture plywood panels with an exterior-type adhesive complying with ASTM D 2559 and containing no urea formaldehyde.
 3. Performance-rated panels: APA Performance-Rated Panels complying with indicated requirements where used for the following concealed applications.
 - a. Countertop Substrate: APA 3/4-inch, B-B Marine Grade, 4-foot by 8-foot plywood.

2.02 ACCESSORIES

- A. Setting Adhesive for Quartz Agglomerate Units: ASTM C 1184, structural, neutral, one-part silicone sealant.
 - 1. Acceptable Manufacturers and Products:
 - a. Dow Corning; 795 Silicone Building Sealant
 - b. GE Momentive; SCS200 SilPruf.
- B. Quartz Surface Adhesive:
 - 1. Provide epoxy or polyester adhesive of type as recommended by quartz agglomerate manufacturer for application and conditions of use.
 - a. Adhesive which is visible in finished work shall be tinted to match quartz surface.
- C. Joint Sealant: Single-component, mildew-resistant, neutral curing silicone sealant conforming to ASTM C 920 and ASTM C 794 that comply with applicable requirements in Section 07920 – SEALANTS and will not stain the quartz surface they are applied to.
 - 1. Where countertops are used in bathrooms or area of food preparation provide anti-bacterial type sealant.
 - 2. Colors: Provide colors of exposed sealants to match colors of quartz surface adjoining sealed joints, unless otherwise indicated.
- D. Solvent: Denatured alcohol for cleaning quartz surface to assure adhesion of adhesive and sealants.
- E. Cleaning Agents: Mild soap and water.

2.03 FABRICATION

- A. Fabricate tops in one piece with shop-applied edges and backsplashes unless otherwise indicated. Comply with quartz agglomerate manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
- B. Layout: Layout surface to minimize joints and avoid L-shaped pieces of quartz surfacing. Layout and fabricate with 'hairline' joints.
- C. Inspection of Materials: Inspect materials for defects prior to fabrication.
- D. Tools: Cut and polish with water cooled powered tools.
- E. Cutouts: Cut openings to accommodate other work and indicated features.
 - 1. Cutouts shall have 3/8-inch minimum inside corner radius. Inside corners shall be reinforced in an acceptable manner to prevent cracking.
 - 2. Polish edges where they will be exposed to view in finished work.
- F. Laminations: Laminate layers of quartz surfacing required to create built up edges.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine surfaces to receive countertops and conditions under which countertops will be installed and to report in writing any conditions which are not in compliance with requirements.
- B. Verify dimensions by field measurements prior to installation.
- C. Verify that substrates supporting countertop are plumb, level and flat to within 1/8 inch in 10 feet and that all necessary supports and blocking are in place.
- D. Do not proceed with installation until surfaces and conditions comply with requirements indicated or for execution of other work which affects countertop installation.

3.02 PREPARATION

- A. Clean surfaces prior to installation.
- B. Preliminary Installation:
 - 1. Position materials to verify the correct size.
 - 2. If size adjustments or additional fabrication is necessary, use water cooled tools. Protect jobsite and surface from dust and water. Perform work away from installation site if possible.
 - 3. Allow gaps for expansion of not less than 1/8 inch per ten feet when installed between walls or other fixed structure.

3.03 INSTALLATION

- A. General:
 - 1. Install materials in accordance with the manufacturer's written instructions.
 - 2. Execute installation of simulated stone countertops by skilled mechanics. Do necessary field cutting as counters are set. Use water-cooled saws to cut stones; for exposed edges, produce edges which are cut straight and true.
 - 3. Set counters to comply with requirements indicated on drawings and final shop drawings. Install supports, fasteners, and other attachments indicated or necessary to secure counters in place. Shim and adjust anchors, supports and accessories to set counters accurately in locations indicated with uniform perimeter joints of widths indicated and with edges and faces aligned according to established relationships and indicated tolerance.
- B. Fasten plywood subtops to cabinets by screwing through subtops into cornerblocks of base cabinets. Shim as needed to align subtops in a level plane.
- C. Set counters to comply with requirements indicated on drawings and final shop drawings. Install supports, fasteners, and other attachments indicated or

necessary to secure counters in place. Shim and adjust anchors, supports and accessories to set counters accurately in locations indicated with uniform perimeter joints of widths indicated and with edges and faces aligned according to established relationships and indicated tolerance.

- D. Secure countertops to subtops with setting adhesive according to manufacturer's written instructions. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with quartz agglomerate manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
- E. Install countertops plumb, level, square and flat to within 1/16-inch in ten feet.
- F. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
- G. Install backsplashes and end splashes by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.
- H. Seal joints between countertop and backsplash, if any, and joints where countertop and backsplash abut walls. Comply with Section 07920-SEALANTS. Remove temporary shims before applying sealant.

3.04 REPAIR, CEANING AND PROTECTION

- A. Repair or replace damaged material in manner which results in countertop matching approved samples, complying with other requirements and showing no evidence of replacement.
- B. Clean countertops after adhesives have fully cured and set, using clean water or specified cleaning agents and soft rags. Do not use wire brushes, acid-type cleaning agents, cleaning compounds with caustic or harsh fillers, or other materials or methods that could damage the quartz surface.
- C. Protect installed countertops with non-staining sheet coverings.

END OF SECTION

SECTION 06620 – SOLID SURFACE MATERIAL COUNTERTOPS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Solid surface material countertops and backsplashes.
- B. Related Sections:
 - 1. Section 06100 - ROUGH CARPENTRY.
 - 2. Section 06412 – ARCHITECTURAL CASEWORK

1.02 SUBMITTALS

- A. Submit under the provisions of Section 01330 - SUBMITTAL PROCEDURES.
- B. Manufacturer's Data: Submit manufacturer's technical data for each type of countertop material, accessory and other manufactured product required.
- C. Shop Drawings: Submit cutting and setting drawings indicating sizes, dimensions, sections and profiles of solid surface units, arrangement and provisions for jointing.
- D. Sealant supporting, anchoring and bonding solid surface material; and other details showing relationships with, attachment to, and reception of, related work such as sinks and plumbing fixtures.
- E. Samples: Submit sets of samples for each type of solid surface countertop consisting of units not less than 12 inches by 12 inches. Include 2 or more units in each set of samples showing the full range of appearance characteristics to be expected in completed Work.
- F. Maintenance Data: For solid surface countertops to include in maintenance manuals. Include Product Data for solid surface care products used or recommended by Installer, and names, addresses, and telephone numbers of local sources for products.

1.03 QUALITY ASSURANCE

- A. Fabricator Qualifications: Engage a fabricator that employs skilled workers who custom-fabricate solid surface countertops and who has successfully completed work similar in material, design and extent to that indicated for this project. The fabricator shall be the installer of the countertops.
- B. Cut all openings from templates for plumbing fixtures, trim, and accessories to be mounted.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver no components to project site until areas are ready for installation.
- B. Store components indoors prior to installation.

February 27, 2026

- C. Handle materials to prevent damage to finished surfaces.
 - 1. Provide protective coverings to prevent physical damage or staining following installation for duration of project.

1.05 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions of countertops by field measurements before countertop fabrication is complete.

1.06 COORDINATION

- A. Coordinate locations of utilities that will penetrate countertops.

1.07 WARRANTY

- A. Provide manufacturer's warranty against defects in manufacturing and workmanship of solid surface assemblies for a period of fifteen (15) years from the Date of Substantial Completion.

PART 2 - PRODUCTS

2.01 SOLID SURFACE MATERIAL COUNTERTOPS

- A. Countertops and Backsplashes: 1/2-inch- thick, solid surface material with beveled edges.
- B. Fabrication: Fabricate tops in one piece unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.

2.02 COUNTERTOP MATERIALS

- A. Solid Surface Material: Homogeneous solid sheets; cast, nonporous, filled polymer, not coated, laminated or of composite construction with through body colors meeting ANSI Z124.3 or ANSI Z124.6.
 - 1. Basis-of-Design Product: Products described in this Section are products of Dupont Corian. Subject to compliance with requirements, provide products by one of the following:
 - a. Formica.
 - b. Wilsonart International
 - c. or Approved Equal.
 - 2. Colors and Patterns: As scheduled.
 - 3. Nominal Thickness: 1/2- inch minimum thickness as indicated.
 - 4. Edge Detail: As Detailed.
 - 5. Splashes: Provide 1/2-inch-thick backsplashes and end splashes, unless otherwise indicated.

February 27, 2026

- a. Height: As indicated on the Drawings.
 - b. Top-Edge-Detail: As Detailed.
6. Joint Adhesive: Manufacturer's own or approved two-part methacrylate-based adhesive designed for joining and seaming solid surface material, color matched to solid surface material to create inconspicuous, nonporous joints.
 - a. Corian Joint Adhesive
 - b. Seam-It Solid Surface Glue by Glue Warehouse
7. Bonding Adhesive: 100% Silicone Sealant, one-part, non-acidic, neutral curing, Type S, Grade NS, Class 50, Use NT, capable of withstanding movements from plus or minus 50% complying with ASTM C920.
8. Sealant: Manufacturer's standard mildew-resistant, FDA-compliant, NSF 51-compliant (food zone — any type), UL-listed silicone sealant in colors matching components.

2.03 FABRICATION

- A. Fabricate solid surface material countertops in sizes and shapes required to comply with requirements indicated, including details on Drawings and final shop drawings. Provide matching backsplash.
- B. Joints: To the great extent possible, fabricate countertops to be one piece with no joints.
 1. Where joints are unavoidable, form joints between components using manufacturer's standard joint adhesive without conspicuous joints. Reinforce with strip of solid polymer material, 2" wide.
- C. Cutouts: Cut openings to accommodate other work and indicated features.
 1. Cutouts shall have 3/8 inch minimum inside corner radius. Inside corners shall be reinforced in an acceptable manner to prevent cracking. Smooth edges.
- D. Cut and drill sinkages and holes in solid surface material for anchors, supports, and attachments.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Require Installer to examine surfaces to receive solid surface countertops and conditions under which countertops will be installed and to report in writing any conditions which are not in compliance with requirements. Do not proceed with installation until surfaces and conditions comply with requirements indicated or for execution of other work which affects the installation.
- B. Verify that substrates supporting solid surface countertops are plumb, level, and flat to within 1/16 inch in ten feet and that necessary supports and blocking are in place.

February 27, 2026

3.02 INSTALLATION

- A. Execute installation of solid surface countertops by skilled mechanics. Do necessary field cutting as counters are set. For exposed edges, produce edges which are cut straight and true.
- B. Set counters to comply with requirements indicated on drawings and final shop drawings. Install supports, fasteners, and other attachments indicated or necessary to secure counters in place. Shim and adjust anchors, supports and accessories to set counters accurately in locations indicated with uniform perimeter joints of widths indicated and with edges and faces aligned according to established relationships and indicated tolerance.
- C. Anchor securely to base cabinets or other supports.
- D. Install applied backsplashes using manufacturer's standard color-matched silicone sealant. Adhere applied backsplashes to countertops using manufacturer's standard color-matched silicone sealant.
- E. Install countertops and backsplashes plumb, level, square and flat to within 1/16-inch in ten feet.
- F. Apply sealant to gaps specified for filling with sealant. Remove temporary shims before applying sealant.

3.03 ADJUSTMENTS AND CLEANING

- A. In-Progress Cleaning: Clean countertops as work progresses. Remove adhesive and sealant smears immediately.
- B. Remove and replace countertop if broken, chipped, stained or otherwise damaged that cannot be repaired to the Architect's satisfaction.
- C. Replace in manner which results in countertops matching approved samples, complying with other requirements and showing no evidence of replacement.
- D. Clean countertops after adhesives and sealants have fully cured and set, using clean water and soft rags. Do not use wire brushes, acid-type cleaning agents, cleaning compounds with caustic or harsh fillers, or other materials or methods that could damage countertops.

END OF SECTION

DIVISION 7 – THERMAL AND MOISTURE CONTROL

SECTION 07130 - ELASTOMERIC SHEET WATERPROOFING

PART 1 - GENERAL

1.01 SUMMARY

- A. The Work of this Section includes but is not limited to elevator pits, retaining walls and other foundation areas.
- B. Provide waterproofing system to prevent the passage of liquid water and install without defects, damage or failure. Waterproofing shall be sheet membrane waterproofing with all applicable accessory products.
 - 1. Planter walls that are backfilled.
- C. Related Documents and Section: Examine Contract Documents for requirements that directly affect or are affected by Work of this Section. A list of those Documents and Sections includes, but is not limited to the following:
 - 1. Section 04220 – CONCRETE UNIT MASONRY
 - 2. Section 07241 – DIRECT-APPLIED EXTERIOR FINISH SYSTEM
 - 3. Section 07910 – EXTERIOR WALL JOINT SEALANTS

1.02 SUBMITTALS

- A. Submit under the provisions of Section 01330 - SUBMITTAL PROCEDURES.
- B. Submit manufacturer's product data, installation instructions and membrane samples for approval.
- C. Certification in the form of a letter, on the manufacturer's letterhead and signed by a technical representative of the manufacturer, that the Waterproofing System to be furnished complies with these specifications.
- D. Complete instructions for handling, storage, mixing, priming, installation and protection of the Waterproofing System.
- E. Shop drawings: Manufacturer to acknowledge review of shop drawings.
 - 1. Drawings showing overall waterproofing areas and flashing details.
 - 2. Shop drawings shall incorporate actual project specific conditions such as framing, shoring, forming and substrates and show adjacent materials and terminations/coordination with those materials.
 - 3. Where this material and adjacent waterproofing materials are flashed to each others, provide coordinated shop drawings clearly noting "tie-in" details and including all adjacent materials and substrates. Included shall be lagging-to-double sided form transitions and transitions to vapor barrier.
- F. Certification showing that all waterproofing components are being supplied and warranted by a single-source manufacturer.

1.03 REFERENCE STANDARDS

- A. The following standards and publications are applicable to the extent referenced in the text.
- B. American Society for Testing and Materials (ASTM):
 - 1. ASTM C 826 - Standard Specification for High Solids, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course
 - 2. ASTM D 412 - Standard Test Methods for Rubber Properties in Tension
 - 3. ASTM D 570 - Standard Test Method for Water Absorption of Plastics
 - 4. ASTM D 903 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds
 - 5. ASTM D 1434 - Standard Test Method for Determining Gas Permeability Characteristics of Plastic Film and Sheeting
 - 6. ASTM D1876 - Standard Test Method for Peel Release of Adhesives (T-Peel)
 - 7. ASTM D1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
 - 8. ASTM D 3767 - Standard Practice for Rubber – Measurements of Dimensions
 - 9. ASTM D 5385 - Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes
 - 10. ASTM E 96 - Standard Test Methods for Water Vapor Transmissions of Materials
 - 11. ASTM E 154 - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover
- C. NRCA Waterproofing Manual, Latest Edition

1.04 QUALITY ASSURANCE

- A. Single Source Responsibility: Sheet waterproofing is part of the complete waterproofing system of planter wall areas. All vertical waterproofing systems shall be furnished and installed by a single entity solely responsible for the waterproofing systems and all materials shall be obtained from a single source.
- B. Sheet Waterproofing shall establish and maintain a continuous waterproof seal on a permanent basis, with recognized limitations of wear and aging as indicated for each application. Failures of installed materials to comply with this requirement will be recognized as failures of materials and workmanship.
- C. Engage a single firm to assume undivided responsibility for installing all components of the Sheet Membrane Waterproofing System including all related sheet metal flashings and all other components. This firm must demonstrate not less than 5 years successful experience in installation of this system and of work similar to the work of this project. Credentials and data must be submitted

February 27, 2026

to Architect for review and approval including contact names and numbers regarding similar products.

1. Employ only skilled tradesmen who are thoroughly experienced with the materials and equipment to be used in the work. The Installer shall maintain a full-time supervisor/foreman (the same person for the duration of the project) who is at the job site during times that waterproofing work is in progress and who is experienced in installing waterproofing systems similar to type and scope required for this Project.
- D. Manufacturer Qualifications: Waterproofing membranes and all accessory products shall be provided by a single manufacturer with a minimum of 20 years' experience in the direct production and sales of waterproofing systems. The Manufacturer shall be capable of providing field service representation during construction, approving an acceptable installer, and recommending appropriate installation methods.
- E. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field installation to establish procedures to maintain required working conditions and to coordinate this work with related and adjacent work. Verify that final waterproofing and waterstop details comply with waterproofing manufacturer's current installation requirements and recommendations.
 1. Pre-Installation meeting attendees should include representatives from the Owner, Architect, General Contractor, Waterproofing Contractor, Concrete Masonry Contractor, Excavating/Backfill Contractor, Mechanical and Electrical Contractors (if work penetrates the waterproofing) and all other trades whose work will interface with the waterproofing system.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in labeled packages. Store and handle in strict compliance with manufacturer's instructions. Protect from damage from weather, excessive temperature and construction operations. Remove and dispose of damaged material in accordance with applicable regulations.

1.06 PROJECT CONDITIONS

- A. Perform work only when existing and forecasted weather conditions are within the limits established by the manufacturer of the materials used. Proceed with installation only when the substrate construction and preparation work is complete and in condition to receive sheet membrane waterproofing.

1.07 WARRANTY

- A. Waterproofing: Provide written ten (10) year material warranty issued by the membrane manufacturer upon completion of work from date of Project Acceptance.
- B. The Surety and the Contractor shall not be held liable beyond two years from the Project Acceptance date.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Self-Adhered Sheet Waterproofing: Self-adhered, cold-applied composite sheet consisting of a thickness of 1.4 mm (0.056 in.) of rubberized asphalt and 0.1 mm (0.004 in.) of cross-laminated, high density polyethylene film. Membrane shall be covered with a release sheet which is removed during installation.
1. Basis-of-Design Product: Subject to compliance with requirements, provide GCP Applied Technologies, Inc., Bituthene 3000 or a comparable product by one of the following:
 - a. Carlisle Coatings & Waterproofing, Inc.; CCW MiraDRI 860/861
 - b. Polyguard Products, Inc.; Polyguard 650 Membrane
 - c. W.R. Meadows, Inc.; SealTight Mel-Rol
 - d. Or approved equal.
 2. Physical Properties:
 - a. Tensile Strength, Membrane: 250 psi minimum; ASTM D 412, Die C, modified.
 - b. Ultimate Elongation: 300 percent minimum; ASTM D 412, Die C, modified.
 - c. Low-Temperature Flexibility: Pass at minus 20 deg F; ASTM D 1970.
 - d. Crack Cycling: Unaffected after 100 cycles of 1/8-inch movement; ASTM C 836.
 - e. Puncture Resistance: 40 lbf minimum; ASTM E 154.
 - f. Water Absorption: 0.2 percent weight-gain maximum after 48-hour immersion at 70 deg F; ASTM D 570.
 - g. Water Vapor Permeance: 0.05 perms (2.9 ng/Pa x s x sq. m) maximum; ASTM E 96/E 96M, Water Method.
- B. Miscellaneous Materials: Detail tape and other accessories specified or acceptable to manufacturer of self-adhered and pre-applied waterproofing membranes.
1. Termination Bars: Type 316 stainless steel, 1/8-inch-thick minimum, predrilled or punched 8 inches o.c. for mechanical fastener attachment to substrate as required.
 2. Primer: Liquid waterborne or solvent-borne primer recommended for substrate by sheet-waterproofing material manufacturer.
 3. Liquid Membrane: Sheet waterproofing manufacturer's elastomeric, two-component liquid, cold fluid applied, of trowel grade or low viscosity.

2.02 MOLDED SHEET DRAINAGE PANELS

- A. Nonwoven-Geotextile-Faced, Molded-Sheet Drainage Panel: Composite subsurface drainage panel consisting of a studded, nonbiodegradable, molded-

plastic-sheet drainage core; with a nonwoven, needle-punched geotextile facing with an apparent opening size not exceeding No. 70 sieve laminated to one side of the core and a polymeric film bonded to the other side; and with a vertical flow rate of 9 to 21 gpm per ft.

1. Basis-of-Design Product: Subject to compliance with requirements, provide GCP Applied Technologies, Inc.; Hydroduct 220 or a comparable product by one of the following:
 - a. Carlisle Coatings & Waterproofing, Inc.; CCW MiraDRAIN 6200
 - b. Polyguard Products, Inc.; Polyflow 15P
 - c. W.R. Meadows, Inc.; Mel-Drain

PART 3 - EXECUTION

3.01 EXAMINATION

- A. The installer shall examine conditions of substrates and other conditions under which this work is to be performed and notify the Contractor, in writing, of circumstances detrimental to the proper completion of the work. Do not proceed with work until unsatisfactory conditions are corrected.
- B. Verify the concrete masonry wall has been parged smooth with patching and leveling materials as specified in Section 07241 – DIRECT-APPLIED EXTERIOR FINISH SYSTEM.

3.02 SHEET WATERPROOFING INSTALLATION, VERTICAL APPLICATION

- A. Preparation:
 1. All surfaces shall be structurally sound and free of voids, spalled areas, loose aggregate and sharp protrusions. Remove contaminants such as grease, oil and wax from exposed surfaces. Remove dust, dirt, loose stone and debris. Use repair materials and methods which are acceptable to manufacturer of sheet membrane waterproofing.
 2. Concrete Masonry Unit Substrates:
 - a. Do not proceed with installation until parging has properly cured and dried a minimum 7 days.
- B. Installation:
 1. Refer to manufacturer's literature for recommendations on installation, including but not limited to, the following:
 - a. Apply surface conditioner at rate recommended by manufacturer. Recoat areas not waterproofed if contaminated by dust. Mask and protect adjoining exposed finish surfaces to protect those surfaces from excessive application of surface conditioner.
 - b. Delay application of membrane until surface conditioner is completely dry. Dry time will vary with weather conditions.
 - c. Install a 3/4-inch fillet of liquid membrane in corner extending 2-1/2-inches onto wall and footing. Allow to cure.

February 27, 2026

- d. Apply a 12-inch self-adhering sheet strip centered over the outside corner of the footing.
- e. Apply self-adhering membrane down wall, onto horizontal surface of the footing, and around the outside corner of the footing.
- f. Extend sheet membrane a minimum of 6-inches down vertical surface of footing lapping onto the underslab waterproofing in accordance with approved shop drawings and waterproofing manufacturer's written instructions.
- g. Apply a bead of liquid membrane or mastic on all terminations.
- h. Seal daily terminations with troweled bead of mastic.

3.03 INSTALLATION, DRAINAGE BOARDS

A. Vertical Drainage Board:

- 1. Position so that the geotextile fabric filter is facing toward the groundwater or backfill.
- 2. Fix drainage board over waterproofing membrane with tape or adhesive recommended by sheet waterproofing manufacturer in accordance with manufacturer's instructions
- 3. Extend drainage board from top of footing up to a point 6-inches below the anticipated grade line. The exposed core along the top terminations should be covered with a strip of geotextile to prevent intrusion of soil into core.
- 4. At the bottom termination extend the drainage board out from the structure so that it passes behind and under the perimeter discharge pipe. Additional geotextile should be wrapped over the pipe to prevent soil intrusion.
- 5. Backfill immediately after installation. Do not leave drainage boards exposed to sunlight for more than two weeks. Drainage boards left exposed for more than two weeks will need to be removed and replaced with new drainage boards at no additional cost to the University.

3.05 PROTECTION

- A. Protect waterproofing from damage and wear during remainder of construction period.
- B. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.
- C. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION

SECTION 07210 - BUILDING INSULATION

PART 1 - GENERAL

1.01 SUMMARY

- A. Work Includes: The extent of building insulation work is shown on the drawings, by the generic name.
- B. The types of building insulation specified in this section include, but are not limited to, the following:
 - 1. Thermal batt insulation for exterior walls and recessed window surrounds.
 - 2. Sound Attenuating Fire Batts (SAFB) for partitions requiring fire ratings and Acoustical batt insulation for walls and partitions.
- C. Related Sections include the following:
 - 1. Section 07410 - STANDING SEAM METAL ROOFING for insulation specified as part of roof construction.

1.02 QUALITY ASSURANCE

- A. Fire and Insurance Ratings: Provide insulation materials which are identical to those whose fire performance characteristics, as listed for each material or assembly of which insulation is a part, have been determined by testing, per methods indicated below, by UL or other testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Surface Burning Characteristics: ASTM E 84.
 - 2. Fire Resistance Ratings: ASTM E 119.
 - 3. Combustion Characteristics: ASTM E 136.

1.03 SUBMITTALS

- A. Submit under the provisions of Section 01330 – SUBMITTAL PROCEDURES.
- B. Manufacturer's Data: Submit manufacturer's specifications and installation instructions for types of insulation required. Include data substantiating that materials comply with specified requirements.
- C. Material Safety Data Sheets (MSDS): Submit MSDS for each material.

1.04 SAFETY PRECAUTIONS

- A. Respirators and Other Concerns: Comply with OSHA 29 CFR 1910.134, "Respiratory Protection, ASTM C 930, "Potential Health and Safety Concerns Associated with Thermal Insulation Materials and Accessories", and other Federal, State and local regulations governing safety. Provide workers with dust/mist respirators, training in their use, and protective clothing as approved by the National Institute for Occupational Safety and Health (NIOSH)/Mine Safety and Health Administration (MSHA).
- B. Smoking: Do not smoke during installation of blanket insulation.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to site in original sealed wrapping bearing manufacturer's name and brand designation, specification number, type, grade, R-value, and class. Store and handle to protect from damage. Do not allow insulation materials to become wet, soiled or crushed. Comply with manufacturer's recommendations for handling, storing, and protecting of materials before and during installation.
- B. Storage: Inspect materials delivered to the site for damage; unload and store out of weather in manufacturer's original packaging. Store only in dry locations, not subject to open flames or sparks, and easily accessible for inspection and handling.

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

- A. Available Manufacturers: Subject to compliance with requirements provide products by one of the following manufacturers:
 - 1. Certainteed Corporation.
 - 2. Johns Manville.
 - 3. Knauf Insulation
 - 4. Owens Corning.

2.02 MATERIALS

- A. Asbestos Prohibition: No asbestos containing materials or equipment shall be used in this section. The Contractor shall ensure that all materials and equipment incorporated in the project are asbestos-free.
- B. Thermal Batt Insulation: ASTM C 665, Type I, unfaced. Insulation shall have a flame spread of 25 or less and a smoke developed index rating of 60 or less when tested in accordance to ASTM E 84. Provide widths as necessary to snugly fit framing and a minimum thickness of 3-1/2-inches for any single layer but not less than required to comply with requirements herein. Insulation to have minimum R-values as follows.
 - 1. Exterior Walls and Recessed Window Surrounds: Shall have a minimum R-value of 13.
- C. Acoustical Wall Insulation: ASTM C 665, Type I, unfaced, except a flame spread of 25 or less and a smoke developed rating of 50 or less when tested in accordance with the procedures of ASTM E 84 fiberglass or mineral wool insulation batt for noise control in partitions where shown; unfaced friction fit, sized to fit framing spacing. Provide in a minimum thickness of 2-1/2-inches for any single layer but not less than required to comply with Sound Transmission Class called for in the Drawings. STC values as determined in accordance with ASTM C 423.
 - 1. Minimum Thicknesses: 3-1/2-inches minimum

- D. Sound Attenuation Fire Blankets (SAFB): ASTM C 665, Type I, unfaced, having a flame spread of 0 and a smoke developed rating of 0 when tested in accordance with the procedures of ASTM E 84 mineral wool insulation batt for noise control in partitions where shown; friction fit, sized to fit framing spacing. Density of 2.5 pcf. Noise Reduction Coefficient (NRC) shall be not less than 0.95 for 2-inch stud cavity, and not less than 1.05 for 3-inch stud cavity unless partitions ratings indicate otherwise. NRC values as determined in accordance with ASTM C 423.
 - 1. Acceptable Manufacturer:
 - a. Owens Corning - Thermafiber SAFB
 - b. Or approved Equal.
- E. Recycled Materials: Provide insulation containing recycled materials to the extent practicable, provided the materials meet all other requirements of this section. The minimum required recycled materials content by weight are:
 - 1. Rock Wool: 75 percent slag
 - 2. Fiberglass: Minimum 25 percent glass cullet

2.03 ACCESSORIES

- A. Mechanical Fasteners: Corrosion resistant fasteners as recommended by the insulation manufacturer.
- B. Wire Mesh Assemblies: Copper, brass, bronze, or AISI Type 304 stainless steel wire cloth, 8 x 8 x 0.025 minimum to 2 x 2 x 0.063 maximum mesh size.
- C. Insulation Fasteners: Adhesively Attached, Spindle-Type Anchors, plate welded to projecting spindle; capable of holding insulation of thickness indicated securely in position indicated with self-locking washer in place; and complying with the following requirements:
 - 1. Product: AGM Industries, Inc.; Series T TACTOO Insul-Hangers.
 - 2. Plate: Perforated galvanized carbon-steel sheet, 12-gauge by 2-inches square.
 - 3. Spindle: Copper-coated, low carbon steel; fully annealed; 0.105-inch in diameter; length to suit depth of insulation indicated.
- D. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch thick galvanized steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches square or in diameter.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. General:
 - 1. Comply with manufacturer's instructions for the particular conditions of installation in each case. If printed instructions are not available or do not apply to the project conditions, consult the manufacturer's technical

representative for specified recommendations before proceeding with the work.

2. Extend wall insulation full thickness as shown over entire area to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation. Remove projections which interfere with placement.
 3. Apply a single layer of insulation of the required thickness, unless otherwise shown or required to make up the total thickness.
 4. Insulation shall be installed after construction has advanced to a point that the installed insulation will not be damaged by remaining work.
 5. Space insulation from heat producing devices as recommended by the manufacturer, but not closer than 3 inches.
 6. Electrical Wiring: Do not install insulation in a manner that would sandwich electrical wiring between two layers of insulation.
- B. Cavity Installations: For thermal and acoustical units, comply with the following:
1. To a Depth of 6-inches: Friction fit units; full depth.
 2. Greater than 6-inches in Depth: When required to be fully filled with insulation, build up with additional layers. Where not required to be filled to full depth and not scheduled to be supported in place with other materials, comply with requirements for "Hung Installations".
- C. Hung Installations
1. Wire Cloth: For thermal and acoustical units, hang units in place with wire mesh. Wire mesh to be taut and without sag. Fasten with wide head fasteners or fasteners with washers larger than mesh size.
 2. Spindle Type Anchors: For thermal and acoustical units in cavities that exceed insulation thickness and are not loose laid installations, comply with the following.
 - a. General: Adhere pin flanges to solid surfaces. Space pins in a manner to fully support insulation. Impale insulation over pins and apply pin clips snug against insulation. If pin extension interferes with subsequent installed work and where pins are installed in people accessible spaces, e.g., attics, clip pins as short as possible and blunt pointed edges. Blunt edges not to interfere with future removal of pin clips.
 - b. Vertical Wall Cavities: Where insulation is not full depth, e.g., 4-inch insulation is required in 12-inch depth cavity, impale with pins at 16-inches on center across top end of insulation.
 - c. Horizontal Cavities: Impale pins at 12-inches on center maximum at perimeters and in field of each unit to prevent sagging. Adhere pins to solid surfaces.
- D. Loose Laid Installations: Lay function monolithically over required horizontal substrates. Do not leave gaps between adjacent butting units.

February 27, 2026

3.02 PROTECTION

- A. Protect installed insulation and facing from harmful weather exposures and from possible physical abuses, where possible by non-delayed installation of concealing work or, where that is not possible, by temporary covering or enclosure.

END OF SECTION

SECTION 07241 – DIRECT-APPLIED EXTERIOR FINISH SYSTEM (DEFS)

PART 1 -GENERAL

1.01 SUMMARY

- A. Section Includes: Direct-Applied Exterior Finish System over a concrete substrate (Walls) and over Exterior Gypsum Sheathing (Soffits) with accessories indicated, specified, or required to complete installation.
 - 1. Sealants and caulking as specified in Section 07910 - EXTERIOR WALL JOINT SEALANTS.
 - 2. All flashings and counter flashings, flashings around penetrations, end dams, and trim as shown, or as may be required in conjunction with system or to join systems to adjacent construction.
 - 3. Water resistive air barriers.
- B. Related work not included in this section:
 - 1. Section 04810 – UNIT MASONRY ASSEMBLIES
 - 2. Section 04860 – ADHERED SIMULATED STONE VENEER
 - 3. Section 05400 – COLD FORMED METAL FRAMING
 - 4. Section 06160 – EXTERIOR GYPSUM SHEATHING
 - 5. Section 07910 - EXTERIOR WALL JOINT SEALANTS

1.02 CODES AND STANDARDS

- A. In addition to referenced codes and standards within this specification, the work shall comply with the latest edition of the following standards. When conflicts arise between standards, the more stringent shall apply.
 - 1. ASTM – American Society for Testing and Materials
 - a. ASTM C150, Specification for Portland Cement.
 - b. ASTM E 2134 Test Method for Evaluating the Tensile-Adhesion Performance of Exterior Insulation and Finish Systems (EIFS)
 - c. ASTM E2568-09e1 PB Exterior Insulation and Finish Systems (EIFS)
 - 2. ANSI – American National Standards Institute– Latest Edition
 - a. ANSI/EIMA 99-A, American National Standards for EIFS
 - 3. EIFS Industry Manufacturers Association, latest specifications and requirements.
 - 4. EIMA (EIFS Industry Members Association) Standards and Publications
 - a. 101.02 Standard Test Method for Resistance to Water Penetration of Exterior Insulation and Finish Systems (EIFS), Class PB (Modified ASTM E-331)
 - b. 101.03 Standard Test Method for Determining Tensile Adhesion Strength of Exterior Insulation and Finish System (EIFS), and Components, Class

PB (Modified ASTM C-297)

- c. 105.01 Standard Test Method for Alkali Resistance of Glass Fiber Reinforcing Mesh for Use in Exterior Insulation and Finishing Systems (EIFS), Class PB

5. IBC 2018 with Kauai County Amendments

1.03 DRAWINGS AND SPECIFICATIONS

- A. Contract Drawings are diagrammatic. The details shown are intended as a guide for the aesthetic and interfacing requirements of the various components of the exterior wall to and with other work; details are intended to establish basic dimensions of the module and the sight lines, jointing and profiles of members. The Exterior Wall Contractor is responsible for the design and engineering of the system within these aesthetic parameters. The drawings are not to be construed as engineering design, or adequate to meet the engineering design requirements.
- B. Design conditions not included in Contract Drawings shall be developed through the Exterior Wall Contractor's shop drawings in compliance with these specifications. Architect shall have the final say as to all matters whether detailed or not on the architectural design details.

1.04 SYSTEM DESCRIPTION

- A. DEFS: Class PB type of lamina adhesively attached to a moisture barrier coated concrete masonry unit or sheathed (soffit) substrate with an integrally reinforced base coat and a texture protective finish coat.

1.05 ACTION SUBMITTALS

- A. Product Data: Manufacturer's technical literature for each product indicated, specified, or required; include the following:
 - 1. Manufacturer's product data
 - 2. Manufacturer's written installation instructions/recommendations, including construction details and fabrication methods.
 - 3. Instructions/recommendations for storage, protection and handling.
- B. Samples for Verification:
 - 1. 18 in square of each DEFS finish, color and texture specified. Layer sample so that each coat can be seen, on rigid backing.
 - 2. 12 in long of each trim accessory, as requested by architect.
 - 3. 12 in long of each foam trim profile.
 - 4. Each fastener.
- C. Shop Drawings: Prepared by Exterior Wall Contractor, with detailed plans, elevations, sections, and large-scale details of products; include the following:
 - 1. Descriptions, types, sizes, and profiles of products; including those concealed.

February 27, 2026

2. Products, sizes, spacings, and edge distances of attachment devices.
 3. Manufacturers, products, types, thicknesses, and layers of finishes.
 4. Material, thicknesses, profiles, and other details for flashings, gutters, and drainage troughs.
 5. Provisions for expansion and contraction, including dimension limits of movement for moving joints.
 6. Maximum and minimum joint sizes, including sealants and backer rods.
 7. Isometric details as requested by Architect.
- D. Shop Drawings Resubmittals:
1. Identify revisions with date, number and revision clouds.
 2. Respond to Architect's comments in writing.
 3. Contractor is fully responsible for any resultant delay caused by failure to comply.

1.06 INFORMATIONAL SUBMITTALS

- A. Installer Qualifications: Data for company, principal personnel, experience, and training specified in PART 1 "Quality Assurance" Article.
- B. Warranty: Copy of specified warranty.
- C. Manufacturers Project Acceptance Certification: Statement from manufacturer certifying products are suitable for use in specific locations, for specific details, and for applications indicated, specified, or required; and that warranty will be issued.
- D. Test Reports: Reports, by qualified testing agency, showing compliance with performance requirements where test methods are indicated.

1.07 CLOSE-OUT SUBMITTALS

- A. Record Shop Drawings: Record actual installation that varies from that shown originally, giving particular attention to concealed components that would be difficult to identify later; comply with appropriate Division 01 Section.

1.08 QUALITY ASSURANCE

- A. The Exterior Wall Contractor assumes undivided responsibility for the manufacturing, fabrication, and installation of the Work as described above and herein. Including:
 1. Securing a weathertight seal with all systems, surfaces and materials.
 2. Continuity of the weather-barrier to adjacent systems for a complete air/water barrier system.
- B. DEFS Manufacturer Qualifications:
 1. Company with not less than 10 years experience in manufacturing products similar to scope of this Project with a record of successful in-service perfor-

HAWAII HEALTH SYSTEMS CORPORATION – KAUAI DIVISION

Samuel Mahelona Memorial Hospital
Behavioral Health New Patient Facility
Project No. 221093-01

Direct-Applied Exterior Finish System (DEFS)
07241-3

mance, and minimum manufacture of 1,000,000 square feet of class PB EIFS/DEFS.

2. Member in good standing of the EIFS Industry Members Association (EIMA).
3. Certified Manufacturing Facilities with ISO 9001 and ISO 14001 by ANSI-RAB
4. Provide technical support by local technical representative employed by the manufacturer and having a minimum 10 years documented experience.
5. Manufacturer's representative shall periodically inspect material and installation to ensure installation is proceeding in accordance with manufacturer's recommendations and warranty requirements. Representative shall submit a written report of each visit indicating observations, findings and conclusions of inspection.

C. Installer Qualifications:

1. Experience: Licensed, bonded and insured Company with not less than 10 years experience in performing specified work similar in design, products, and extent to scope of this Project; with a record of successful in-service performance; and with sufficient production capability, facilities, and trained and skilled personnel. Minimum installation experience of 100,000 square feet of class PB EIFS/DEFS.
2. Supervision: Maintain a competent supervisor who is at Project during times specified work is in progress, and who is experienced in installing work similar in design, products, and extent to scope of this Project.
3. Manufacturer Qualification: Certified to manufacturer to install specified work.

D. Field Samples for Aesthetic Purposes: Before beginning work of this Section, build as many field samples as required by Architect to verify selections made under submittals and to demonstrate aesthetic effects of EIFS (not for work execution).

1. Use same Subcontractors, including supervisors, which will perform work on Project.
2. Finish various components to show maximum variation that will exist.
3. Approval is for, but not limited to, following aesthetic qualities:
 - a. Color quality and uniformity of appearance.
 - b. Texture quality and uniformity of appearance.
4. Protect and maintain approved field samples during construction in an undisturbed condition as a standard for judging completed work.
5. When directed, demolish and remove from Project.

E. Pre-Installation Conference: Before beginning work of this Section, conduct conference at site to comply with requirements of applicable Division 01 Sections.

1. Reports: Record discussions, including decisions and agreements reached, and prepare report.

F. All shop and field materials as well as workmanship are subject to inspection by the Owner and Architect at all times. Such inspections do not relieve the Exterior

February 27, 2026

Wall Contractor from obligations to comply with all requirements of the Contract Documents.

1.09 DESIGN REQUIREMENTS

A. Impact Resistance

1. Provide ultra-high impact resistance, in accordance with ASTM E 2486, to a minimum height of 6 ft. above finished grade of first level at all areas accessible to pedestrian traffic and other areas exposed to abnormal stress or impact. Areas identified in Shop Drawings.

B. Color Selection

1. Finish coat with a light reflectance value of 20 or greater. Dark colors are not recommended.

C. Joints

1. General: Design and location of expansion joints in the DEFS system is the responsibility of the Subcontractor.
2. Install joints at the following locations, but not limited to:
 - a. Where they exist in the substrate or supporting construction
 - b. Where DEFS adjoins dissimilar construction or materials
 - c. Where substrate type changes
 - d. In continuous elevations at intervals not exceeding 25 ft and 625 sq ft for light colors (LRV > 70), and at intervals not exceeding 16 ft and every 256 sq ft for dark colors (LRV < 70 and > 30). Do not exceed length to width ratio of 2-1/2:1 in joint layout.
 - e. Where significant structural movement occurs such as changes in roofline, building shape or structural system.
 - f. Changes in building height
 - g. Floor lines
 - h. Wall penetrations.
3. Minimum joint size: 3/8 inch wide.

D. Grade Condition

1. DEFS below grade or surfaces subject to continuous or intermittent water immersion or hydrostatic pressure not acceptable.
2. Terminate DEFS minimum 6 -inches above finished grade.

E. Sloped Conditions

1. Use of DEFS on build-outs or weather exposed sloped and horizontal surfaces is not acceptable.

F. Moisture Control

1. DEFS does not offer moisture control; it is not to be used on moisture sensitive substrates or locations.

February 27, 2026

2. Provide flashing to direct water to the exterior where it is likely to penetrate components in the wall assembly.

1.10 PERFORMANCE REQUIREMENTS

- A. Wind Resistance: Withstand load effects of 150 percent (safety load) of inward positive and outward negative wind load design pressures, as calculated based on the most current ASCE 7 "Minimum Design Loads for Buildings and Other Structures", acting inward and outward normal to plane of wall according to ASTM E 330.
 1. Wind Loading Criteria: As indicated on the Structural Drawings
- B. Air Infiltration Resistance Criteria:
 1. Air Leakage not more than 0.06 cfm/sq ft at static air pressure differential at not less than 6.24 ft lbs/sq ft according to ASTM E 283.
- C. Water Penetration Resistance Criteria:
 1. Show no evidence of uncontrolled water leakage at inward design wind load not less than 12.0 ft lbs/sq ft according to ASTM E 331 (Static) and AAMA 501.1 (Dynamic).
 2. Coordinate with adjacent exterior wall claddings and provide flashing to direct water to the exterior where it is likely to penetrate components in the wall assembly.
- D. Thermal Movement Resistance Criteria:
 1. Withstand expansion and contraction movement of framing members and components without excessive thermal movement according to AAMA 501.5.
 2. Base calculations on actual surface temperatures due to both solar heat gain and nighttime sky heat loss.
 - a. Ambient Temperature Range: Plus 170 deg F to 40 deg F
 - b. Surface Temperature: 180 deg F.

1.11 DELIVERY, STORAGE, AND HANDLING

- A. Follow manufacturer's recommendations.
- B. Delivery: Deliver products in original unopened packages or containers, fully identified with intact and legible labels.
- C. Storage: Store materials inside under cover and off of floor. Protect from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other affects causing damage or deterioration. Storage temperature as recommended by product manufacturers.

1.12 FIELD CONDITIONS

- A. Warm Weather Requirements:
 1. Protect each coat of DEFS against uneven and excessive evaporation and from strong flows of dry air, both natural and artificial.

February 27, 2026

2. Apply and cure DEFS as required by climatic and job conditions to prevent dry out during cure period.
 3. Provide suitable coverings, moist curing, and barriers to deflect sunlight and wind, or combinations of these, as required.
- B. Protection During Work: Protect adjacent substrates from damage caused by application of cementitious materials.

1.13 WARRANTY

- A. Performance Special Warranty: Furnish repair and replacement warranty for a period of 5 years from date of substantial completion agreeing to repair or replace defects, faulty work and failures, signed by authorized representatives of Exterior Wall Contractor, Installer, and Manufacturer.
1. Warranty to include exploratory work to determine the cause of defective work during the guarantee period, at no additional cost.
 2. Continuing corrections to defective work beyond the 5 year guarantee period are required if initial corrective measures were executed per the requirements as noted above but later found to be inadequate and/or not acceptable after the specified 5 year guarantee period.
 3. Exterior Wall Contractor is responsible for damage to the building and furnishings occasioned by defective materials or workmanship or damage due to repair work.
- B. Defects, Faulty Work, and Failures: Include, but not limited to, following:
1. Excessive cracking due to thermal cycles or poor mixes.
 2. Sealant failure as specified in Section 07910.
 3. Air infiltration in excess of specified limits.
 4. Water penetration or condensation in excess of specified limits.
 5. Staining of exposed surfaces due to incompatibility of adjacent products.
 6. Failure to fulfill other specified performance requirements.
- C. Failure of finishes:
1. Cracking, peeling, crazing, pitting, or corroding discernible from a distance of 10 ft
 2. Color fading: N not more than 5 Hunter units according to ASTM D 2244 on exposed surfaces cleaned with clean water and soft cloth. Includes non-uniform fading to extent there are color differences between adjacent panels.
 3. Chalking: Not more than No. 8 rating according to ASTM D 4214 on exposed unwashed surfaces.
- D. Exceptions: Warranty does not cover damage resulting from vandalism, acts of nature exceeding performance criteria, failure of the supporting structure and other causes beyond the Exterior Wall Contractor's control.
- E. This warranty and its enforcement shall not deprive the Owner of other action right or remedy available to them.

HAWAII HEALTH SYSTEMS CORPORATION – KAUAI DIVISION

Samuel Mahelona Memorial Hospital
Behavioral Health New Patient Facility
Project No. 221093-01

Direct-Applied Exterior Finish System (DEFS)
07241-7

PART 2 -PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design Manufacturer: The Drawings and Specifications are based on the DEFS systems; StoQuik Finish for Concrete and CMU (Walls) and StoQuik Finish System for Soffits as manufactured by STO Corporation. Subject to compliance with requirements of Contract Documents, comparable DEFS systems by one of manufacturers named below are acceptable. If not named, submit as substitution according to Conditions of the Contract and appropriate Division 01 Sections.
1. Dryvit
 2. Parex (www.parex.com)
 3. Senergy (www.senergy.com)
 4. Omega Products International
 5. or Approved Equal

2.02 MATERIALS, GENERAL

- A. Source Limitations for DEFS materials: Obtain materials from a single manufacturer for each cementitious component and from one source or producer for each aggregate.
- B. Material Compatibility: Provide primer, adhesive, insulation board, reinforcing mesh, base coat materials, finish coat materials, and accessories that are compatible with one another and approved for use by system manufacturer.
- C. Air and Water Resistive Barrier:
1. Flexible, polymer-based water-resistive coating and accessories as recommended by DEFS manufacturer.
 - a. Basis of Design Product: Sto Gold Coat.
 2. Sheathing Joint Treatment Materials:
 - a. Joint Filler: Ready-mixed, trowelable, flexible, joint compound, air barrier material; Sto Gold Fill.
 - b. Joint Tape: 4.2 oz/yd² (142 g/m²) self-adhesive, flexible, symmetrical, interlaced glass fiber mesh; StoGuard Mesh
- D. Transition Membranes
1. Membrane Flashing: Self-adhered membrane flashing, rough opening protection, sheathing joint treatment, and transition detailing material; Sto Conformable Membrane.
 2. Transition Membrane: Flexible air and water-resistive barrier coating used to embed flexible membrane material; Sto Gold Coat and StoGuard Transition Membrane.
- E. Reinforcing Mesh: Balanced, alkali-resistant, open-weave glass-fiber mesh treated for compatibility with other EIFS materials, made from continuous multi-end strands with retained mesh tensile strength of not less than 145 lb/in and 150

February 27, 2026

lb/in in warp and fill directions per ASTM D 5035, complying with ASTM D 578 and the following requirements for minimum weight:

1. Standard-Impact Reinforcing Mesh: Not less than 4.5 oz. /sq. yd. or greater.
2. High Impact Resistant Reinforcing Mesh: Not less than 15 oz. /sq. yd.
Provide heavy-duty mesh at locations from finish floor to 8'-0" above finish floor.
3. Ultra-High Impact resistance reinforcing fabric: Comprised of two layers - 1 layer Standard Impact resistance reinforcing fabric of 4.5 oz /sq. yd. with a 2nd layer of High Impact resistance reinforcing fabric of 15 oz /sq. yd.

F. Primer: (As required)

1. System manufacturers' standard primer-sealer substrate conditioner designed to seal substrates from moisture penetration and to improve the bond between substrate and adhesive used for application of insulation.

G. Base Coat (Soffits):

1. Manufacturers' single-component, polymer-modified, cement based material.
 - a. Basis-of-Design Product: Sto BTS Xtra.

H. Waterproof Base Coat (Walls):

1. Acrylic based, fiber-reinforced, flexible adhesive and waterproofing and recommended by DEFS manufacturer:
 - a. Basis of Design Product: Sto Flexyl.

I. Finish Coat (Wall & Soffit): DEFS manufacturer's special acrylic-based coating, factory-mixed formulation of polymer-emulsion binder, colorfast mineral pigments, sound stone particles, and fillers:

1. Stolit Acrylic Textured Finish:
 - a. Stolit X - 81524
 - b. Texture: Fine
 - c. Color: As indicated on drawings

J. Water: Clean and potable.

K. Sealants: (**JS-03**)

1. Comply with requirements of Section 07910 – EXTERIOR WALL JOINT SEALANTS and manufacturer's recommendations.
2. Backer rod: Closed-cell polyethylene foam.

L. Mechanical fasteners: fasteners used to attach accessories must be corrosion resistant.

2.03 MISCELLANEOUS MATERIALS

A. Sheet Metal Flashing: Required within the system or to join the system to adjacent construction, one of following:

1. Aluminum Sheet, ASTM B 209 not less than 1/16 in thick at exposed applications.

HAWAII HEALTH SYSTEMS CORPORATION – KAUAI DIVISION

Samuel Mahelona Memorial Hospital
Behavioral Health New Patient Facility
Project No. 221093-01

Direct-Applied Exterior Finish System (DEFS)
07241-9

February 27, 2026

2. Galvanized Steel Sheet, ASTM A 653 G90, not less than 1/32 -inch at concealed applications.
3. Stainless steel:
 - a. Description: 2D annealed finish, not less than 0.018-inch (26 ga) thick, unless noted otherwise.
 - b. Product Quality Standard: ASTM A 167 Type 302, 318.
- B. Patching and Leveling Material for Concrete and Masonry
 1. Polymer modified Portland cement-based patch and leveling material for prepared concrete and masonry surfaces for leveling up to 1/4 inch; Sto Leveler and Skim Coat.
 2. Polymer modified Portland cement-based lightweight patch and leveling material for prepared concrete and masonry surfaces for leveling up to 1/4 inch; Sto BTS Xtra.
- C. Crack Fillers: Substrate manufacturer's recommended crack fillers or sealants compatible with air barrier assembly components and adjacent materials.

2.04 METAL FLASHING FABRICATION

- A. Fabrication Quality Standards: In addition to standards listed elsewhere, comply with following, unless otherwise specified:
 1. SMACNA – Architectural Sheet Metal Manual.
 2. Approved submittals.
 3. Contract Documents.
- B. Fabrication Procedures: Fabricate continuous flashings in sections 96-inches long minimum but not exceeding 144-inches. Provide splice plates at joints of formed, smooth metal flashing.
- C. Flashing Joinery: Fabricate interior and exterior corners, intersections, and complex flashing conditions in shop, with properly folded, constructed and continuous soldered joints.

PART 3 -EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of DEFS.
 1. Approved substrates for DEFS Installation (Wall):
 - a. Concrete and masonry: Dry and cured a minimum of 28 days.
 - i. Poured-in-place concrete.
 - ii. Masonry units.

February 27, 2026

2. Coordinate to provide a continuous moisture protection. Provide protection of rough openings before installing windows, doors, and other penetrations through the wall and provide sill flashing.
3. Approved substrates for DEFS Installation (Soffits)
 - a. Exterior Gypsum Sheathing installed in conformance with applicable building code and manufacturers written installation instructions and the requirements in Section 06160 – EXTERIOR GYPSUM SHEATHING.
 - b. Gypsum exterior sheathing surface must be clean, dry, and free of surface contamination. Soffit board surface shall not have planar irregularities in excess of 1/16 inch and shall be free of voids, cracks, and other surface defects.

3.02 PREPARATION

A. Substrate Condition:

1. Commence installation after completion of all floor, roof construction and other construction that imposes dead loads on the walls to prevent excessive deflection (and potential cracking) of the substrate.
2. Ensure substrate surface is smooth and flat without protrusions that will affect thickness of DEFS. Plane tolerance not be more than 1/4 in in 10 ft.
3. Substrates be free of oil, dust, dirt, form-release agents, efflorescence, paint, wax, water repellents, moisture, frost and any other materials that inhibit adhesion.
4. Parge/Leveling Coat: Apply in one application Patching and Leveling material to a maximum thickness of 1/4" to the prepared surface and smooth the surface.

3.03 INSTALLATION, GENERAL.

- A. Installation Performance Requirements: Ensure air/water barrier isolates building interiors from air and water infiltration through exterior walls.
- B. Installation Quality Standards: In addition to standards listed elsewhere, perform work according to following, unless otherwise specified:
 1. ASTM C 1397
 2. ASTM C 1516
 3. Respective manufacturer's written installation instructions.
 4. Approved submittals.
 5. Contract Documents.

3.04 INSTALLATION OF DEFS OVER CONCRETE MASONRY

A. Base Coat Installation:

1. Apply waterproof base coat over wall surface to receive DEFS to an approximate wet thickness of 1/8-inch.

HAWAII HEALTH SYSTEMS CORPORATION – KAUAI DIVISION

Samuel Mahelona Memorial Hospital
Behavioral Health New Patient Facility
Project No. 221093-01

Direct-Applied Exterior Finish System (DEFS)
07241-11

February 27, 2026

2. Work horizontally or vertically in strips of 40-inches, and immediately embed Sto Mesh into the wet base coat by troweling from the center to the edges of the mesh. Avoid wrinkles in the mesh and smooth the base coat to eliminate trowel marks.
 3. Overlap mesh not less than 2-1/2- inches at mesh seams and feather at seams. Double wrap all inside and outside corners with minimum 6-inch overlap in each direction.
 4. Base coat must completely hide the reinforcing mesh color when dry. Reapply additional base coat material if necessary to achieve minimum thickness as soon as the first application is dry.
- B. Primer Installation: After base coat is dry, apply primer with brush, roller, or proper spray equipment in a continuous coat. Allow primer to completely dry before applying finish coat.
- C. Finish Coat Installation:
1. Apply finish coat with a clean stainless steel trowel to a rough thickness slightly more than the largest aggregate size.
 2. Use the trowel to scrape the material down to a uniform thickness no greater than the largest aggregate size.
 3. Achieve final texture by floating with a stainless steel or plastic trowel in a figure eight motion. Once applied, the working time is up to 20 minutes depending upon material, ambient temperatures and surface conditions.

3.05 INSTALLATION OF DEFS SOFFIT SYSTEM

- A. Accessory Installation:
1. Install corrosion proof termination accessories with perforated flanges for keying of the base coat at junctures with penetrations such as electrical fixtures, and with abutting walls and columns. Install corrosion proof control joints with perforated flanges for keying of the base coat at intervals as required by the exterior gypsum sheathing manufacture.
- B. Base Coat Application:
1. Install nominal 1/8-inch base coat by trowel to the soffit/ceiling board surface. Work horizontally or vertically in strips of 40 inches, and immediately embed the reinforcing mesh into the wet base coat by troweling from the center to the edge of the mesh.
 2. Overlap mesh installed at perforated accessory flanges by installing mesh up to the termination bead of the accessory. Overlap mesh not less than 2-1/2-inches at mesh seams and feather at seams.
 3. Double wrap all inside and outside corners with minimum 6-inches overlap in each direction (except where corner bead is used at outside corners lap mesh over perforated flange of accessory). Avoid wrinkles in the mesh.
 4. The mesh must be fully embedded so that no mesh color shows through the base coat when it is dry. Re-skim with additional base coat if mesh color is visible. Do not install base coat and mesh onto solid (unperforated) portions of accessories.

HAWAII HEALTH SYSTEMS CORPORATION – KAUAI DIVISION

Samuel Mahelona Memorial Hospital
Behavioral Health New Patient Facility
Project No. 221093-01

Direct-Applied Exterior Finish System (DEFS)
07241-12

February 27, 2026

- C. Primer Installation: After base coat is dry, apply primer with brush, roller, or proper spray equipment in a continuous coat. Allow primer to completely dry before applying finish coat.
- D. Finish Coat Installation:
 - 1. Apply finish coat with a clean stainless steel trowel to a rough thickness slightly more than the largest aggregate size.
 - 2. Use the trowel to scrape the material down to a uniform thickness no greater than the largest aggregate size.
 - 3. Achieve final texture by floating with a stainless steel or plastic trowel in a figure eight motion. Once applied, the working time is up to 20 minutes depending upon material, ambient temperatures and surface conditions.
- E. Attach penetrations through DEFS to structural support and provide watertight seal at penetrations.
- F. Do not install wet materials during inclement weather. Temperature limitations during application and curing per Manufacturer's recommendations. Protect materials from inclement weather until they are completely dry.
- G. Exposed DEFS Quality: Finish shall be free of hairline cracks, rough areas, trowel marks, checks, or other blemishes and imperfections. Finish coat texture and color to match Architect's samples.
- H. Installation Tolerance: Variation in surface flatness of exposed plaster not more than 1/8 in in 10 ft in any direction.

3.06 SEALANTS

- A. Comply with Section 07910 - EXTERIOR WALL JOINT SEALANTS and ASTM C 1481.
- B. Weather sealant lines between DEFS panels shall be applied directly to the DEFS base coat, and not to the finish coat.
- C. Apply primer if recommended as a result of sealant manufacturer's testing. At no cost to Owner, due to failure of work to pass testing and inspections.

3.07 ADJUSTING

- A. Repair and recoat damaged DEFS to eliminate cracks and similar imperfections. Repair work to be previously approved by the Architect and executed following manufacturer's written instructions.

3.08 PROTECTION AND CLEANING

- A. Provide protection of installed materials until DEFS is fully cured and dry.
- B. Remove materials from the job site in accordance with contract provisions and as required by law. Job site must be left free of debris and foreign substances resulting from the contractor's work.

February 27, 2026

3.09 ACCEPTANCE

- A. Areas or materials which are damaged, or which in the opinion of the Architect do not conform to the specification requirements, shall be removed and replaced with acceptable material at no additional cost to the Owner.
- B. Demonstrate proper cleaning methods and materials to Owner's maintenance personnel.
- C. Provide "as built" shop drawings and maintenance manuals per requirements of the project documents.

END OF SECTION

SECTION 07270 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.01 SUMMARY

- A. Work includes through-penetration firestop systems for penetrations through fire-resistance-rated constructions, including both empty openings and openings containing penetrating items.
- B. Related Work Described Elsewhere:
 - 1. Section 09250 – GYPSUM BOARD ASSEMBLIES.
 - 2. Division 15 - MECHANICAL.
 - 3. Division 16 – ELECTRICAL.

1.02 REFERENCES

- A. ASTM E 84 Test Method for Surface Burning Characteristics of Building Materials
- B. UL-05 Underwriters Laboratory, Inc. Fire Resistance Directory.
- C. UL 2079 Standard Tests for Fire Resistance of Building Joint Systems.
- D. ASTM E 119 Fire Tests of Building Construction and Materials.
- E. UL 1497 Fire Tests of Through-Penetration Firestops.
- F. NFPA 70 National Electrical Code.
- G. 2018 International Building Code (IBC) with Kauai County Amendments.

1.03 PERFORMANCE REQUIREMENTS

- A. Select and provide through-penetration firestop systems test by Underwriters Laboratories or another qualified testing and inspection agency to resist spread of fire according to requirements indicated, resist passage of smoke and other gases and maintain the fire resistance rating of the construction penetrated as determined by UL 1497.
 - 1. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, but not less than that equaling, or exceeding fire-resistance rating of constructions penetrated.
 - 2. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas:
 - a. Penetrations located outside wall cavities.
 - b. Penetrations located outside fire-resistance-rated shaft enclosures.
 - c. Penetrations located in construction containing fire protection rated openings.

- d. Penetrating items larger than 4-inches in diameter nominal pipe or 16 square inch in overall cross-sectional area.
- B. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that, after curing, do not deteriorate when exposed to these conditions both during and after construction.
 - 1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
 - 2. For floor penetrations with annular spaces exceeding 4-inches in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved, either by installing floor plates or by other means.
 - 3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.
- C. For through-penetration firestop systems exposed to view, provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.
- D. Select and Provide fire resistive joint systems test by Underwriter's Laboratories or other qualified testing and inspecting agency to resist spread of fire, resist passage of smoke and other gases, and maintain the fire resistance rating of the construction penetrated and, where applicable, UL 1497 and UL testing standard 2079.

1.04 SUBMITTALS

- A. Product Data: For each through-penetration firestop system indicated submit documentation, including illustrations, from Underwriter's Laboratories or other certified testing and inspecting agency. Submit data for the component products of the selected systems.
- B. Shop Drawings: For each through-penetration firestop system, show each type of construction condition penetrated, relationships to adjoining construction, and type of penetrating item. Include firestop design designation of qualified testing and inspecting agency that evidences compliance with requirements for each condition indicated.
 - 1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop system configuration for construction and penetrating items.
 - 2. Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular through-penetration firestop condition, submit illustration, with modifications marked, approved by through-penetration firestop system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.
- C. Through-Penetration Firestop System Schedule: Indicate locations of each through-penetration firestop system, along with the following information:
 - 1. Types of penetrating items.

2. Types of constructions penetrated, including fire-resistance ratings and, where applicable, thicknesses of construction penetrated.
 3. Through-penetration firestop systems for each location identified by firestop design designation of qualified testing and inspecting agency.
- D. Qualification 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, name and addresses of the architects and owners, and other information specified.
- E. Product Certificates: For through-penetration firestop system products, signed by product manufacturer.
- F. Product Test Reports: From a qualified testing agency indicating through-penetration firestop system complies with requirements, based on comprehensive testing of current products.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: A firm experienced in installing through-penetration firestop systems similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its through-penetration firestop system products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.
- B. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, through one source from a single manufacturer.
- C. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in Part 1 "Performance Requirements" Article:
1. Firestopping tests are performed by Underwriter's Laboratories (UL).
 2. Through-penetration firestop systems are identical to those tested per ASTM E 814. Provide rated systems complying with the following requirements:
 - a. Through-penetration firestop system products bear UL classification marking.
 - b. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by the following:
 - i. UL in its "Fire Resistance Directory."
- D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Section 01310 – PROJECT MANAGEMENT AND COORDINATION. The manufacturer's technical representative must attend.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, lot number, shelf life if applicable, qualified testing and inspecting agency's classification marking applicable to Project, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.07 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

1.08 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements. Coordination includes but not limited to:
 - 1. Offsetting the penetrating item from parallel walls, ceilings or from other penetrating items so that the penetration details match the tested design on all sides.
 - 2. Rerouting the penetrating item so the item penetrates the rated barrier at a 90-degree angle or at an angle sufficiently great to stay within the limits of the tested design.
- B. Limiting the size of sleeves, openings, core-drilled holes, or cut openings so that the annular space remaining between the penetrating item and the surrounding construction does not exceed that of the tested design.
- C. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until each installation has been examined by a building inspector, if required by authorities having jurisdiction.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the through-penetration firestop systems indicated for each application that are produced by one of the following manufacturers:
 - 1. Hilti, Inc.

February 27, 2026

2. Isolatek International
3. Nelson Firestop Products.
4. PABCO Gypsum
5. Specified Technologies Inc.
6. 3M; Fire Protection Products Division.
7. Tremco; Sealant/Weatherproofing Division.

2.02 FIRESTOPPING, GENERAL

- A. Asbestos Prohibition: No materials or equipment containing asbestos shall be used under this section. Assure that all materials and equipment used in the project are asbestos free.
- B. Provide penetration firestopping that is produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated.
- C. Compatibility: Provide through-penetration firestop systems that are compatible with one another; with the substrates forming openings; and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.
- D. Penetrations in Fire-Resistance-Rated Walls: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
 1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- E. Penetrations in Horizontal Assemblies: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
 1. F-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated.
 2. T-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
- F. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with Part 1 "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by qualified testing and inspecting agency for firestop systems indicated.
 1. Permanent forming/damming/backing materials, including the following:
 - a. Slag-wool-fiber or rock-wool-fiber insulation.
 - b. Fillers for sealants.
 2. Temporary forming materials.

3. Substrate primers.

2.03 FILL MATERIALS

- A. Mortars: ASTM E 814, Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers and lightweight aggregate formulated for mixing with water at the Project site to form a non-shrinking, homogeneous mortar.
 - 1. Acceptable Products:
 - a. CP 637 Firestop Mortar; Hilti, Inc.
- B. Intumescent Sealants: Single component intumescent latex formulations containing no water-soluble intumescent ingredients capable of expanding a minimum 8 times.
- C. Intumescent Putties: Non-hardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds for protection of electrical switch and receptacle boxes to reduce horizontal separation to less than 24-inches and allow for back-to-back conditions.
- D. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- E. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
 - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and non-sag formulation for openings in vertical and sloped surfaces, unless indicated firestopping limits use of non-sag grade for both opening conditions.

2.04 MIXING

- A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of work.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with firestop system manufacturer's written instructions and with the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
 - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

3.03 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

- A. General: Install through-penetration firestop systems to comply with Part 1 "Performance Requirements" Article and with firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
 - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
- C. Install fill materials for firestop systems by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 - 3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.04 FIRE RESISTIVE JOINT SYSTEM INSTALLATION

A. Perimeter Fire Containment Systems:

1. Where indicated for gaps between tops of fire resistance rated partitions assemblies and fire resistance rated ceilings, floor slabs, and roofs, provide a perimeter fire containment system with the fire test response rating of the assembly indicated, as determined by UL 2079. Materials shall be identified with UL classification markings.

3.05 PUTTY PAD INSTALLATION

A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions and product carton instructions for installation.

B. Installation:

1. Remove the release paper.
2. Inspect the outlet box to make sure it is properly installed and free of free of dust, grease, oil, loose materials, rust or other substances.
3. Starting at side, align the putty pad to front edge of box and overlap onto the stud.
4. Cut the putty pad to allow the pad to fit around conduits or cables.
5. Pleat the extra material at the corners.
6. Fold the pleated corners into place and firmly press the putty pad into place so that the entire surface of the back of the outlet box is covered.

3.06 IDENTIFICATION

A. Identify through-penetration firestop systems with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6-inches of edge of the firestop systems so that labels will be visible to anyone seeking to remove penetrating items or firestop systems. Use mechanical fasteners for metal labels. For plastic labels, use self-adhering type with adhesives capable of permanently bonding labels to surfaces on which labels are placed and, in combination with label material, will result in partial destruction of label if removal is attempted. Include the following information on labels:

1. The words "Warning - Through-Penetration Firestop System - Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Through-penetration firestop system designation of applicable testing and inspecting agency.
4. Date of installation.
5. Through-penetration firestop system manufacturer's name.
6. Installer's name.

February 27, 2026

3.07 FIELD QUALITY CONTROL

- A. Inspecting Agency: Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E2174 and to prepare test reports. Inspecting Agency will state in each report whether inspected through-penetration firestop systems comply with or deviate from requirements.
- B. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.
- C. Proceed with enclosing through-penetration firestop systems with other construction only after inspection reports are issued and firestop installations comply with requirements.

3.08 CLEANING AND PROTECTING

- A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce systems complying with specified requirements.

END OF SECTION

SECTION 07410 – STANDING SEAM METAL ROOF PANELS

PART 1 - GENERAL

1.01 SUMMARY

- A. Work Includes: Extent of standing seam metal roof is indicated on the drawings and by provisions of this section. Provide all materials including all flashings for a complete system.
- B. Type of panels required include the following: Formed sheet panels, intended for concealed fastener installation which are structurally capable of withstanding the wind loads and uplift pressures of the Project.
- C. Related Work Described Elsewhere:
 - 1. Section 05400 – COLD-FORMED METAL FRAMING
 - 2. Section 06100 – ROUGH CARPENTRY
 - 3. Section 07600 – FLASHING AND SHEET METAL
 - 4. Division 15: MECHANICAL: Mechanical work penetrating thru roof.
 - 5. Division 16: ELECTRICAL: Electrical work penetrating thru roof.

1.02 PERFORMANCE REQUIREMENTS

- A. Except as otherwise indicated, Standing Seam Metal Roofing System is required to establish and maintain a waterproof continuous seal on a permanent basis, with recognized limitations of wear and aging as indicated for each application. Failures of installed roofing materials to comply with this requirement will be recognized as failures of materials and workmanship.
- B. As roofing manufacturer's system installation requirements and tested assemblies vary, this specification is to provide and intent of the type of membrane and overall roofing system. The noted performance requirements shall be met by the installed system. The installer shall provide the manufacturer of their choice with all applicable project documents for review before the installer shall develop and submit final costs. Whether specifically noted by the project documents or not, the installer shall include all manufacturer requirements and recommendations (and including all project document related requirements when more stringent) in the final submitted costs.
- C. Material Compatibility: Provide roofing materials compatible with one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience
- D. Wind-Uplift Resistance: Provide standing seam metal roofing capable of resisting the following project windloads. Provide clips, fasteners, and clip spacings of type indicated and with capability to sustain, without failure, a load equal to 2 times the wind uplift resistance. Wind uplift resistance shall be determined in accordance with IBC 2018 as amended and ASCE 7 "Minimum Design Loads for Buildings" but not less than required by UL 580 wind uplift rating of UL 90.
 - 1. Wind Design Criteria: As indicated on the Structural Drawings.

- E. Structural capacity of metal roofing system shall be determined in accordance with ASTM E 1592. A minimum of two tested spans are required in order to interpolate allowable load data between tested spans. Extrapolation of data outside the tested spans is not allowed.
- F. Provide a design analysis signed by a registered Professional Engineer licensed in the State of Hawaii, confirming that the structural capacity of the metal roofing system as determined in accordance with ASTM E 1592 is adequate to resist the design loads required by the International Building Code. Analysis shall include calculation verifying the design loads, the uplift pressures, and how those loads affect the various areas of discontinuity clearly shown and distinguished from the typical field roof elements.
- G. Resistance to Water Infiltration: Roofing system shall show no infiltration at seams, edges, flashings, counter-flashings and penetrations at a static pressure of 12.0 lbf/sq. ft when tested per ASTM E 1646.
- H. Air Infiltration: Maximum 0.06 cfm/sq. ft. (0.3 L/s per sq. m) per ASTM E 1680 at a static-air-pressure difference of 6.24 lbf/sq. ft.
- I. Thermal Movement: Allow for thermal movements from ambient and surface temperature changes. Temperature Change (Range) of 120 deg F, ambient; 200 deg F, material surfaces.

1.03 QUALITY CONTROL

- A. Installer Qualifications: Engage a single firm to assume undivided responsibility for installing all components of the Roofing System including all related sheet metal flashings and all other components. The installer shall be authorized or licensed by the panel manufacturer to install manufacturer's products and that is eligible to receive manufacturer's warranty. The actual work shall be supervised by personnel trained by the manufacturer in proper application of the product. The installer shall have capability for preparation of shop details and fabrication of all flashings not furnished by the panel manufacturer. Installer must execute 100% of metal roof system installation with installer's own forces. Panels shall be factory-produced only. No portable, installer-owned or installer rented machines will be permitted.
 - 1. Installer shall provide evidence of at least three (3) similar and successful installations including contact names and numbers regarding those projects.
- B. Installation Crew: Provide and maintain same foreman and crew from start to finish of work unless change is approved by the Architect and manufacturer's representative. Workmen who will be walking on roof panels shall wear soft-soled shoes that will not damage the panels.
- C. A project specific QA / QC manual shall be submitted by the Installer before any work has begun. This manual shall be reviewed at the pre-installation meeting and copies shall be kept at roof level in the possession of the Installer's supervisory personnel. Approved shop drawings and all other pertinent submittal materials shall be kept at roof level in the possession of the Installer's supervisory personnel.

February 27, 2026

- D. Flashing and Sheet Metal Accessories shall comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.
- E. Take required steps and precautions to properly isolate and prevent incompatibility between this system and adjacent work, in accordance with manufacturer's specifications, recommendations and instructions.
- F. Manufacturer Qualifications: Roofing membrane and all accessory products shall be provided by a single manufacturer with a minimum of 15 years' experience in the direct production and sales of roofing systems. Manufacturer shall be capable of providing field service representation during construction and recommending appropriate installation methods.
- G. Source Limitations: Obtain components for roofing system from a single manufacturer.
- H. Manufacturer's Technical Representative: The representative shall have authorization from manufacturer to approve field changes and shall be thoroughly familiar with the products and with installations in the geographical area where construction will take place. The manufacturer's representative shall be an employee of the manufacturer with at least 5 years' experience in installing the roof system.
- I. Manufacturer's technical representative shall make periodic site visits and complete inspection reports that are submitted to the owner. At least one visit per roof area not including final inspections. Final inspections by the roofing membrane manufacturer shall be coordinated at least two weeks in advance with the Contractor and Owner/Owners consultants so that their attendance can be properly coordinated. Final inspection reports and signed / completed punch list reports by the roofing membrane manufacturer shall be submitted to the owner. Submittal of the roofing warranty alone shall not be acceptable.
- J. Pre-roofing Conference: After submittals are received and accepted but before roofing work, including associated work are performed, the Contractor shall hold a prerooting conference to review the following:
 - 1. Procedure for on site inspection and acceptance of the roofing substrate and pertinent structural details relating to the roofing system.
 - 2. Contractor's plan for coordination of the work of the various trades involved in providing the roofing system and other components secured to the roofing.
 - 3. Attendees: The pre-roofing conference shall be attended by the Contractor and personnel directly responsible for the roofing installation and the roofing manufacturer's technical representative. Conflicts among those attending the prerooting conference shall be resolved and confirmed in writing before roofing work, including associated work, is begun. Prepare written minutes of the pre-roofing conference and submit to the Architect.
- K. Mock-up:
 - 1. Construct mockup(s) of metal roofing system, from eave to ridge, 10-12 feet wide, including associated attachments, flashings, joints and junctions, ridge, hip and valley construction, control or expansion joints, terminations and terminating components, for Architects review and acceptance. Demonstrate proposed junctions of roofing system with various roof elements and related

accessories indicated on the Drawings. At Architects request, provide additional mockups until satisfactory installation and appearance are obtained.

2. Locate mockup where directed by the Architect. Make such modifications and revisions to installation as the Architect may request, until the Architects acceptance is obtained. Match accepted mockup in subsequent installations. At the Architects request, remove non-matching work and replace with work matching accepted installation.
3. Mockup may remain as part of the work, at the discretion of the Architect.

1.04 SUBMITTALS

A. Submit in accordance with Section 01330- SUBMITTAL PROCEDURES.

1. Product Data: Submit manufacturer's product specifications, standard details, installation instructions and general recommendations, as applicable to materials and finishes for each component and for total system of preformed panels.
2. Shop Drawings: Submit shop drawings of all roofing, flashing, fastenings, supports, anchors, and clearances, and connection details to the Contracting Officer for acceptance.
 - a. Plans shall clearly show all adjacent materials for proper coordination including but not limited to plans, elevations, sections, details and attachments to other work. Do not use or submit drawings prepared by Architect or Owner for shop drawings.
 - b. Associated sheet metal flashing systems shall be included in shop drawings and clearly detailed in coordination with adjacent exterior finish materials. Sheet metal items shall be clearly noted regarding gauge, profile, fastening and compliance with applicable anticipated project specific wind uplift forces.
3. Delegated Design Structural Analysis: Submit calculations that are wet stamped by a professional engineer currently licensed in the State of Hawaii.. Calculations shall include all relative metal panel information. Calculations confirming project specific wind uplift conditions and associated attachment methods and materials, as required to comply with 1.02 of this section, shall also be noted on the shop drawings and / or submitted separately. Calculations submitted separately must be submitted at the same time as the shop drawings
4. Samples: Furnish 12-inch long samples of full width panel materials and samples of all other materials to be used to Architects for approval.
5. Test Reports: Provide test data demonstrating structural capacity, wind uplift and resistance to water infiltration performance as specified.
6. Manufacturer's Technical Representative's Reports: Submit copies of all reports to the Architect.
7. Warranty: Submit warranty as noted under paragraph entitled "WARRANTY".

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle preformed panels, bulk roofing products and other manufactured items in a manner to prevent damage or deformation.
- B. Delivery: Provide adequate packaging to protect materials during shipment. Do not uncrate materials until ready for use except for inspection. Immediately upon arrival of materials at jobsite, inspect materials for damage, dampness, and staining. Replace damaged or permanently stained materials that cannot be restored to like-new condition with new material. If materials are wet, remove moisture, restack and protect panels until used.
- C. Storage: Stack materials stored on the site on platforms or pallets and cover with tarpaulins or other suitable weathertight coverings which prevent water trapping or condensation. Store panels so that water which might have accumulated during transit or storage will drain off. Do not store the panels in contact with materials that might cause staining, such as mud, lime, cement, fresh concrete or chemicals. Protect stored panels from wind damage.
- D. Handling: Handle material carefully to avoid damage to surfaces, edges and ends.

1.06 WARRANTY

- A. Special Weathertightness Warranty: Manufacturers standard form, without monetary limitation, in which manufacturer agrees to repair or replace components of metal roof system that fail in materials or workmanship within specified warranty period. Failure shall include roof leaks.
 - 1. Special Warranty shall include roof panels, base flashings, roof system accessories, roof insulation, fasteners, cover board and other components of roofing system.
 - 2. Warranty Period: 10 years from date of Substantial Completion.
 - 3. Wind Speed: At a minimum Project Wind Speed as indicated in Article 1.02 of this Section and in concert with Factory Mutual wind speed determination, whichever is more stringent. Note: All manufacturer material and installation requirements to obtain wind speed warranty shall be included by the installer.
- 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 paint finish are free from material defects and shall be warranted for 20 years from the date of Substantial Completion against peeling, chipping, cracking or color change in excess of 5 NBS units during the term of this warranty. In the event that the above paint system fails under normal wind and weathering conditions within the warranty period, the manufacturer/supplier shall replace or repair as necessary any panels whose factory color finish that fails. This paint finish warranty commences upon Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design Product: The product indicated in this Section and on the drawings, is Tite-Loc Plus as manufactured by Petersen Aluminum Corporation.
- B. Subject to compliance with requirements and Architects approval comparable products from the following manufacturers may be substituted:
 - 1. Custom-Bilt Metals; CB-2000
 - 2. Elevate; UC-3
 - 3. Kloeckner Metals; MAC 200
 - 4. or approved equal.

2.02 MATERIALS

- A. Roof Panels: Formed from minimum 0.040-inch prefinished aluminum of alloy 3003-H14 or 5052-H32 conforming to ASTM B 209.
 - 1. Surface: Smooth
- B. Panel configuration shall be standing seam roofing with concealed fasteners. Pan width shall be 18-inches with a 2" inch vertical leg with flat pan. Panels shall be designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels, engaging opposite edge of adjacent panels, and snapping panels together, sealed with factory-applied sealant. Provide panel with roof panel manufacturer's factory-installed, in-seam, thermally applied, seam sealant.
- C. Anchor Clips: Stainless steel, 2-piece, 18-gauge base and 22-gauge top, with movement allowance of 3-inch. Clip shall have a self-centering feature to assure movement capability in both directions.

2.03 FLASHING AND CLOSURES

- A. Flashing and Trim: Flashing shall be formed from the same material type and finish as the roof panel. Minimum thickness shall be the same as the roof panel unless otherwise indicated.
- B. General:
 - 1. Configuration of flashings shown on the drawings are intended to indicate basic intent. Other flashings which accomplish the basic intent will be acceptable if standard with the panel manufacturer.
 - 2. 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.
 - 3. Provide accessories and other items essential to complete the sheet metal installation of the same materials as the items to which they are applied.
 - 4. Connect all pieces of linear flashing by a slip joint to permit thermal movement.

February 27, 2026

- C. Gutters: Formed to cross section indicated, from same material as roof panels, complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum 96-inch- long sections. Furnish flat-stock gutter spacers and gutter brackets fabricated from same metal as gutters of size and metal thickness according to SMACNA's "Architectural Sheet Metal Manual." but not less than twice the gutter thickness. Space gutter supports a maximum of 36 inches o.c. Fabricate expansion joints, expansion-joint covers and gutter accessories from same metal as gutters. Provide wire ball strainers of compatible metal at outlets.
 - 1. Gutter Profile: As indicated
 - 2. Sheet Metal Thickness: 0.040-inch
 - 3. Fabricate and locate lap type expansion joints in compliance with SMACNA recommendations for the material specified. Expansion joint to be type as shown in Figure 1-6 in the SMACNA "Architectural Sheet Metal Manual".
- D. Downspouts: Fabricate rectangular downspouts from same material as roof panels, to the size indicated on the Drawings, complete with mitered elbows. Furnish with metal hangers, from same material as downspouts, and anchors.
 - 1. Hanger Style: SMACNA figure designation 1-35D
 - 2. Sheet Metal Thickness: 0.032-inch.
- E. Base, Counter, Drip Edge, Valley, Eave, Rake, Ridge and Hip Flashings: to be fabricated in same material and thickness as roof panels.

2.04 METAL FINISH

- A. General: Apply coatings either before or after forming and fabricating panels, as required by coating process and as required for maximum coating performance capability.
- B. For exposed exterior surfaces, provide Three-Coat Fluoropolymer: AAMA 62'. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions
 - 1. Color: To be selected by Architect.
 - 2. Concealed Finish (Interior Surface): Pretreat with manufacturer's standard white or light-colored acrylic or polyester-backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

2.05 ROOF INSULATION

- A. Composite Polyisocyanurate Board Insulation: ASTM C1289 Type V, Class 1 Grade 3 (25 psi), rigid roof insulation composite panel composed of a closed-cell polyisocyanurate foam core factory-applied to a fiber reinforced facer on one side and bonded to 5/8-inch CDX plywood on the other side; H-Sheild NB by Hunter Panels.

- B. Insulation Fasteners: Provide composite polyiso board manufacturers SIP WD fastener specifically to be used to attach composite polyiso board to metal roof deck.
 - 1. Fastener Material: SAE 1022 heat treated steel with corrosion-resistant coating of length to be able to penetrate plywood roof deck at the length required to withstand uplift forces.

2.06 MISCELLANEOUS MATERIALS

- A. Fasteners: Fasteners shall be Type 316 stainless steel with composite metal and neoprene composition washers. Where required, exposed fasteners shall be gasketed on the exterior side of the covering to waterproof the covering and finished to match roof finish. Concealed fastener and clip system shall be manufacturer approved for system provided and uplift specified.
- B. Accessories: Except as indicated as work of another specification section, provide components required for a complete roofing system, including stainless steel clips, standoff clips, sidelap clips, and uplift clips; trim, flashings and expansion joint flashing; single component polyurethane sealants, gaskets, fillers, closure strips and similar items. All clips shall be stainless steel. Match materials/finish of preformed roof panels where exposed.
- C. Closure Strips: Formed specifically for this purpose of laminated cross-linked polyethylene closed cell-foam or neoprene materials and as standard with manufacturer. Molded closure strips shall be free of open voids and shall not absorb or retain water. Closure strips shall be formed to match configurations of the roofing and shall be provided where indicated and where necessary to provide weathertight construction.
- D. Exposed Sealant: ASTM C 920; silicone sealant; of type, grade, class, and use classifications required to seal joints in metal roof panels and remain weathertight; as recommended by metal roof panel manufacturer colored to match panel color.
- E. Sealing Tape: For side laps, end laps and flashing details, pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, non-sag, nontoxic, non-staining tape.
- F. Butyl Sealant: For side laps, end laps and flashing details, ASTM C 1311, single-component, solvent-release butyl rubber sealant, polyisobutylene plasticized, heavy bodied for hooked-type expansion joints with limited movement.
- G. Mastic: As recommended by the roofing manufacturer.
- H. Bituminous Coating: Cold-applied asphalt mastic, SSPC paint 12, compounded for 1 5-mil dry film thickness per coat.
- I. Prefabricated Pipe Flashing System: A premolded flexible pipe sleeve of EPDM in pleated concentric rings, and bond to a square, corrosion-resistant base of soft, aluminum alloy, allowing conformance of base by hand pressure to roofing panel profile. Pipe flashing system shall be equal to "Master Flash" by Aztec Washer, "Dektite" by Buildex, or approved equal.
- J. Waterproofing Underlayment: Self-Adhering, High-Temperature Sheet, 40 mils thick minimum, consisting of slip-resisting, polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper

February 27, 2026

backing; cold applied. Provide primer when recommended by underlayment manufacture.

1. Clad-Gard SA-S; Elevate
 2. Palisade SA-HT; SDP Advanced Polymer Products Inc.
 3. Rainproof 40; Protecto-Wrap Company
 4. Sharkskin Ultra SA; Kirsch Building Products, LLC
 5. Wind and Water Seal High Temperature; MFM Building Products Corp.
- K. Flexible Flashing: Aluminum foil faced 45 mil rubberized asphalt or butyl rubber roll sheet as recommended by roofing manufacturer for waterproofing top set flashings.

2.07 PANEL FABRICATION

- A. General: Fabricate and finish panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes, and as required to fulfill performance requirements, which have been demonstrated by factory testing. Comply with indicated profiles and dimensional requirements, and with structural requirements. Fabricate panels in full lengths from ridge to eave to the greatest extent possible.
- B. Metal Gages: Thicknesses required for structural performances, but not less than manufacturer's recommended minimums for profiles and applications indicated, and not less than specified under "Roof Panels".
- C. Metal Protection: Where dissimilar metals will contact each other, protect against galvanic action by painting contact surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by manufacturers of dissimilar metals or by fabricator.
- D. Sheet Metal Accessories: Custom fabricate flashings and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Obtain field measurements for accurate fit before shop fabrication.
1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
 2. Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
 3. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
- E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
1. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" for application but not less than thickness of metal being secured.

PART 3 - EXECUTION

3.01 GENERAL

- A. Install roofing, insulation, flashings, and accessories in accordance with roofing manufacturer's published instructions and recommendations for the specified roofing system. Where manufacturers provide no instructions or recommendations, follow good roofing practices and industry standards. Comply with federal, state, and local regulations.
- B. Obtain all relevant instructions and maintain copies at project site for duration of installation period.
- C. Verify that shop drawings prepared by metal roof panel manufacturer have been approved and are available to installers; do not use drawings prepared by Architect or owner for installation drawings.
- D. Verify that the specifications and drawing details are workable and not in conflict with the roofing manufacturer's recommendations and instructions; start of work constitutes acceptance of project conditions and requirements.
- E. Does not start work until Pre-Installation Notice has been submitted to manufacturer as notification that this project requires a manufacturer's warranty.
- F. Perform work using competent and properly equipped personnel.
- G. Temporary closures, which ensure that moisture does not damage any completed section of the new roofing system, are the responsibility of the applicator. Completion of flashings, terminations, and temporary closures shall be completed as required to provide a watertight condition.
- H. Install roofing only when surfaces are clean, dry, smooth and free of snow or ice; do not apply roofing during inclement weather or when ambient conditions will not allow proper application; consult manufacturer for recommended procedures during cold weather. Do not work with sealants and adhesives when material temperature is outside the range of 60 to 80 degrees F (15 to 25 degrees C).
- I. Protect adjacent construction, property, vehicles, and persons from damage related to roofing work; repair or restore damage caused by roofing work.
 - 1. Protect from spills and overspray from bitumen, adhesives, sealants and coatings.
 - 2. Particularly protect metal, glass, plastic, and painted surfaces from bitumen, adhesives, and sealants within the range of wind-borne overspray.
 - 3. Protect finished areas of the roofing system from roofing related work traffic and traffic by other trades.
- J. Until ready for use, keep materials in their original containers as labeled by the manufacturer.
- K. Consult roofing manufacturer's instructions, container labels, and Material Safety Data Sheets (MSDS) for specific safety instructions. Keep all adhesives, sealants, primers and cleaning materials away from all sources of ignition.

3.02 EXAMINATION

- A. Examine roof deck to determine that it is sufficiently rigid to support installers and their mechanical equipment and that deflection will not strain or rupture roof components or deform deck.
- B. Verify that surfaces and site conditions are ready to receive work. Correct defects in the substrate before commencing with roofing work.
- C. Verify that the substructure installation is in accordance with the approved shop drawings and roof panel manufacturer's requirements that the fasteners are correct for the substrate, and the substrate is installed to accommodate and support the appropriate clip spacing and attachment.
- D. Verify that installed work of other trades that such work is complete to a point where the roofing system installation may commence.
- E. Verify that roof openings, curbs, pipes, sleeves, ducts, vents, and other penetrations through roof substrate are complete and properly located.
- F. In event of discrepancy, notify General Contract and the Contracting Officer in writing; do not proceed with installation until discrepancies have been resolved. The Manufacturer's Technical Representative shall approve roof substrate as suitable for roofing system application.

3.03 INSTALLATION, GENERAL

- A. Comply with panel fabricator's and material manufacturers' instructions and recommendations for installation, as applicable to project conditions and supporting substrates.
- B. Anchor panels and other components of the work securely in place in full and firm contact with concealed anchor clips with provisions for thermal/structural movement of the panels.
- C. Obtain acceptance prior to installation on prefinished panels cut in the field and factory applied coverings or coatings that were repaired after being abraded or damaged during handling or installation. Make repairs with material of same color as weather coating. Completely seal openings through panels.
- D. Correct defects or errors in materials in an approved manner. Replace materials which cannot be corrected in an approved manner with new materials. Provide molded closure strips where indicated and where necessary for weathertight construction.

3.04 ROOF INSULATION BOARD INSTALLATION

- A. Coordinate installing metal roofing system components, so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with metal roofing system manufacturer's written instructions and UL Design System for installing roof insulation board.
- C. Install insulation under area of roofing as indicated. Insulation boards to be installed with end joints staggered a minimum of 6-inches in adjacent rows.

February 27, 2026

- D. Mechanically Fastened Insulation: Install insulation to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.

3.05 WATERPROOFING UNDERLAYMENT INSTALLATION

- A. Install underlayment over entire area to be roofed in accordance with manufacturer's instructions.
- B. Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation.
- C. Apply wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps with roller.
- D. Install waterproofing underlayment to provide for a continuous and uninterrupted waterproofing membrane under the metal roofing system. Tie-in to adjacent cladding systems to provide for waterproofing continuity.

3.06 INSTALLATION

- A. Install the metal roof panel system in accordance with the manufacturer's instructions, installation drawings, and approved shop drawings, so that it is weathertight and allows for thermal movement.
- B. Install metal roof panels with standing seams parallel to slope of roof. Attach clips to bearing plates with a minimum of 3 stainless steel screws per clip unless manufacturer's data allows otherwise for the required performance specified.
- C. Attach panels to structure with concealed clips which are incorporated into the panel seams. Clip attachment shall allow roof to move freely and independently of the structure. With clip screws in place, test all clips for freedom of movement before covering with the next panel. All clips that bind and cannot be moved with hand pressure shall be replaced.
- D. Seamed Joint: Crimp standing seams with manufacturer-approved, motorized seamer tool so clip, metal roof panel, and factory-applied sealant are completely engaged.
 - 1. Joint Type: Double Lock
- E. Before applying roofing over flashing such as at eaves, valleys and penetrations, place additional sealant on the underside of the pan to assure a continuous seal.
- F. Installation Tolerances: Shim and align panel units within installed tolerance of 1/4-inch in 20'-0" on level/plumb/slope and location line as indicated, and within
- G. 1/8-inch offset of adjoining faces and of alignment of matching profiles. Layout lines parallel to the rakes at intervals. Use a spacing gage at each row of panels to ensure that panel width is not stretched or shortened.
- H. All field cutting of roofing panels shall be done mechanically, no saw or abrasive cutting will be allowed.
- I. Joint Sealers: Install joint fillers and sealants where indicated and where required for weatherproof performance of panel system. Provide types of sealants/fillers

HAWAII HEALTH SYSTEMS CORPORATION – KAUAI DIVISION

Samuel Mahelona Memorial Hospital
Behavioral Health New Patient Facility
Project No. 221093-01

Standing Seam Metal Roof Panels
07410-12

indicated or, if not otherwise indicated, types recommended by panel manufacturer. Refer to Section 07910 – EXTERIOR WALL JOINT SEALANTS of these specifications for installation requirements applicable to indicated joint sealers.

- J. Flashings: Provide flashing and related closures and accessories in connection with preformed metal panels as indicated and as necessary to provide a weathertight installation. Install flashing to ensure positive water drainage away from roof penetrations. Flash and seal roof at ridge, valleys, eaves and rakes, at projections through roof, and elsewhere as necessary. Accomplish placement of closure strips, flashing, and sealing material in an approved manner that will ensure complete weathertightness. Details of installation which are not indicated shall be in accordance with the NRCA CD, SMACNA ASMM, panel manufacturer's printed instructions and details of the accepted shop drawings. Installation shall allow for expansion and contraction of flashing.
- K. Flashing Fasteners: Fastener spacings shall be in accordance with the panel manufacturer's recommendations and as necessary to withstand the indicated design loads. Install exposed fasteners in panel valleys as recommended by the manufacturer of the panels. Install fasteners in straight lines within a tolerance of 1/2-inch in the length of a bay. Drive exposed penetrating type fasteners normal to the surface and to a uniform depth to seat gasketed washers properly and drive so as not to damage factory applied coating. Exercise extreme care in drilling pilot holes for fastenings to keep drills perpendicular and centered. Do not drill through sealant tapes. After drilling, remove metal filings and burrs from holes prior to installing fasteners and washers. Torque used in applying fasteners shall not exceed that recommended by the manufacturer. Remove panels deformed or otherwise damaged by over-torqued fastenings and provide new panels.
- L. Closure, Closure Strips: Install closure strips as indicated and as recommended by the manufacturer.
- M. Apply bituminous coating or other permanent separation materials on concealed panel surfaces where panels would otherwise be in direct contact with wood or other substrate materials which are noncompatible (i.e. copper and aluminum) or could result in corrosion or deterioration of either material or finishes.

3.07 GUTTER AND DOWNSPOUT INSTALLATION

- A. General: Install sheet metal roof drainage items to produce complete roof drainage system according to SMACNA recommendations and as indicated. Coordinate installation of roof perimeter flashing with installation of roof drainage system.
- B. Hanging Gutters: Join sections with lapped joints sealed with elastomeric sealant. Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchored gutter straps spaced not more than 36 inches apart. Provide end closures and seal watertight with sealant.
 - 1. Attached gutter to fascia as detailed with expansion joints at locations as indicated and if not indicated then comply with SMACNA recommendations for spacing and location.

February 27, 2026

- C. Downspouts: Join sections with 1-1/2-inch telescoping joints. Provide fasteners and hangers designed to hold downspouts securely 1 inch away from walls; locate hangers at top and bottom.

- 1. Provide elbows at base of downspout to direct water away from building.

3.08 CLEAN UP AND PROTECTION

- A. Damaged Units: Replace panels and other components of the work which have been damaged or have deteriorated beyond successful repair by means of finish touch-up or similar minor repair procedures. Touch-up paint shall not be used without the permission of the Architect.
- B. Cleaning: Upon completion of panel installation, clean finished surfaces as recommended by panel manufacturer, and maintain in a clean condition during construction. Remove metal shavings, filings, nails, bolts, and wires from roofs and gutters on completion to prevent discoloration and harm to the panels and flashing. Remove grease and oil films, excess sealants, handling marks, contamination from steel wool, fittings and drilling debris and scrub the work clean. Exposed metal surfaces shall be free of dents, creases, waves, scratch marks, and solder or weld marks.

3.09 MANUFACTURER'S FIELD INSPECTION

Manufacturer's technical representative shall visit the site as necessary during the installation process to assure panels, flashings, and other components are being installed in a satisfactory manner. Manufacturer's technical representative shall perform a field inspection of the installation at Substantial Completion and prior to issuance of warranty. After each site visit, a report, signed by the manufacturer's technical representative, shall be submitted to the Architect noting the overall quality of work, deficiencies and any other concerns, and recommended corrective actions in detail. Notify the Architect a minimum of 2 working days prior to site visit by manufacturer's technical representative.

END OF SECTION

SECTION 07464 – ALUMINUM COMPOSITE PANELS

PART 1 - GENERAL

1.01 SUMMARY

- A. Work Includes: Aluminum faced composite column and beam cover panels with mounting system. Panel mounting system including anchorages, shims, furring, fasteners, adhesive tape, gaskets and sealants, related flashing adapters, and masking (as required) for a complete installation.
- B. Related Work Described Elsewhere:
 - 1. Section 05400 – COLD-FORMED METAL FRAMING
 - 2. Section 07600 – FLASHING AND SHEET METAL
 - 3. Section 07910 – EXTERIOR WALL JOINT SEALANTS

1.02 CODES AND STANDARDS

- A. The work of this section shall comply with the latest edition of the following standards. When conflicts arise between standards, the more stringent shall apply.
- B. AAMA – Architectural Aluminum Manufacturers Association
 - 1. AAMA 508: Voluntary Test Method and Specification for Pressure Equalized Rain Screen Wall Cladding Systems.
 - 2. AAMA 2605, Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
 - 3. RPC, Rain Penetration Control
- C. ASTM - American Society for Testing and Materials
 - 1. ASTM B 117, Method of Salt Spray (Fog) Testing
 - 2. ASTM B 209, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - 3. ASTM B221, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
 - 4. ASTM D 822, Practice for Operating Light and Water Exposure Apparatus (Carbon-Arc Type) for Testing Paint, Varnish, Lacquer, and Related Products.
 - 5. ASTM D 1308, Effect of Household Chemicals on Clear and Pigmented Organic Finishes.
 - 6. ASTM D 1781, Climbing Drum Peel Test for Adhesives
 - 7. ASTM D 1929, Standard Test for Ignition Properties of Plastics
 - 8. ASTM D 2244, Calculation of Color Differences from Instrumentally Measured Color Coordinates.

February 27, 2026

9. ASTM D 2247, Practice for Testing Water Resistance of Coatings in 100% Relative Humidity.
10. ASTM D 2794, Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
11. ASTM D 3359, Methods for Measuring Adhesion by Tape Test
12. ASTM D 3363, Standard Test Method for Film Hardness by Pencil Test
13. ASTM D 4214, Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films.
14. ASTM E 84, Surface Burning Characteristics of Building Materials
15. ASTM E 330, Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
16. ASTM E 331, Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

1.03 PERFORMANCE REQUIREMENTS

- A. General Performance: Aluminum Composite Panel System shall comply with performance requirements without failure due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Structural Performance: Aluminum Composite Panel System and its anchorage and related components shall be designed with adequate strength and stiffness to withstand the loads as determined by the 2018 IBC and ASCE 7 "Minimum Design Loads for Buildings and Other Structures", based on testing according to ASTM E 1592.
 1. Wind Design Criteria: As indicated on the Structural Drawings
 2. Deflection Limits: For wind loads, no greater than 1/180 of the perimeter span and L/60 center of panel
 3. Design corners for simultaneous positive (inward) design pressures on both surfaces, and simultaneous negative (outward) design pressure on both surfaces.
 4. Partial loading on one surface shall also be considered.
 5. A 1/3 increase in allowable working stress for wind or seismic loads is not acceptable
 6. In no case shall the wind load be less than 20 psf for positive and/or negative pressure.
- C. Thermal Movement: The work shall be designed to provide for such expansion and contraction of component materials, as will be caused by an exterior ambient temperature range of 120°F and metal surface temperature extreme of 180° F, without causing stresses on the plaster wall or joint seals, undue stress on structural elements, damaging loads on fasteners, reduction of performance, or other detrimental effects.

D. Water Penetration:

1. Water penetration or uncontrolled water leakage, in this specification, is defined as the appearance of uncontrolled water on the indoor face of any part of the work. "Controlled" water or condensation is defined as water which is demonstrably drained harmlessly to the exterior of the work without endangering or wetting adjacent surfaces or insulation, and not visible in the final construction.
2. Provision shall be made to drain to the exterior face of the work, any water entering at joints, and/or any condensation occurring within the work. The wall shall be designed to collect and remove all water that penetrates through the plaster surface and from the surrounding conditions.
3. Static Water Penetration: Aluminum Composite Panel System shall have no water penetration as defined by the test method when tested in accordance with ASTM E 331 at inward static pressure differential of 12.0 psf.
4. Dynamic Water Penetration: Aluminum Composite Panel System shall have been tested in accordance with AAMA 501 and shall have passed with no uncontrolled water leakage at 12.0 psf dynamic pressure differential, with water application rate of 5 gallons/hr/sqft.

1.04 QUALITY CONTROL

- A. Fabricator/Installer Qualifications: Engage a single firm with a minimum 5 years' experience of metal panel work similar in scope and size to this project, to assume undivided responsibility for installing all components of the Aluminum Composite Panel System including all related sheet metal flashings and all other components. The installer shall be approved or licensed by the panel manufacturer to install manufacturer's products and that is eligible to receive manufacturer's warranty. The actual work shall be supervised by personnel trained by the manufacturer in proper application of the product. The installer shall have capability for preparation of shop details and fabrication of all flashings not furnished by the panel manufacturer. Installer must execute 100% of Aluminum Composite Panel system installation with installer's own forces.
- B. Flashing and Sheet Metal Accessories shall comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.
- C. Take required steps and precautions to properly isolate and prevent of incompatibility between this system and adjacent work, in accordance with manufacturer's specifications, recommendations and instructions.
- D. Manufacturer Qualifications: Composite Panel Manufacturer shall have a minimum of 15 years' experience in the manufacturing of this product and shall be solely responsible for panel manufacture and application of the finish
- E. Source Limitations: Obtain components for composite panel system from a single manufacturer.
- F. Preinstallation Conference: Conduct conference at Project site
 1. Meet with Contracting Officer, Architect, metal composite material panel Installer, metal composite panel system manufacturer's representative,

structural support installer, and installers whose work interfaces with or affects metal composite material panels.

2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
3. Review methods and procedures related to metal composite material panel installation, including manufacturer's written instructions.
4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
5. Review flashings, special details, penetrations, openings, and condition of other construction that affect metal composite material panels.
6. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
7. Review temporary protection requirements for metal composite material panel assembly during and after installation.
8. Review procedures for repair of panels damaged after installation.
9. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.05 SUBMITTALS

A. Submit in accordance with Section 01330- SUBMITTAL PROCEDURES.

1. Product Data: Submit manufacturer's product specifications, standard details, installation instructions and general recommendations, as applicable to materials and finishes for each component and for total system of aluminum composite panels.
2. Shop Drawings: Submit shop drawings of all composite panels, flashing, fastenings, supports, anchors, and clearances, and connection details to the Contracting Officer for acceptance.
 - a. Plans shall clearly show all adjacent materials for proper coordination including but not limited to plans, elevations, sections, details and attachments to other work. Do not use or submit drawings prepared by Architect for shop drawings.
 - b. Calculations that are wet stamped by a duly licensed professional engineer. Calculations shall include all relative composite panel information. Calculations confirming project specific wind load and seismic conditions and associated attachment methods and materials, as required to comply with 1.03 of this section, shall also be noted on the shop drawings and/or submitted separately. Calculations submitted separately must be submitted at the same time as the shop drawings.
 - c. Associated sheet metal flashing systems shall be included in shop drawings and clearly detailed in coordination with adjacent exterior finish materials. Sheet metal items shall be clearly noted regarding gauge, profile, fastening and compliance with applicable anticipated project specific wind forces.

February 27, 2026

3. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.
 - a. Metal Composite Material Panels: For each panel type and finish submit 12-inches square panel samples in specified color and finish. Include fasteners, closures, and other metal composite material panel accessories.
 4. Test Reports: Provide test data from tests performed by a qualified testing agency demonstrating structural capacity and resistance to water infiltration performance as specified.
 5. Warranty: Submit warranty as noted under paragraph entitled "WARRANTY".
- B. Sustainable Design Submittal
1. LEED Credits MRc3 Building Product Disclosure and Optimization – Sourcing of Raw Materials, Option 2 – Recycled Content.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, metal composite material panels, and other manufactured items so as not to be damaged or deformed. Package metal composite material panels for protection during transportation and handling.
- B. Unload, store, and erect metal composite material panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack metal composite material panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal composite material panels to ensure dryness, with positive slope for drainage of water. Do not store metal composite material panels in contact with other materials that might cause staining, denting, or other surface damage.
- D. Retain strippable protective covering on metal composite material panels during installation.

1.07 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal composite material panels to be performed according to manufacturers' written instructions and warranty requirements.
- B. Field measurements should be taken prior to the completion of shop fabrication whenever possible. However, coordinate fabrication schedule with construction progress as directed by the Contractor to avoid delay of work. Field fabrication may be allowed to ensure proper fit. However, field fabrication shall be kept to an absolute minimum with the majority of the fabrication being done under controlled shop conditions

1.08 COORDINATION

- A. Coordinate metal composite material panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.09 WARRANTY

- A. Special Warranty: Manufacturers standard form, in which manufacturer agrees to repair or replace components of aluminum composite panel system that fail in materials or workmanship within specified warranty period.
 - 1. Failure shall include but are not limited to, the following:
 - a. Structural failures including rupturing, cracking, or puncturing.
 - b. Deterioration of metals and other materials beyond normal weathering
 - 2. Special Warranty shall include composite panels, flashings, accessories, fasteners, cover board and other components of composite panel system.
 - 3. Warranty Period: 5 years from date of Substantial Completion.
- B. Provide manufacturer's warranty for coating system under Hawaiian weather conditions, provide following as a guide for expected warranty:
 - 1. The aluminum composite panels and matching flashings with a factory applied Fluoropolymer paint finish are free from material defects and shall be warranted for 20 years from the date of Substantial Completion against peeling, chipping, cracking or color change in excess of 5 NBS units during the term of this warranty. In the event that the above paint system fails under normal wind and weathering conditions within the warranty period, the manufacturer/supplier shall replace or repair as necessary any panels whose factory color finish that fails. This paint finish warranty commences upon Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Metal Composite Material Wall Panel Systems: Provide factory-formed and -assembled, metal composite material wall panels fabricated from two metal facings that are bonded to a solid, extruded thermoplastic core; formed into profile for installation method indicated. Include attachment assembly components panel stiffeners, and accessories required for weathertight system.
- B. Basis of Design Product: The product indicated in this Section and on the drawings, is AL13™ Architectural Panels as manufactured by AL13 Architectural Systems, Inc.
 - 1. Subject to compliance with requirements and Architects approval comparable products from the following manufacturers may be substituted:
 - a. 3A Composites USA, Inc; Alucobond PE
 - b. Mitsubishi Plastics Composites America; Apolic/PE
 - c. NorthClad; ACM Series
 - d. PAC-CLAD Petersen; PAC-3000 CS
 - e. or approved equal.

2.02 MATERIALS

- A. Aluminum-Faced Composite Wall Panels: Formed with 0.020-inch thick, coil-coated aluminum sheet facings, AA3000 Series Alloy have the following properties:
1. Panel Thickness: 3-mm
 2. Panel Weight: 0.94 lbs/sq.ft.
 3. Core: Polyethylene (PE)
 4. Bond Integrity: When tested for bond integrity, in accordance with ASTM D 1781 (simulating resistance to panel delamination), there shall be no adhesive failure of the bond a) between the core and the skin nor b) cohesive failure of the core itself below the following values:
 - a. Peel Strength:
 - 1) 100 N·mm/mm (22.5 in lb/in) as manufactured
 - 2) 100 N·mm/mm (22.5 in lb/in) after 21 days soaking in water at 70°F (21°C).
 5. Coefficient of Thermal Expansion: ASTM D 696; 1.19×10^{-5} in/in/°F
 6. Tensile Strength: ASTM D 638, 6400 psi
 7. Flexural Strength: ASTM D 790, 14,510 psi
- B. Attachment Assembly Components: Formed from extruded aluminum conforming with ASTM B 221 and the recommendations of the manufacturer.

2.03 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Sub-framing and Furring: ASTM C 645, cold-formed, metallic-coated steel sheet ASTM A 653 G90 coating designation or ASTM A 792, Class AZ50 aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal composite material panel system.
- B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal composite material panels unless otherwise indicated.
1. Back Plates, Corner Frames and End Frames: AA 6063-T5 extruded aluminum with wall thickness of 0.050-inch to 0.060-inch.
 2. Panel Spacers: AA3105-H24 aluminum with thickness of 0.020-inch.
 3. Panel Joint Top Caps: AA6063-T5 extruded aluminum snap-lock top cap providing 0.5-inch by 0.325-inch reveal.
- C. Flashing and Trim: Provide flashing and trim formed from same material as metal composite material panels, 0.040-inch thick, as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, drips, corners, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal composite material panels.

February 27, 2026

- D. Foam Adhesive Tape: Acrylic foam adhesive tape for temporary adhesion of panels to framing prior to top cap installation.
 - 1. Acceptable Material: AL13™ Adhesive Tape as manufactured by Anenda Systems Inc.
- E. Panel Fasteners: Shall be Type 316, non-magnetic stainless steel, self-drilling, self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal composite material panels by means of factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.
- F. Attachment of System frame components to Concrete or Masonry Walls: 1/4 inch diameter threaded stainless steel concrete screw anchor. Minimum embedment into concrete or masonry of 1-1/4-inch. Ultimate withdrawal resistance shall be a minimum of 750 lbf. Installed every 24 inches on center.
 - 1. Acceptable Materials:
 - a. 1/4-inch stainless steel AL13® Hex-Head Anchor, with matched tolerance drill bit.
- G. Panel Sealants: ASTM C 920; elastomeric silicone sealant as specified in Section 07910 – EXTERIOR WALL JOINT SELANTS.
- H. Isolation Tape: Manufacturers standard material for separating dissimilar metals from direct contact.
- I. Gaskets: Santoprene or EPDM as recommended by manufacturer.

2.04 METAL FINISH

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Manufacturer's standard two-coat, thermo-cured system composed of specially formulated inhibitive primer and Fluoropolymer color topcoat. Color topcoats containing not less than 70% polyvinylidene fluoride resin by weight; comply with AAMA 2605.
 - 1. Resin Manufacturers: Subject to compliance with requirements, provide products containing resin by one of the following:
 - a. Duranar, PPG
 - b. Fluropon Classic, Valspar Corp.
 - c. Hylar 5000, Ausimont USA, Inc.
 - d. Kynar 5000, Elf Atochem North America, Inc
 - 2. Color: As scheduled.

2.05 PANEL FABRICATION

- A. General: Fabricate and finish metal composite material panels and accessories at the factory, by panel wall system manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements

February 27, 2026

demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. Panel Tolerances:

1. Panel Bow: Maximum 0.8% of panel overall dimension in width or length.
2. Panel Dimensions: Field fabrication shall be allowed where necessary but shall be kept to an absolute minimum. All fabrication shall be done under controlled shop conditions when possible.
3. Panel lines, breaks, and angles shall be sharp, true, and surfaces free from warp and buckle.
4. Maximum deviation from panel flatness shall be 1/8 -inch in 5-feet on panel in any direction for assembled units. (Non-accumulative - No Oil Canning).

C. Metal Protection: Where dissimilar metals will contact each other, protect against galvanic action by painting contact surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by manufacturers of dissimilar metals or by fabricator.

D. Sheet Metal Accessories: Custom fabricate flashings and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Obtain field measurements for accurate fit before shop fabrication.

1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
2. Fabricate nonmoving seams in accessories with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
3. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
4. Sealed Joints: Form non-expansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
5. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
 - a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" for application but not less than thickness of metal being secured.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal composite material panel supports, and other conditions affecting performance of the Work.
1. Examine soffit framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within

alignment tolerances required by metal composite material panel manufacturer.

2. Examine sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal composite material panel manufacturer.
 3. Verify that weather-resistive barriers have been installed over sheathing or backing substrate in accordance with Section 07250 – WEATHER BARRIERS, to prevent air infiltration or water penetration.
- B. Examine roughing-in for components and assemblies penetrating metal composite material panels to verify actual locations of penetrations relative to seam locations of metal composite material panels before installation.
 - C. Verify that shop drawings prepared by aluminum composite panel manufacturer have been approved and are available to installers; do not use drawings prepared by Architect or Owner for installation drawings.
 - D. Verify that the specifications and drawing details are workable and not in conflict with the composite panel manufacturer's recommendations and instructions; start of work constitutes acceptance of project conditions and requirements.
 - E. Perform work using competent and properly equipped personnel.
 - F. In event of discrepancy, notify General Contractor and the Contracting Officer in writing; do not proceed with installation until discrepancies have been resolved.

3.02 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal composite material panel manufacturer's written recommendations

3.03 INSTALLATION

- A. General: Install metal composite material panels according to manufacturer's written instructions in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to supports unless otherwise indicated. Anchor metal composite material panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 1. Shim or otherwise plumb substrates receiving metal composite material panels.
 2. Flash and seal metal composite material panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until weather-resistive barriers and flashings that will be concealed by metal composite material panels are installed.
 3. Install screw fasteners in predrilled holes.
 4. Locate and space fastenings in uniform vertical and horizontal alignment.
 5. Install flashing and trim as metal composite material panel work proceeds.
 6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.

7. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.
- B. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal composite material panel manufacturer.
- C. Attachment Assembly, General: Install attachment assembly required to support metal composite material wall panels and to provide a complete weathertight wall system, including subgirts, perimeter extrusions, panel frames, end frames, panel spacers, and panel joint top clips.
 1. Include attachment to supports, panel-to-panel joinery, panel-to-dissimilar-material joinery, and panel-system joint seals.
- D. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.
 1. Install components required for a complete metal composite material panel assembly including trims, corners, seam covers, flashings, sealants, gaskets, fillers, and similar items. Provide types indicated by metal composite material panel manufacturer; or, if not indicated, provide types recommended in writing by metal composite material panel manufacturer.
- E. Attachment system shall allow for free and noiseless vertical and horizontal thermal movement due to expansion and contraction for material temperature range of -20°F to +180°F. Buckling of panels, opening of joints, undue stress on fasteners, failure of sealants or any other detrimental effects due to thermal movement shall not be permitted.
- F. Do not install defective component parts, including warped, bowed, dented, abraided, and broken members.
- G. Do not cut, trim, weld, or braze component parts during erection in manner which would damage finish, decrease strength, or result in visual imperfection or failure in performance. Return component parts which require alteration to shop for fabrication, if possible, or for replacement with new parts
- H. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.
 1. Install exposed flashing and trim that is without buckling and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof performance.
 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints)

February 27, 2026

3.04 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align metal composite material panel units within installed tolerance of 1/4 inch in 20 feet, non-accumulative, on level, plumb, and location lines as indicated, and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.05 FIELD QUALITY CONTROL

- A. Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instruction.

3.06 CLEAN UP AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal composite material panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal composite material panel installation, clean finished surfaces as recommended by metal composite material panel manufacturer. Maintain in a clean condition during construction.
- B. After metal composite material panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.
- C. Replace metal composite material panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07541 –TPO MEMBRANE ROOFING

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:

1. Fully Adhered TPO membrane roofing system at low slope roofs unless otherwise indicated, including base flashing, roofing membrane, and all accessories needed for complete installation.
2. Roof substrate board.
3. All edge flashing where TPO membrane roofing is installed under coping or terminated with edge flashing as specified in Section 07600 – FLASHING AND SHEET METAL, shall be provided by the TPO membrane roofing manufacturer, installed by the roofing contractor performing the work specified herein and included in the TPO membrane roofing system warranty

B. Related Sections include the following:

1. Section 05310 – STEEL DECKING
2. Section 07600 – FLASHING AND SHEET METAL for sheet metal roof flashings, counter-flashings and pre-manufactured edge flashing systems.
3. Section 07910 – EXTERIOR WALL JOINT SEALANTS

1.02 PERFORMANCE REQUIREMENTS

- A. Except as otherwise indicated, Thermoplastic Roof Membrane system is required to establish and maintain a waterproof continuous seal on a permanent basis, with recognized limitations of wear and aging as indicated for each application. Failures of installed roofing materials to comply with this requirement will be recognized as failures of materials and workmanship.
- B. As roofing manufacturer's system installation requirements and tested assemblies vary, this specification is to provide and intent of the type of membrane and overall roofing system. The noted performance requirements shall be met by the installed system. The installer shall provide the manufacturer of their choice with all applicable project documents for review before the installer shall develop and submit final costs. Whether specifically noted by the project documents or not, the installer shall include all manufacturer requirements and recommendations (and including all project document related requirements when more stringent) in the final submitted costs.
- C. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience.
- D. Fire-Test-Response Characteristics: Provide membrane roofing materials with the fire-test-response characteristics indicated as determined by testing

identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.

1. Exterior Fire-Test Exposure: Class A; ASTM E 108, for application and roof slopes indicated.
 2. Fire-Resistance Ratings: ASTM E 119, for fire-resistance-rated roof assemblies of which roofing system is a part
- E. Roofing System Design: Provide a membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspection agency to resist uplift pressures as indicated below and with a safety factor of two applied.
1. Uplift Design: Uplift pressures to be calculated according to ANSI / SPRI's WD-1; "Wind Design Standard Practice for Roofing Assemblies" and conforming to those pressures and calculations contained in Chapter 30 of the ASCE/SEI 7-16 including Local Amendments.
 2. All requirements and / or enhancements to a given manufacturer's standard roofing system shall be incorporated into the installation in order to meet or exceed the manufacturer's requirements to obtain the specified wind speed warranty.
 3. Wind Design Criteria: As indicated on the Structural Drawings.
- F. FM Approvals Listing (Basis-of-Design, Project not Insured by FM): Provide membrane roofing, base flashings, and component materials that comply with requirements in FM Approval Standard 4450 and FM Approval Standard 4470 as part of a membrane roofing system, and that are listed in FM Approvals' "RoofNav" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals markings.
1. Fire / Windstorm Classification: Minimum Class 1A-135 or as required per Delegated Design calculations (whichever is more stringent).

1.03 SUBMITTALS

- A. Submit copy of statement, in an approved form, signed by the Roofing Subcontractor and Manufacturer, certifying that the products comply with these specifications.
- B. Product Data: Submit specifications, installation instructions and general recommendations from manufacturers of membrane roofing system materials, for types of roofing required. Include data substantiating that materials comply with requirements.
1. Installation Instructions: Complete instructions for handling, storage, priming, installation and protection of the Thermoplastic Membrane Roof System.
- C. Shop Drawings: For roofing system. Include plans, elevations, sections, project specific details, and attachments to other Work that have been reviewed and approved by the roof membrane manufacturer prior to submission to the Architect. Clearly show all adjacent materials for proper coordination.

February 27, 2026

Manufacturer's standard details are not sufficient and not acceptable for shop drawings submission. Drawings shall indicate the following:

1. Base flashings and membrane terminations.
 2. Roof substrate board and fastener patterns required to meet project wind uplift requirements.
 3. Details of edge conditions and all other project specific detail items shall be included.
 4. Associated sheet metal flashing systems shall be included in shop drawings and clearly detailed in coordination with adjacent exterior finish materials. Sheet metal items shall be clearly noted regarding gauge, profile, fastening and compliance with applicable anticipated project specific wind uplift forces.
- D. Calculations provided by the roof system manufacturer and conforming to ASCE-7 (ANSI/SPRI WD-1) and FM criteria, confirming project specific wind uplift conditions and associated attachment methods and materials, as required to comply with Performance Requirements of this section, shall also be noted on the shop drawings and / or submitted separately. Standard manufacturer "code" data sheets are NOT acceptable as the sole source of information in regards to these noted calculations.
- E. Samples
1. 12-inch square field membrane and base flashing.
 2. 6- inch square for substrate board.
- F. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.
- G. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
1. Submit evidence of meeting performance requirements.
 2. Statement that each product to be furnished is recommended for the application shown for this project.
- H. Qualification Data: For Installer and manufacturer.
- I. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of roofing system.
- J. Research/Evaluation Reports: For components of membrane roofing system including the following:
1. ICC-ES Evaluation Report
 2. FM RoofNav number Assembly
 3. ANSI/SPRI ES-1/RAS 111 Notice of Compliance.
- K. Maintenance Data: For roofing system to include in maintenance manuals.

- L. Warranties: Special warranties specified in this Section.
- M. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.
- N. 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 standards and meet the requirements for the General and Special Warranties of the Complete Roofing System for the specified project.

1.04 QUALITY ASSURANCE

- A. Coordinate as required and be totally responsible for the full and satisfactory compatibility and performance between all Thermoplastic Membrane Roofing materials used under this section with all other applicable and related sections which may be in direct contact with work of this section.
- B. A project specific QA / QC manual shall be submitted by the Installer before any work has begun. This manual shall be reviewed at the pre-installation meeting and copies shall be kept at roof level in the possession of the Installer's supervisory personnel. Approved shop drawings and all other pertinent submittal materials shall be kept at roof level in the possession of the Installer's supervisory personnel.
- C. Take required steps and precautions to properly isolate and prevent of incompatibility between this system and adjacent work, in accordance with manufacturer's specifications, recommendations and instructions.
- D. Installer Qualifications: Engage a single firm to assume undivided responsibility for installing all components of the Roofing System including all related sheet metal flashings and all other components. A qualified firm that (at time of bid) is approved, authorized or licensed by roofing system manufacturer to install manufacturer's products and that is eligible to receive and provide specified manufacturer's warranty. Installer shall provide evidence of at least five (5) similar and successful installations including contact names and numbers regarding those projects. Installer shall be properly licensed to provide the services noted by this section and the overall project. Installer shall have 10 years of documented experience (as the same entity / company) in regards to roofing services.
- E. Manufacturer Qualifications: A qualified manufacturer that has a minimum 20 years' experience in manufacturing the TPO membrane roofing system identical to that specified for this Project. Membrane manufacturers shall submit the following certification for review when making substitution requests or submittals.
- F. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.
- G. Source Limitations: Obtain components for membrane roofing system from roofing membrane manufacturer or materials and components certified by the roofing manufacturer as compatible with other system components.

H. Preinstallation Conference: Prior to installation of roofing and associated work conduct conference at Project site. Comply with requirements in Section 01310 – PROJECT MANAGEMENT AND COORDINATION. Review methods and procedures related to roofing system including, but not limited to, the following:

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing including installers of roof accessories and roof-mounted equipment.
 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
 5. Review structural loading limitations of roof deck during and after roofing.
 6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
 7. Review governing regulations and requirements for insurance and certificates if applicable.
 8. Review temporary protection requirements for roofing system during and after installation.
 9. Review roof observation and repair procedures after roofing installation.
- I. All TPO membrane roofing related sheet metal flashings specified in Section 07600 – FLASHING AND SHEET METAL shall be supplied by the roof system manufacturer as applicable and installed by the roofing contractor. Pre-manufactured coping and edge systems specified in Section 07600 – FLASHING AND SHEET METAL shall be included per the roofing manufacturer in the roofing systems warranty.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.
- B. Outside storage of insulation in manufacturing packaging is not acceptable. Roofing insulation, along with all other roofing materials, shall be properly protected including, but not limited to, the use of water-resistant tarps.
- C. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

February 27, 2026

- D. During installation, protect the roof deck and membranes with appropriate material such as plywood sheeting. Never scrape or puncture slip sheet or membranes. Keep roof surfaces free of soil, grit, or debris at all times with broom. Never set roof modules on top of soil, dirt or grit.
- E. Transport conveyors to be run parallel to the line of installation.
- F. Transport carts to have pneumatic tires, to be wheeled about only upon protective plywood sheeting, and to be loaded so as not to exceed weight capacity of roof deck.
- G. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.06 PROJECT CONDITIONS

- A. Do not apply roofing membrane during inclement weather.
- B. Do not apply roofing membrane to damp deck surface.
- C. The Applicator shall conduct fastener pullout tests in accordance with the latest version of the SPRI/ANSI Fastener Pullout Standard to verify condition of the deck/substrate and to confirm expected pullout values.
- D. All new and temporary construction, including equipment and accessories, shall be secured in such a manner as to preclude wind blow-off and subsequent roof or equipment damage.
- E. Arrange work sequence to avoid use of newly constructed roofing as a walking surface or for equipment movement and storage. Where such access is absolutely required, the Installer shall provide all necessary protection and barriers to segregate the work area and to prevent damage to adjacent areas. A substantial protection layer consisting of plywood over membrane or plywood over insulation board shall be provided for all new and existing roof areas that receive rooftop traffic during construction.
- F. Install only as much insulation and other roofing system materials that are vulnerable to sun and water damage, as can be made waterproof during the same day.

1.07 WARRANTY

- A. General Warranty: The Contractor shall submit a written guaranty on the roofing membrane system and sheet membrane flashing for a 2-year period after the date of Substantial Completion. The warranty shall provide the following at no cost to the Owner:
 - 1. Repair of roofing and flashings as necessary to seal leaks, which are attributable to faulty materials and/or workmanship.
 - 2. Repair or replacement of damage to the building and/or its finishes, equipment and/or furniture when occasioned by such leaks.
 - 3. Inspection of the roofing and flashings together with the Owner or their designated representative, on or about the 1st and 2nd anniversaries of the date of Substantial Completion and repair or replacement of roofing and/or flashing as necessary to correct any deficiencies in workmanship or

materials, such as by eliminating blisters exceeding 12 inches in any dimension or re-adhering open seams.

Such repair or replacement of roofing and/or flashings shall be done in a manner which will preserve the integrity of the roofing membrane.

B. Special Warranty: Submit a written warranty, without monetary limitation, signed by roofing system manufacturer agreeing to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.

1. Special warranty includes roofing membrane, base flashings, roofing membrane accessories, substrate board, fasteners, walkway products, fasteners, roof related sheet metal edge flashing and coping supplied by the roofing manufacturer.
2. Warranty Period: 20 years from date of Substantial Completion.
3. Wind Speed: Wind speed warranty shall be a minimum of 101 mph as determined by converting Project wind speed indicated in Article 1.02 of this Section to V_{asd} in accordance with paragraph 1609.3.1 of the 2018 IBC. Note: All manufacturer material and installation requirements to obtain wind speed warranty shall be included by the installer.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Roofing Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Holcim Elevate; Ultraply Platinum TPO Fully Adhered Roofing System.
2. Carlisle-Syntec; Sure-Weld Reinforced TPO 80-mil.
3. GAF; EverGuard TPO 80 Membrane
4. or Approved Equal.

2.02 ROOFING MEMBRANE

A. Fabric-Reinforced Thermoplastic Polyolefin Roofing Membrane: ASTM D 6878, fabric or scrim internally reinforced uniform, flexible sheet.

1. Thickness: 80 mils, nominal
2. Exposed Face Color: White
 - a. Finished roof membrane shall have a Solar Reflectance Index (SRI) of no less than 82 (Initial) and no less than 64 (3-year aged) when tested in accordance with ASTM E 903.

B. Non-reinforced Flashing Membrane: Manufacturer's standard non-reinforced thermoplastic polyolefin sheet flashing 60-mil-thick of same color as sheet membrane.

C. Cover Strip: ASTM D 6878; Reinforced 8-inch-wide thermoplastic polyolefin strip, 60-mil thick

2.03 AUXILLARY MATERIALS

- A. Membrane Bonding Adhesive: A solvent-based contact-type adhesive used to attach the membrane to the substrate. Consult Product Data Sheets for additional information and as recommended by the insulation manufacturer.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate and acceptable to membrane roofing system manufacturer.
- C. Seaming Material: Manufacturer's standard thermoplastic polyolefin 5-1/2-inch-wide minimum, 30 mil seaming tape.
- D. Lap Sealant: Manufacturer's standard single-component sealant, color to match roofing membrane.
- E. Cut Edge Sealant: Manufacturer's standard polymer-based sealant.
- F. Metal Termination Bars: Manufacturer's standard predrilled stainless-steel or aluminum bars, approximately 1 by 1/8-inch-thick; with anchors.
- G. Metal Battens: Manufacturer's standard aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide by 0.05 inch thick, prepunched.
- H. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.
- I. Thinner and Cleaner: As recommended by adhesive manufacturer, compatible with membrane.

2.04 ROOF SUBSTRATE BOARD

- A. Roof Substrate Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, Type X, 5/8 inch thick.
 - 1. DensDeck Fireguard as manufactured by Georgia-Pacific Corporation or pre-approved equal.
- B. Substrate Joint Tape: 6- or 8-inch wide, coated, glass-fiber joint tape.
- C. Fasteners and Plates: Provide manufacturers heavy duty pre-assembled fastener and insulation plate design specifically to be used to attach underlayment board to roof deck.
 - 1. Metal Plate: Fabricated from Galvalume sheet steel; ASTM A 792, Class AZ50 coating designation, Grade 40.
 - a. Diameter: 3-inches.
 - b. Thickness: 0.17inch – 0.23 inch.
- D. Fastener: SAE 1022 heat treated steel with epoxy coating of length to be able to penetrate metal roof deck at the length required to withstand uplift forces.

February 27, 2026

2.05 ACCESSORIES

- A. Sealants: As recommended by the membrane manufacturer and specified in Section 07910 – EXTERIOR WALL JOINT SEALANTS.
- B. Wood Roof Nailer: As specified in Section 06100 – ROUGH CARPENTRY

2.06 FLASHINGS

- A. Flexible Flashing: Same material as membrane.
- B. Sheet Metal Flashing: Roof related sheet metal flashing as specified in Section 07600 - FLASHING AND SHEET METAL.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
 - 1. Verify that roof openings and penetrations are in place and set and braced.
 - 2. Verify that metal “nailers” are securely anchored to roof deck at terminations as specified in Section 07600 – FLASHING AND SHEET METAL.
 - 3. Contractor shall engage a qualified independent testing and inspecting agency or the manufacturer's technical personnel to perform fastener pullout tests in accordance with the latest version of the SPRI/ANSI FX-1 “Standard Field Test Procedure for Determining the Withdrawal Resistance of Roofing Fasteners” to verify condition of the deck/substrate and to confirm required pullout values. Perform pullout test in various areas of the roof to include corner, perimeters, field and drain areas.
 - a. Number of pullout tests required: Minimum of 5
 - 1) 50 percent of the tests shall be performed in the corner and perimeter areas
 - b. Immediately inform the Architect if any of the pull-out tests reveal that the deck does not meet the minimum required pull values.
 - 4. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Mask off adjoining surfaces not receiving roofing membrane material to prevent spillage or over spray affecting other construction.

- C. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- D. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.03 ROOF SUBSTRATE BOARD INSTALLATION

- A. Coordinate installing membrane roofing system components, so substrate board is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with membrane roofing system manufacturer's written instructions for installing roof substrate board.
- C. Install roof substrate boards with long joints in continuous straight lines perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.
- D. Fasten substrate board to metal roof deck to resist uplift pressure at corners, perimeter, and field of roof according to the approved Wind Uplift Analysis and membrane roofing system manufacturers' written instructions.

3.04 ADHERED ROOFING MEMBRANE INSTALLATION

- A. Install roofing membrane over area to receive roofing according to membrane roofing system manufacturer's written instructions.
- B. Unroll roofing membrane, without stretching, over the acceptable substrate and allow to relax for a minimum of 30 minutes prior to adhesion.
- C. Accurately align roofing membrane and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- D. Apply roofing membrane with side laps shingled with slope of roof deck where possible.
- E. Extend membrane up a minimum of 8 inches onto vertical surfaces.
- F. Bonding Adhesive: Apply bonding adhesive to substrate and underside of roofing membrane at rate required by manufacturer and allow to partially dry before installing roofing membrane. Do not apply bonding adhesive to splice area of roofing membrane. Roofing membrane shall be fully bonded to cover board. The use of low-rise or similar adhesives, and ribbon adhesive installation methods are not acceptable.
- G. Mechanically or adhesively fasten roofing membrane securely at terminations, penetrations, and perimeter of roofing.
- H. Adhesive Seam Installation: Clean both faces of splice areas, apply splicing cement, and firmly roll side and end laps of overlapping roofing membranes according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of roofing membrane terminations.

February 27, 2026

- I. Strip in the seams for added protection in accordance to the manufacturer's instructions.
- J. Seal membrane around roof penetrations.

3.05 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
- B. Apply solvent-based bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with sheet flashing.
- D. Clean seam areas and overlap and firmly roll sheet flashings into the adhesive. Weld side and end laps to ensure a watertight seam installation.

3.06 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified independent testing and inspecting agency to perform roof tests and inspections and to prepare test reports.
- B. The Contractor shall perform the work to patch a maximum of 5 "membrane" samples that may be taken by the testing / observation firm at any given roof area.
- C. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion of all areas and submit report to Architect. The Architect or Owner shall be notified of this inspection two weeks in advance.
- D. Provide periodic site observation by roofing, adhesive and insulation materials manufacturer's representatives at the commencement, midpoint and at completion of each stage of the roofing system work or at more frequent intervals if so required by the manufacturer's extended warranty require by this section
- E. Repair or remove and replace components of membrane roofing system where test results or inspections indicate that they do not comply with specified requirements.
- F. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- G. Water Testing: All roof areas shall be water tested. Water testing shall consist of "sprinklers" or "soaker hoses" and does not imply flood testing. Water shall be allowed to run across all roof areas to drainage units for at least 2 hours at all areas. The Architect shall be notified 72 hours in advance of such testing. The Installer shall be responsible for interior observations of on-going testing to identify any water intrusion and to stop testing to minimize any interior damage.

February 27, 2026

1. At time of water testing, if lack of positive drainage is noted, the Architect and Owner reserve the right to not accept the roofing membrane installation until such time that drainage issues are resolved.

3.07 PROTECTING AND CLEANING

- A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates, and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements. The Architect and Owner reserves the right to accept "patches" at damaged or repair areas and / or require the installation of fully width "sheets" of new membrane.
- C. Final cleaning shall be provided by the Roofing Subcontractor. The Architect and Owner reserve the right to not fully accept the roofing membrane system if the membrane is "dirty" and has not been cleaned.

END OF SECTION

SECTION 07600 - FLASHING AND SHEET METAL

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide all labor, materials and equipment necessary to install flashing, counterflashing, scupper, leader boxes, gutters, downspouts, steep-slope and low-slope flashing, wall flashing and other related work as shown on drawings and as specified herein.
- B. All edge flashing and coping (where TPO membrane roofing is terminated with edge flashing) shall be provided by the TPO membrane roofing manufacturer, installed by the roofing contractor performing the work specified in Section 07541 – TPO MEMBRANE ROOFING and included in the Modified Bitumen membrane roofing system warranty.

1.02 PERFORMANCE REQUIREMENTS

- A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking, and fastener disengagement.
- B. Wind Uplift Design: Provide metal roof flashing and counterflashing that resists the uplift pressures as determined in Section 07541 – TPO MEMBRANE ROOFING complies with the following:
 - 1. Metal edge flashings of low-slope roofs shall comply with the requirements set forth in the current edition of ANSI/SPRI ES-1.
 - 2. Standards set forth in the current edition of SMACNA's "Architectural Sheet Metal Manual"
- C. Thermal Movements: Provide sheet metal flashing and trim that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of sheet metal and trim thermal movements. 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.
- D. Water Infiltration: Provide sheet metal flashing and trim that do not allow water infiltration to building interior.

1.03 SUBMITTALS

- A. General: Submit under provisions of Section 01330 – SUBMITTAL PROCEDURES.

February 27, 2026

- B. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes
- C. Shop Drawings: Submit shop drawings to the Architect for approval, showing layouts of sheet metal flashing and trim, including plans, elevations and details. Distinguish between shop and field assembly works. No fabrication will be permitted before approval is secured. Include the following:
 - 1. Identify material, thickness, weight, and finish for each item and location in Project.
 - 2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
 - 3. Details for fastening, joining, supporting, and anchoring sheet metal flashing and trim, including fasteners, clips, cleats, and attachments to adjoining work.
 - 4. Details of expansion-joint covers, including showing direction of expansion and contraction.

1.04 QUALITY ASSURANCE

- A. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" and the NRCA's Roofing and Waterproofing Manual in coordination with requirements of roofing and waterproofing systems (the more stringent shall apply). Conform to dimensions and profiles shown unless more stringent requirements are indicated.
- B. ANSI/SPRI ES-1 Use the current edition of ANSI/SPRI ES-1 Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems. All configurations, gauges, attachments and other items shall meet or exceed testing and design criteria related to ES-1.
- C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section.
 - 1. Meet with Architect, Engineer, Owner's insurer if applicable, Installer, and installers whose work interfaces with or affects sheet metal flashing and trim including installers of roofing materials and roof-mounted equipment.
 - 2. Review methods and procedures related to sheet metal flashing and trim.
 - 3. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
 - 4. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.05 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.

February 27, 2026

- 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 weathertight 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.

1.06 COORDINATION

- A. Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.
- B. Fabricate flashings from materials noted below as most appropriate in regards to the system that the flashing is being integrated with and / or adjacent to and in coordination with the drawings and finish schedules. Concealed flashings may be mill finish.

1.07 WARRANTY

- A. The Contractor shall execute to the Owner a 5-year written warranty beginning for the date of Substantial Completion, that the installation will be watertight and that any leaks which develop during that period which are not due to improper use or willful damage will be repaired at no cost to the Owner.
 - 1. Flashing for roofing to be performed by roofing contractor and be included in roofing warranty.
 - 2. Edge flashing and coping system shall be warranted to perform over the term of the specified roofing system warranty in Section 07541 – TPO MEMBRANE ROOFING and shall be warranted to not blow off or cause membrane failure, even in wind conditions up to 105 mph or the manufacturer shall replace or repair their materials.
- B. Special Warranty on Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Exposed Sheet Metal Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from the date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Asbestos Prohibition: No asbestos containing materials or equipment shall be used in this section. The Contractor shall ensure that all materials and equipment incorporated in the project are asbestos-free.
- B. Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required.
- C. Metallic-Coated Steel Sheet: "Zincalume" or "Galvalume" coated steel conforming to ASTM A 792/A 792 M, Grade 40 with a minimum AZ55 coating.
- D. Fasteners: Same material as flashing/sheet metal, or other noncorrosive metal as recommended by sheet manufacturer. Match finish of exposed heads with material being fastened.
 - 1. For attachment to wood substrates and blocking, provide 18-8/Type 304 stainless steel nails not less than 1-1/4-inch long, barbed with large head.
 - 2. For attachment to concrete or masonry provide 1/4-inch by 2-inches long, 18-8/Type 304 stainless steel drive pins with neoprene bonded stainless steel washers
- E. Lead Sheet for Vent Pipe Flashing: ASTM B 749, Grade B, copper bearing sheet lead, minimum 2-1/2 pounds per square foot, unless indicated otherwise.
- F. Isolation Membrane: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, non-perforated. To be used to isolate flashing metal from dissimilar metals or corrosive substrates.
- G. Sealants and Sealant Tape: Comply with the requirements of Section 07910 – EXTERIOR WALL JOINT SEALANTS.
 - 1. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
 - 2. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.
 - 3. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant, polyisobutylene plasticized, heavy bodied for hooked-type expansion joints with limited movement.
- H. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
- I. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.02 FABRICATION

- A. General: Fabricate sheet metal copings and low-slope roof edge systems to comply with ANSI/SPRI ES-1 and all other flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Shop fabricate items where practicable. Obtain field measurements for accurate fit before shop fabrication.
- B. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
- C. Fabricate sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
 - 1. Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.
- D. Reglets: Units of type, material, and profile indicated, formed to provide secure interlocking of separate reglet and counter-flashing pieces, and compatible with flashing indicated with factory-mitered and -welded corners and junctions and interlocking counter-flashing on exterior face, of same metal as reglet.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Fry Reglet Corporation.
 - b. Heckmann Building Products Inc.
 - c. Hickman, W. P. Company
 - 2. Material: 0.024-inch aluminum sheet.
 - 3. Siding Type: Provide with upturned fastening flange and extension leg of length to match thickness of applied finish materials.
 - 4. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
 - 5. Finished to match flashings.
- E. Sealed Joints: Form non-expansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA recommendations.
- F. Expansion Provisions: Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.
- G. Conceal fasteners and expansion provisions where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated.
- H. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
 - 1. Thickness: As required by ANSI/SPRI ES-1 for copings and low-slope roof edge systems and for all other flashing and trims as recommended by

February 27, 2026

SMACNA's "Architectural Sheet Metal Manual" for application but not less than thickness of metal being secured.

2.03 LOW SLOPE ROOF; PRE-MANUFACTURED EDGE FLASHING AND COPING SYSTEMS

- A. Roof-Edge Flashing: Metal roof edge fascia and metal extender metal with offset both with continuous coated steel cleat. The system shall be watertight, maintenance free, not requiring exposed fasteners. Joints shall be a butt type with concealed splice plates. Holcim Elevate; Elevate Drip Edge (Basis-of-Design).
1. Fabricate fascia cover and extender metal from 0.050-inch aluminum in standard 12-foot long sections. Vertical face length as detailed.
 2. Concealed Splice Plates: Fabricate concealed splice plates in 12-inch widths of same thickness as fascia.
 3. Cleat: Shall be continuous 24-gauge, pre-punched, Kynar coated steel cleat in standard lengths of 12-feet. Mechanically fastened as indicated and detailed.
 4. Fasteners: #10 x 2", Type 316 stainless steel hex head fasteners.
 5. Acceptable Manufacturers offering equivalent system for their respective roof systems:
 - a. Carlisle-Syntec
 - b. GAF
 - c. Or approved equal.

2.04 STEEP SLOPE ROOF FLASHING

- A. Steep Slope Roof Flashing shall be as specified Section 07410 – STANDING SEAM METAL ROOFING.

2.05 WALL FLASHING

- A. Openings Flashing in Frame Construction: Fabricate head, sill and similar flashings to extend a minimum of 4 inches beyond wall openings. Form sill flashing with 2-inch-high end dams.
1. At Windows and Doors:
 - a. Aluminum Windows: Fabricate from 0.062-inch aluminum sheet.

2.06 FINISHES

- A. Finishes: Three-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
1. Humidity Resistance: 2000 hours.
 2. Salt-Spray Resistance: 2000 hours.

February 27, 2026

3. Color:
 - a. Downspouts, scuppers, collection boxes, coping, drip edges and roof flashing
 - 1) As selected by Architect.
 - b. Wall opening flashings at windows and doors
 - 1) Custom color to match door and window frame color.
 - c. Wall drip cap flashing
 - 1) Custom color to match wall cladding or trim color.

PART 3 - EXECUTION

3.01 INSTALLATION AND WORKMANSHIP

- A. 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. Report any unsatisfactory surfaces to the Architect. In the absence of such a report, the Contractor shall be held responsible for the finished product.
- B. 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. Nails, screws, rivets, and bolts shall be of the type best suited for the purpose intended and shall be of a composition that is compatible with the metal to which it will contact.
- C. 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 Architect.
 1. Torch cutting of sheet metal flashing and trim is not permitted.
- D. All sheet metal work shall be watertight and wind-tight in compliance with the purpose intended for the items indicated on the drawings or specified herein.
- E. Install sheet metal flashing and trim true to line and levels indicated without excessive oil canning, buckling and tool marks. Provide uniform, neat seams with minimum exposure of solder, welds, and elastomeric sealant.
- F. Cleating: Cleats for sheet metal work shall be provided continuous, unless otherwise indicated on the drawings. Cleats shall be of the same material and weight as the metal being installed.
- G. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently watertight, form

- expansion joints of intermeshing hooked flanges, not less than 1-inch deep, filled with elastomeric sealant concealed within joints.
- H. Fasteners: Use fasteners of types and sizes indicated that will penetrate substrate not less than 1-1/4 inches.
 - I. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F, set joint members for 50 percent movement either way. Adjust setting proportionately for installation at higher ambient temperatures.
 - 1. Prepare joints and apply sealants to comply with requirements in Section 07910 – EXTERIOR WALL JOINT SEALANTS.
 - J. Reglets: Type and size as indicated.
 - K. 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 moisture-proof building felts.

3.02 INSTALLATION OF STEEP SLOPE ROOF FLASHING

- A. Steep Slope Roof Flashing: As specified in Section 07410 – STANDING SEAM METAL ROOFING

3.03 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
- B. Edge Flashing at Low Slope Applications: Anchor to resist uplift and outward forces and comply with the requirements set forth by ANSI/SPRI ES-1
- C. Pipe Flashings: Form flashing around pipe penetrations and asphalt shingles. Fasten and seal to asphalt shingles as recommended by manufacturer.

3.04 WALL FLASHING INSTALLATION

- A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Opening Flashings in Frame Construction: Install continuous head, sill, and similar flashings to extend 4 inches beyond wall openings.
 - 1. Form end dams in sill flashing at each where flashing meets jamb. Turn metal up jamb a minimum of 2-inches.

February 27, 2026

3.05 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder and sealants.
- C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.
- D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.
- E. Protect all sheet metal work until final acceptance of the building.
- F. 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 07910 – EXTERIOR WALL JOINT SEALANTS

PART 1 - GENERAL

1.01 SUMMARY

- A. This section includes joint preparation, joint packing, priming, caulking and sealing indicated by the Contract Documents and furnish all supplementary items necessary to completely seal the joints in the facade such as those joints in the exterior finish systems, skylights, aluminum storefront, windows and doors using approved sealant technique, with weeps or vents as required. Furnishing and installing sealants and backer rods for visual mockup specimens are also included as part of this work.
- B. Related Work:
 - 1. Section 07241 – DIRECT-APPLIED EXTERIOR FINISH SYSTEM
 - 2. Section 07600 – FLASHING AND SHEET METAL
 - 3. Section 07920 – SEALANTS for sealants used elsewhere on the project.
 - 4. Section 08520 – GLAZED ALUMINUM SYSTEMS
 - 5. Section 08800 - GLAZING.

1.02 REFERENCES

- A. The work of this section shall comply with the latest edition of the following standards. When conflicts arise between standards, the more stringent applies.
 - 1. AAMA – Architectural Aluminum Manufacturers Association
 - a. AAMA 800, Test Methods for Sealants
 - 2. American Society for Testing and Materials.
 - a. ASTM C509, Specification for Elastomeric Cellular Preformed Gasket and Sealing Material
 - b. ASTM C718, Test Method for Ultraviolet (UV) Cold Box Exposure of One-Part Elastomeric, Solvent-Release Type Sealants
 - c. ASTM C719, Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle)
 - d. ASTM C793, Test Method for Effects of Accelerated Weathering on Elastomeric Joint Sealants
 - e. ASTM D2203, Test Method for Staining from Sealants
 - 3. Federal Specification TT-S - 00230C and TT-S-001543A.
 - 4. The 2018 International Building Code with Kauai County Amendments.

1.03 QUALITY ASSURANCE

- A. The character of these requirements is intended to provide a performance type specification for the design selection and installation of the exterior wall sealants.

The exterior sealant sub-contractor is responsible for the design selection and installation of the sealants, as well as the performance of the sealant system.

- B. Except as otherwise indicated, joint sealants are required to establish and maintain airtight and waterproof continuous seals on a permanent basis, with recognized limitations of wear and aging as indicated for each application. Failures of installed sealants to comply with these requirements will be recognized as failures of materials and workmanship.
- C. To the greatest extent possible, engage a single firm to assume undivided responsibility for sealing all components of the exterior facade. This firm must demonstrate not less than 10 years successful experience in installation of work similar to the work of this Project. Credentials and data must be submitted to Architect for review and approval.
 - 1. If a single firm cannot be engaged to assume undivided responsibility for sealing all components of the exterior façade, coordinate between the different contractors and their work to provide sealant from the same manufacturer and of the same type to assure continuity and compatibility for sealed joints throughout the entire exterior façade.
- D. The manufacturer of sealants used for exterior sealants shall provide additional on-site testing by authorized personnel, in addition to the sealant tests specified in herein, to assure that materials are suitable for the application, have not suffered detrimental loss of shelf life, and will be fully covered by the warranty in event of failure or staining of the sealed components including stone.
 - 1. Method(s) of testing is at manufacturer's option.
 - 2. Provide testing as follows to demonstrate curing properties:
 - a. Between 24 and 72 hours prior to initial application.
 - b. Prior to use of each new shipment of materials.
 - c. Not less than twice a month for existing stored materials.
 - 3. Manufacturer and contractor shall submit log of testing, on company letterhead for each test performed indicating, but not limited to the following:
 - a. Date.
 - b. Project identification.
 - c. Sealant identification including name, type and batch number.
 - d. Test performance, i.e., acceptable, marginal, not acceptable.
 - e. Storage conditions.
 - f. Signature of person conducting test.
- E. If tests that indicate sealant material are marginal or not acceptable, it shall not be used. Tester to immediately notify Architect and Contractor. The contractor shall immediately remove materials from site.
- F. Manufacturer of sealants for exterior building enclosure shall provide instruction to the exterior sealant subcontractor foreman and mechanics, and Contractor on proper installation techniques required to achieve maximum life and weather

February 27, 2026

- tightness from the sealant installation. Special emphasis shall be directed to practices required to avoid staining or other changes in appearance of sealed components such as stone in the completed work.
- G. Materials and workmanship are subject to review by the Architect at all times. Such review inspections do not relieve the facade sealants subcontractor from obligations to provide a watertight and weather tight seal at all facade systems, surfaces, and related materials.

1.04 SUBMITTALS

- A. Submit under the provisions of Section 01330 – SUBMITTAL PROCEDURES.
- B. Submit the following information from the manufacturer:
1. Certification in the form of standard data sheet or letter that each type of compound and sealant to be furnished complies with these specifications.
 2. Statement that each product to be furnished is recommended for the application shown for this project.
 3. Complete instructions for handling, storage, mixing, priming, installation, curing and protection of each type of sealant.
 4. Certification in writing that sealant will not cause staining nor change appearance of adjacent substrate materials.
- C. Submit 5 samples of specified products, 12 in. long and installed between samples of the materials to be sealed for the Project. Architect's acceptance will be for color only. Compliance with other requirements is the sealant Contractor's responsibility.
- D. Submit copy of statement, in an approved form, signed by the Contractor and manufacturer, certifying that the products comply with these specifications and were the proper selections for the applications made, and that the installation methods complied with the manufacturer's printed instructions and their field representatives' verbal instructions and were proper and adequate for the condition of installation and use.
- E. For each type aluminum window and exterior substrate used provide test reports per ASTM E 575 on materials and methods proposed for this project which will demonstrate successful behavior of sealant systems under limiting design stresses with respect to adhesion, compatibility, migration, stability, cohesion, staining, recovering and any other deleterious effects. Provide a procedure detailing the cleaning, priming, taping, tooling and other steps recommended to ensure satisfactory function and appearance.
1. Submit, for record only, sealant manufacturer's test reports for weather seal silicone adhesion to all relevant substrates. Tests must include seven day water immersion after which silicone must have excellent adhesion to substrates. Report adhesion strength in terms of shear stress and tensile stress. Test samples shall approximate sealant joint sizes and configurations intended for production materials.
 2. Submit documentation of product performance as required per ASTM C 920. Also, perform the same testing but substitute actual job substrate materials in lieu of standard test materials, e.g. in ASTM C 510, use job

stone samples in lieu of white cement mortar. Long-term behavior, under compression shall be tested.

3. Submit, for record only, sealant manufacturer's test report for staining of all relevant substrates. Tests on granite material must include the use of "project" silicone sealant and tests must be performed both wet and dry. Granite must not experience "waterproofing" of the granite surface beyond the sealant joint. Test samples shall approximate sealant joint sizes and configurations intended for production materials.
- F. Provide a procedure detailing the cleaning, priming, taping, tooling and other steps recommended to ensure satisfactory function and appearance.
- G. Submit copy of pigtail type field adhesion tests results.

1.05 JOB CONDITIONS

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

1.06 INSPECTIONS

- A. Coordinate as required and be totally responsible for the full and satisfactory compatibility and performance between all sealants used under this Section with all other applicable and related Sections using sealants which may be in direct contact with work of this Section or adjacent to other work.
- B. Take required steps and precautions to properly isolate and prevent incompatibility between said sealants in accordance with manufacturer's specifications, recommendations and instructions.
- C. Periodically test sealants in place in addition to the manufacturer's field testing, for adhesion, using methods recommended by sealant manufacturer. Promptly replace sealant, which does not adhere or fails to cure.
- D. Contractor shall arrange to meet the sealant manufacturer at the jobsite and witness initial installation of sealant on the project wall with the Contractor and Architect.

1.07 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.

February 27, 2026

- B. Storage: Carefully handle and store all materials to prevent inclusion of foreign materials. Remove from project site all damaged and deteriorated materials and materials exceeding shelf life.
- C. All sealant materials shall be installed prior to expiration of shelf life. Remove all sealant materials that have exceeded their maximum shelf-life from the jobsite.

1.08 SEALANT TESTING

- A. Provide to sealant manufacturer samples of all relevant substrates, including but not limited to finished aluminum, wood, concrete, stainless steel, vision glass, gaskets, spacers, setting blocks and backers as well as any other material which will contact the sealant either during installation or normal wall movements.
 - 1. For each type of substrate provide test reports per ASTM E575.
 - 2. Submit documentation of product performance as required per ASTM C920. Also, perform the same testing but substitute actual job substrate materials in lieu of standard test materials, e.g. in ASTM C510, use job stone samples in lieu of white cement mortar. Long-term behavior, under compression shall be tested.
- B. Tests on substrate materials must include the use of the same sealants on the project, including the project color.
- C. Test samples shall approximate sealant joint sizes and configurations intended for production materials.
- D. Sealant manufacturer shall perform the following tests on weather seal sealant against all substrates to verify:
 - 1. ASTM C794 – Adhesion
 - a. Test must include 7-day water immersion after which silicone must have excellent adhesion to substrates.
 - b. Report adhesion strength in terms of shear stress and tensile stress.
 - 2. ASTM C1087 – Compatibility
 - 3. ASTM C1248 – Staining or migration on porous substrates
 - a. Tests must be performed both wet and dry. Substrate must not experience waterproofing of the substrate surface beyond the sealant joint.

1.09 WARRANTY

- A. Special Warranty:
 - 1. Submit a written warranty agreeing to repair or replace sealant compounds which have failed to provide airtight and watertight joints for any reason, or which appear to have failed in adhesion, cohesion, abrasion-resistance, migration-resistance, stain-resistance, general durability or any other form of apparent deterioration (excluding inherent qualities and limitations clearly specified in the manufacturer's data which was submitted).

February 27, 2026

2. The warranty to be provided shall be for full replacement for a period of 5 years from the date of Substantial Completion for the building.
3. A warranty that is to be provided by the sealant manufacturer shall consist of a 20-year labor and material warranty matching that provided by Dow Corning Corporation or GE Silicones. Warranty shall be signed by both the Exterior Wall Contractor and the Sealant Manufacturer.
 - a. Warranty period to commence on date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Asbestos Prohibition: No asbestos containing materials or equipment shall be used in this section. The Contractor shall ensure that all materials and equipment incorporated in the project are asbestos-free.
- B. Foam Backer Rods:
 1. Preformed joint filler, non-staining. Diameter approximately 25 percent larger than joint width, unless otherwise directed by manufacturer.
 2. Bi-cellular Structure with Surface Skin: ASTM C 1330, Type B, non-gassing, extruded polyolefin; acceptable to joint sealant manufacturer.
 - a. Available Manufacturers and Products:
 - 1) Nomaco Inc.; SOF-Rod (Dual-Rod) Backer Rod
 - 2) BASF; Sonneborn, Sonolastic Soft Backer Rod: Degussa
 - 3) Industrial Thermo Polymers LTD.; Soft-Type Insulating Backer Rod
 - 4) Or approved equal.
 3. Closed Cell Structure: ASTM C 1330, Type C, non-gassing, extruded polyethylene; acceptable to joint sealant manufacturer.
 - a. Available Manufacturers and Products:
 - 1) Backer Rod Manufacturing, Inc.; Mile High Foam Backer Rod.
 - 2) BASF; Sonneborn, Closed-Cell Backer Rod.
 - 3) Industrial Thermo Polymers LTD.; ITP Std. Insulating Backer Rod.
 - 4) Nomaco Inc.; Green Rod or HBR Backer Rod
 - 5) Or approved equal.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer in writing to the Architect.
- D. Masking Tape: Non-staining, nonabsorbent type compatible with joint sealants and to surfaces adjacent to joints.
- E. Primer as recommended by manufacturer of sealant in writing to the Architect, having been tested for staining and durability on samples of actual surfaces to be

sealed. In the case of structural silicone use with fluoropolymer coatings, primer must be used

F. Sealants:

1. At Exterior Vertical And Overhead Moving Joints, including interior and exterior perimeter seals around windows and louvers, (**JS-01**): Medium Modulus Silicone Sealant, one-part, non acidic, neutral curing, Type S, Grade NS, Class 50, Use NT, capable of withstanding movements from plus 50% to minus 50% based on original joint design. All sealants that are used must be SWRI certified and comply with ASTM C920. Provide one of the following:
 - a. GE Silpruf SC 2000
 - b. Dow Corning 795
2. Low Modulus Silicone Sealant (**JS-02**): One-part, non-acidic, neutral curing, Type S, Grade NS, Class 50, Use NT, capable of withstanding movements from plus 100% to minus 50% based on original joint design. All sealants that are used must be SWRI certified and comply with ASTM C920.
 - a. **Only low modulus sealants such as Dow 790, GE Silpruf LM, Pecora Corp. 890 or approved equal shall be used when sealing to and within the DEFS systems
3. Air and Water Resistive Barrier Sealant (**JS-03**): Low modulus, non-sag, one-component silyl-terminated polyether joint sealant in conformance with ASTM C920: Type S, Grade NS, Use NT, A, M, Class 100/50 and tested in accordance with ASTM C1382. Provide the following:
 - a. StoSeal STPE Sealant
 - b. Or Approved equal.

G. Accessories:

1. Cleaners for Non-Porous Surfaces: Chemical cleaners recommended by sealant manufacturer in writing, free of harming residues, non-staining, and formulated to promote optimum adhesion.
2. MEK, Toluene or Xylene are not acceptable except in cases of extreme cleaning conditions.

2.02 SOURCE QUALITY CONTROL

- A. Fabricator Testing: Fabricator shall, through its own laboratory testing, perform source quality control testing to establish compliance with specified requirements.
- B. Structural sealant testing during fabrication of unitized panels (Location: Manufacturer's or Exterior Wall Contractor's assembly and glazing facility)
 1. Methods:
 - a. Product Mix Check: Butterfly Test.
 - b. Work Life Check: Snap Time Test.
 - c. Adhesion

February 27, 2026

- d. Ratio Check (By Weight)
- e. Finished Unit De-Glazing
 - 1) 1 out of the first 10 finished units
 - 2) 1 out of the first 40 finished units
 - 3) 1 of the next 50 finished units
 - 4) 1 of each subsequent 100 units (until project completion) once 10 successive, successful de-glazing tests are experienced.
- f. Execute a full negative design pressure test of one full size unit randomly selected from the production line at the minimum rate of 1 every 50 units.
 - 1) The test units might be used on the project at the conclusion of successful test results.
- 2. A failure of any tested unit will require the testing of the 2 units manufactured immediately before and after the failed unit. Depending on the success or failure of subsequent tests, and the determination of cause of initial failure, additional tests may be required.
- 3. All samples must demonstrate the ability to surpass a tensile load per linear centimeter equivalent to three times the design pressure.
- 4. Testing shall be witnessed and results recorded by a Professional Engineer or an independent testing laboratory.
- 5. Additional tests as required by Sealant Manufacturer.
- C. Reports: Maintain log indicating tests conducted, sealant lot numbers, dates, times, results.

PART 3 - EXECUTION

3.01 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.

3.02 EXAMINATION

- A. Prior to installation of sealant, and at the Contractor's direction, meet at the Project site to review the material selections, joint preparations, installation procedures, weather conditions and coordination with other trades.
 - 1. Meeting shall include the sealants subcontractor, Contractor, Architect, manufacturer's representative, and representatives of other trades or subcontractors affected by the sealant installation.
 - 2. Examine sample installations, which have been prepared and determine and record whether everyone present is in agreement that the proposed installations are likely to perform as required.

3. Accepted control section shall be standard to which all other sealant work must conform.
- B. Examine the substrates, adjoining construction and the conditions under which the work is to be installed. Correct unsatisfactory conditions before proceeding with work.

3.03 JOINT 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. Remove protective coatings on metal surfaces with a solvent that leaves no residue. Use clean white cloths or lintless paper towels for cleaning with solvent and drying. Clean joint areas protected with masking tape or strippable film with solvent after removal of tape or film. Do not allow solvent to air dry without wiping.
 3. Remove laitance by acid washing, grinding or mechanical abrading. Remove form oils by sand or water-blast cleaning. Remove loose particles present or resulting from grinding, abrading or blast cleaning by blowing out joints with oil free compressed air or by vacuuming joint prior to application of primer or sealant.
 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 ceramic 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.
 6. Joint widths, depths, and conditions detailed on shop drawings by related trades shall be considered as minimum allowable requirements except where they may conflict with sealant manufacturer's recommendations. In all cases, joints must be uniform in width. Do not seal joints until they are in compliance with Drawings, or meet the control section standard.
 7. Clean out and rake to full width and depth, joints to receive sealant, backup material or preformed joint filler. Make joints of sufficient width and depth to accommodate specified back-up material or preformed joint filler and sealant.
- 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. Priming of surfaces receiving Structural Silicone Sealant

1. Prior to installing two-part fast cure structural sealant, abrade fluoropolymer painted substrate with alcohol soaked "scotch brite" pads and wipe clean with a lint-free rag.
 2. Any primers that are used with the structural silicone shall be pre-approved in writing by the sealant manufacturer for the noted application and environment including specific installation and handling instructions. No structurally glazed unit shall be moved prior to sample testing that shows 100% cohesive failure has been achieved.
- D. 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.

3.04 INSTALLATION OF JOINT SEALERS

- A. General: Follow sealant manufacturer's instruction regarding surface preparation, priming, application life, and application procedure. Consult sealant manufacturer for recommendation for application procedure. Consult sealant manufacturer for recommendation for application of sealant when air temperature is below 40 degrees F., or surface temperatures of sealant contact surfaces are above 120 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 indicated.
- C. Installation of Sealant Backings: Install sealant backings to comply with the following requirements:
1. Install back-up material or joint filler at proper depth in joint to provide specified sealant dimensions. Compress back-up material 25% to 50% into the joints as required. Do not apply sealant without back-up materials. Install bond breaker strip between sealant and non-release type backup material. 3-side adhesion is acceptable only for the sealing at joinery of members that are to be rigidly attached to each other by means of screws or welding restricting movement.
 - 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 seats, 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.
- D. 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.

- E. Tooling of Nonsag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents which discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.
 - 1. Provide concave joint configuration per Figure 8A in ASTM C 1193, unless otherwise indicated.
 - 2. Provide flush joint configuration per Figure 8B in ASTM C 1193, where indicated.

3.05 FIELD QUALITY CONTROL

- A. Test facade sealant work in the field during the testing of the other exterior building facade elements. Area and time of test shall in accordance with Architect's recommendation. Perform out of sequence or scheduled sealant installation at test areas as necessary and as directed so that the testing of the facade elements can be performed at the specified intervals of erection.
- B. Refer to related Sections for criteria pertaining to field testing.
- C. Perform and record results of pig-tail type adhesion tests on at least 2 different elevations per floor as the work progresses.
- D. Field Adhesion and Cohesion Testing: Sealant manufacturer representative will perform a minimum of 20 field tests to determine if installed work complies with specified requirements. Tests to be witnessed by Architect and Architect. Test sealant after it has fully cured (7-21 days).
 - 1. Provide testing as follows to demonstrate curing properties:
 - 2. Between 24 and 72 hours prior to initial application.
 - 3. Prior to use of each new shipment of materials.
 - 4. Not less than twice a month for existing stored materials
- E. Reports: Record test results and prepare reports according to ASTM E 575 and ASTM C 1521 formats.
- F. Re-testing and Re-inspections Due to Failures:
 - 1. Perform further testing to ascertain the extent of the problem. All failed sealants are to be replaced promptly and the resulting weather tightness must be verified.
 - 2. Remove from site marginal or defective material.
 - 3. Contractor responsible for expenses incurred, without additional cost to Owner, due to failure of work to pass testing and inspections.
- G. Repairs for Destructive Testing:

February 27, 2026

1. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints.
2. Ensure original sealant surfaces are clean and new sealant properly contacts original sealant.

3.06 CLEAN UP

- A. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealers and of products in which joints occur.

3.07 PROTECTION

- A. 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 Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealers immediately and reseal joints with new materials to produce joint sealer installations with repaired areas indistinguishable from original work.

END OF SECTION

SECTION 07920 - SEALANTS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. All sealants not covered in Section 07910 – EXTERIOR WALL JOINT SEALANTS used to completely close all joints indicated or specified to be filled or sealed to a watertight, smoke-tight or acoustical condition as required for the particular application indicated.
2. Security Sealants to be used for glazing and joint sealants in area where patients have access.

B. Related Sections:

1. Section 07910 – EXTERIOR WALL JOINT SEALANTS
2. Section 08110 – STEEL DOORS AND FRAMES
3. Section 08340 – BEHAVIORAL HEALTH DOORS AND FRAMES
4. Section 08520 – GLAZED ALUMINUM SYSTEMS
5. Section 08565 – BEHAVIORAL HEALTH WINDOWS
6. Section 09250 – GYPSUM BOARD ASSEMBLIES
7. Section 09310 – CERAMIC TILE
8. Section 09900 - PAINTING

1.02 SUBMITTALS

- A. Submit under the provisions of Section 01330 – SUBMITTAL PROCEDURES.
- B. Manufacturer's Data: Submit copies of manufacturer's product data and specifications for type of sealant required, to the Architect for approval.
- C. Material Safety Data Sheets (MSDS): Submit MSDS for each sealant product.
- D. Color Samples: Submit sets of color finish samples of sealants.
- E. Sustainable Design Submittals
 1. LEED v4 BD+C: Healthcare.
 - a. LEED Credit IEQ2 – Low Emitting Materials – Adhesives and Sealants.
 - 1) Provide product data, MSDS or other documentation indicating VOC content and emissions testing documents showing compliance with requirements for low-emitting materials

1.03 JOB CONDITIONS

- A. 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

February 27, 2026

performance of sealers. Do not proceed with joint sealer work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

1.04 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: Carefully handle and store all materials to prevent inclusion of foreign materials. Remove from project site all damaged and deteriorated materials and materials exceeding shelf life.
- C. All sealant materials shall be installed prior to expiration of shelf life.

1.05 WARRANTY

- A. Provide a 2-year written warranty against leaks, air infiltration, cracks, and other failures of the installation and materials.
 - 1. Repair of sealants to seal leaks caused by faulty materials or workmanship.
 - 2. Repair or replace damage to the building or its finishes, equipment or furniture when caused by such leaks.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Asbestos Prohibition: No asbestos containing materials or equipment shall be used in this section. The Contractor shall ensure that all materials and equipment incorporated in the project are asbestos-free.
- B. Sealant Backer Rod: Compressible rod stock of polyethylene foam, polyethylene-jacketed polyurethane foam, butyl rubber foam, neoprene foam or other flexible, permanent, durable, nonabsorptive material 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.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer.
- D. Masking Tape: Non-staining, nonabsorbent type compatible with joint sealants and to surfaces adjacent to joints.
- E. Primer for Sealants: Non-staining, as recommended by the sealant manufacturer.
- F. Sealants: All site-applied, interior sealants shall have a VOC of not more than 250 g/L.
 - 1. At Interior Vertical and Overhead Moving Joints (**JS-04**) except at tile joints: One-part polyurethane-based sealant, conforming to ASTM C 920, Type S,

February 27, 2026

Grade NS, Class 25, Use NT. Provide products from one of the following, or approved equal:

- a. Tremco, Inc.
 - b. Bostik Construction Products Div.
 - c. Sika Corp.
 - d. Pecora Corp.
 - e. Sonneborn.
2. At Interior Vertical and Overhead Non-Moving Joints (**JS-05**): Non-Elastomeric Sealant; acrylic-emulsion type, conforming to ASTM C 834. Provide one of the following, or approved equal:
- a. AC-20 Acrylic Latex: Pecora Corp.
 - b. Tremco Acrylic Latex 834; Tremco, Inc.
 - c. Chem-Calk 600; Bostik Construction Products Div.
 - d. Sonolac; Sonneborn.
3. At Horizontal Traffic-Bearing Joints (**JS-06**): Two-part polyurethane-based sealant, conforming to ASTM C 920, Type M, Grade P, Class 25, Use T. Provide one of the following, or an approved equal:
- a. Sikaflex 2c SL; Sika Corp.
 - b. THC-900; Tremco, Inc.
 - c. Urespan NR-300; Type HM; Pecora Corp.
 - d. SL-2; Sonneborn.
4. Silicone Sealant (**JS-07**): At Perimeter of All Plumbing Fixtures and Fittings and wall and floor tile movement joints: One-part mildew-resistant silicone sealant conforming to ASTM C 920, Type S, Grade NS, Class 25, Use NT, formulated with fungicide; intended for sealing interior joints with non-porous substrates. For use in kitchens and food preparation areas provide sealant complying with FDA requirements. Provide one of the following, or approved equal:
- a. Dow Corning 786; Dow Corning Corp.
 - b. SCS 1702 Sanitary; General Electric Co.
 - c. Tremsil 600 White; Tremco, Inc.
 - d. Omni Plus; Sonneborn.
 - e. 898 or 893, No. 345; Pecora Corp.
5. 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:
- a. Extru-Seal; Pecora Corp.
 - b. 440 Tape; Tremco, Inc.

- c. Chem-Tape 40; Bostik Construction Products Div.
- 6. Acoustical Sealant: Provide one of the following, or approved equal:
 - a. Fire-rated and Non-rated Exposed Joints and Fire-rated Concealed Joints (**JS-08**): Non-sag, paintable, non-staining, latex sealant complying with ASTM C 834, ASTM A 119 or ANSI/UL 263 that effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90 as well and resists the spread of fire and passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which the sealant is installed.
 - 1) AC-20 FTR; Pecora Corp.
 - 2) SpecSeal ES Elastomeric Sealant, Specified Technologies, Inc.
 - 3) MasterSeal NP 520, BASF.
 - 4) or Approved Equal.
 - b. Non-Rated Concealed Joints (**JS-09**): Non-drying, non-hardening, non-skinning, non-staining, gunnable, synthetic-rubber sealant recommended for sealing interior concealed joints to reduce airborne sound transmission.
 - 1) BA-98; Pecora Corp.
 - 2) Tremco Acoustical Sealant; Tremco.
 - 3) Pro-Series SC-170; Ohio Sealants.
 - 4) or Approved Equal.
- 7. Security Sealants (**SJS-01**): Manufacturer's standard, nonsag, tamper-resistant sealant for joints with low movement complying with ASTM C920, Grade NS, Class 12.5 or 25, Use NT and with a Shore A hardness of at least 45 when tested in accordance with ASTM C661.
 - a. Basis-of-Design Product: Subject to compliance with requirements provide the following products from Pecora Corporation
 - 1) Pecora 896 HIS, High Impact Silicone for glazing applications.
 - 2) Pecora DynaFlex SC, Flexible Polyurethane Security Sealant for perimeter joints, expansion and control joints.

PART 3 - EXECUTION

3.01 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.

3.02 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.

3.03 JOINT 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 unglazed surfaces of ceramic tile and similar porous joint substrate surfaces, by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealers. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.
 - 3. Remove laitance and form release agents from concrete.
 - 4. Steel Surfaces in Contact with Sealant: Scrape and wire-brush 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 ceramic 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 it is indicated or 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.

3.04 INSTALLATION OF JOINT SEALERS

- A. General: Comply with joint sealer manufacturers' printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply. Do not apply sealant 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 indicated.

- C. Acoustical Sealant Application Standard: Comply with recommendations of ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.
- D. Installation of Sealant Backings: Install sealant backings to comply with the following requirements:
 - 1. Install joint fillers of type indicated to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths which allow optimum sealant movement capability.
 - a. Do not leave gaps between the 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 them with dry material.
 - 2. Install bond breaker tape between sealants and joint fillers, compression seats, 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 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 8A in ASTM C 1193, unless otherwise indicated.
 - 2. Provide flush joint configuration per Figure 8B in ASTM C 1193, where indicated.

3.05 CLEAN UP

- A. Clean off excess sealants or smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealers and of products in which joints occur.

February 27, 2026

3.06 PROTECTION

- A. 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 Substantial Completion. If damage or deterioration occurs despite such protection, 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 08- DOORS AND WINDOWS

SECTION 08110 - STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Standard steel frame products and doors assemblies including glazing, glazing stops and louvers as indicated and scheduled on drawings.
2. Behavioral Health steel frame products and door assemblies including glazing and glazing stops as indicated and scheduled on the Drawings.

B. Related Work Described Elsewhere:

1. Finish hardware is specified in Section 08710 - FINISH HARDWARE.
2. Paint Finish is specified in Section 09900 – PAINTING.

1.02 DEFINITIONS

- A. Behavioral Health Assemblies: Steel door and frame assemblies located in areas that are accessible to the patients.

1.03 REFERENCES

A. American National Standards Institute (ANSI)

1. ANSI/NFPA 80, Standard for Fire Doors and Other Opening Protectives.
2. ANSI/UL 10C, Standard for Positive Pressure Fire Tests of Door Assemblies.

B. American Society of Testing and Materials (ASTM)

1. ASTM A 653, Specification for Steel Sheet, Zinc-Coated, (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.
2. ASTM A 1008, Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability. Solution Hardened and Bake Hardenable.
3. ASTM A 1011, Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability and Ultra-High Strength.

C. Hollow Metal Manufacturer's Association (HMMA)

1. HMMA 805, Recommended Selection and Usage Guide for Hollow Metal Doors and Frames.
2. HMMA 810, Hollow Metal Doors
3. HMMA 820, Hollow Metal Frames

D. Steel Door Institute (SDI)

February 27, 2026

1. ANSI/SDI A250.8, Specifications for Standard Steel Doors and Frames
2. ANSI/SDI A250.10, Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
3. ANSI/SDI A250.11, Recommended Erection Instructions for Steel Frames.
4. SDI 117, Manufacturing Tolerances for Standard Steel Doors and Frames.

1.04 QUALITY ASSURANCE

- A. Provide doors and frames complying with ANSI/SDI 100 "Recommended Specifications for Standard Steel Doors and Frames", Hollow Metal Manufacturer's Association, HMMA and as herein specified.
- B. Manufacturer's Qualifications: Provide evidence of having personnel and plant equipment capable of fabricating hollow metal door and frame assemblies of the type specified herein.
- C. Fire-Rated Assemblies: Where fire-rated assemblies are indicated or required, provide fire-rated door assemblies that comply with NFPA 80 "Standard for Fire Doors and Fire Windows", and have been tested, listed, and labeled in accordance with UL 10C "Positive Pressure Fire Tests of Door Assemblies" and NFPA 252 "Fire Tests of Door Assemblies" by a nationally recognized independent testing and inspection agency acceptable to authorities having jurisdiction.
- D. Fire door assemblies in exit enclosures and exit passageways must have a maximum transmitted temperature end point of not more than 250°F (121°C) above ambient at the end of 30 minutes of the standard fire test exposure.
- E. Hardware Mounting Heights: The Contractor shall be responsible to coordinate all mounting heights of various finish hardware with all project requirements.

1.05 SUBMITTALS

- A. Submit under the provisions of Section 01330 – SUBMITTAL PROCEDURES.
- B. Manufacturer's Data: Submit manufacturer's technical product data substantiating that products comply with requirements.
- C. Shop Drawings: Submit for fabrication and installation of steel doors and frames. Include details of each frame type, conditions at openings, details of construction, location and installation requirements of finish hardware and reinforcements, and details of joints and connections, gauges, and finishes. Show anchorage and accessory items.
- D. Manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the work.
- E. Manufacturer's Qualifications.
- F. Schedule: Provide a schedule of doors and frames using same reference numbers for details and openings as those on contract drawings.
- G. Label Construction Certification: For assemblies required to be fire-rated and exceeding sizes of tested assemblies, submit manufacturer's certification for that

each frame assembly has been constructed to conform to design, materials and construction equivalent to requirements for labeled construction.

- H. Contractor responsible for coordination and installation of products covered under this Section shall:
 - 1. Verify and submit to the manufacturer's the actual opening sizes and site conditions by field measurements before fabrication. Coordinate field measurements with fabrication and construction schedules to avoid delays.
 - 2. Verify that substrate conditions, whether existing or installed under other Sections, are as detailed in the Architect's drawings and are acceptable for product installation in accordance with the manufacturer's instructions.
- I. Reflect measurements and conditions determined under Section 1.04.G in submittal documents and manufacture product accordingly.
- J. Do not proceed with fabrication without receipt of approved submittal drawings and approved hardware schedules.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver hollow metal work cartoned or crated to provide protection during transit and job storage. Strap knock-down frames in bundles. Provide temporary steel spreaders securely fastened to the bottom of each welded frame.
- B. Inspect hollow metal work upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to the Architect; otherwise, remove and replace damaged items as directed.
- C. Store doors and frames at building site under cover in a dry, secure place. Place units on minimum 4-inch high wood blocking. Avoid use of non-vented plastic or canvas shelters which could create humidity chambers.

1.07 COORDINATION

- A. Coordinate Work with other directly affected sections involving manufacture or fabrication of internal cutouts and reinforcement for door hardware, electric devices and recessed items.
- B. Coordinate work with frame opening construction, door and hardware installation.
- C. Sequence installation to accommodate required door hardware.
- D. Hardware Mounting Heights: The Contractor shall be responsible to coordinate all mounting heights of various finish hardware with all project requirements.
- E. Verify field dimensions for factory assembled frames prior to fabrication.

1.08 WARRANTY

- A. Provide manufacturer's standard written warranty in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
 - 1. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

2. Warranty Period: One (1) year from the date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Galvanized Steel Sheets: Zinc coated commercial quality carbon steel, Type B; suitable for exposed applications, complying with ASTM A 1008. Protective zinc coating to comply with ASTM A 653 coating designation G90 at all doors and frames.
- B. Supports and Anchors: Fabricate of not less than 18-gauge galvanized sheet steel.
- C. Frame Anchors:
 1. Wall Anchors for Attachment to Drywall Partitions:
 - a. Use manufacturer's adjustable type compression anchors with knocked down die mitered frames at drywall locations.
 - b. Use stud anchors sized to accommodate frame jamb depth and face dimension on all welded frames.
 2. Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.
 3. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
 4. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
 5. Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
 - a. Compression Type: Not less than two anchors for each jamb.
 - b. Stud Wall Type: Provide three anchors per jamb up to 60-inches in height and four anchors for jambs 60 to 90 inches in height.
 - c. Masonry Type: Provide two anchors per jamb up to 60-inches in height and three anchors for jambs 60 to 90 inches in height.
 6. Floor Anchors: Angle clip type:
 - a. 16 gauge minimum.
 - 1) Same gauge as door frames for floor anchors used in Behavioral Health assemblies.
 - b. To receive 2 fasteners per anchor.
 - c. Welded to the bottom of each jamb.
 - 1) Weld floor anchors inside the jamb with at least 4 weld spots per anchor for floor anchors used in Behavioral Health assemblies.

February 27, 2026

- D. Inserts, Bolts and Fasteners: Manufacturer's standard units, except hot-dip galvanize, complying with ASTM A 153/A 153M "Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware", Class C or D as applicable.
- E. Factory Applied Primer Paint: Rust-inhibitive enamel paint, either air-drying or baking, suitable as a base for specified finish paints conforming to ANSI A250.10 "Test Procedures and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames". Primers shall be free from asbestos, lead, mercury, chromate, and cadmium.

2.02 MANUFACTURERS

- A. Standard Steel Door and Frame Manufacturers: Subject to compliance with requirements of this section, provide products from one of the following:
 - 1. Amweld Building Products, Inc.
 - 2. Ceco Door, Assa Abloy
 - 3. Curries Co.
 - 4. Steelcraft
 - 5. Or approved equal.

2.03 FABRICATION, GENERAL

- A. Fabricate doors and frames to meet the quality standards and fabrications methods established by the Steel Door Institute (SDI) and the Hollow Metal Manufacturer's Associations (HMMA) and in accordance with the Contract Documents and approved submittal drawings.
- B. Fabricate steel doors and frame units to be rigid, neat in appearance and free from defects, warp or buckle.
- C. Fabricate frames, concealed stiffeners, reinforcement, edge channels, and moldings from galvanized cold-rolled steel.
- D. Fabricate all doors and frames from galvanized sheet steel.
- E. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."
- F. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat Phillips heads for exposed screws and bolts.
- G. Finish Hardware Preparation: Prepare doors and frames to receive mortised and concealed finish hardware in accordance with final Finish Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI/SDI A250.6 series specifications for frame preparation for hardware.
 - 1. Reinforce standard doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied finish hardware may be done at project site. Provide minimum gauge hardware reinforcing for mortise or surface applied hardware as follows:
 - a. Standard Doors and Frames

February 27, 2026

- 1) Mortised Hinges: 0.093-inch.
 - 2) Surface Closers: 0.067-inch.
 - b. Behavioral Health Assemblies
 - 1) Hinges: 0.167-inch
 - 2) Closers: 0.167-inch
 - 3) Lock Front: 0.093-inch
 2. Locate finish hardware as indicated on final shop drawings or, if not indicated, in accordance with DHI-05 "Recommended Locations for Builder's Hardware for Standard Steel Doors and Frames" and the 2010 ADA Standards for Accessible Design Section 404.2.7.
- H. Factory Painting:
1. Clean, phosphatize, and prime paint exposed surfaces of steel doors and frame units, including galvanized surfaces.
 2. Clean steel surfaces of mill scale, rust, oil, grease, dirt, and other foreign materials before application of paint.
 3. Apply factory coat of prime paint to an even consistency to provide a uniformly finished surface ready to receive paint finish specified in Section 09900 – PAINTING.

2.04 STANDARD STEEL DOORS

A. Flush Steel Doors:

1. Provide doors complying with the requirements indicated below by referencing ANSI 250.8 for level and model and ANSI A250.4 for physical-endurance level:
 - a. Interior Doors: Level 2 (18 gauge); Physical Performance Level B (Heavy Duty), Model 1 (Full Flush)
 - b. Exterior Doors: Level 3 (16 gauge) and Physical Performance Level B (Heavy Duty), Model 2 (Seamless).
2. Construction, General:
 - a. Doors shall be of the types and sizes shown on approved shop drawings.
 - b. Door face sheets shall be joined at their vertical edges with no visible seams on their faces. Minimum door thickness shall be 1-3/4-inches.
 - c. Face sheets shall be stiffened by continuous vertical formed steel sections which, upon assembly span the full thickness of the interior space between the door faces. These stiffeners shall be not less than 22 gage, spaced so that the vertical interior webs shall be no more than 6" apart and securely fastened to both face sheets by spot welds spaced at a maximum of 5" o.c. vertically. Spaces between stiffeners shall be filled with fiberglass or mineral rockwool batt-type material.

- d. Door faces shall be joined together at their vertical edges by a continuous weld extending the full height of the door. All such welds to be ground, filled and dressed smooth to make them invisible and provide a smooth flush surface.
 - e. Top and bottom edges of all doors shall be closed with continuous steel channels not less than 16 gage, spot welded to both faces.
 - f. Edge profiles shall be provided on both vertical edges of doors as follows:
 - 1) Single-acting swing doors - beveled 1/8-inch in 2-inches.
3. Finish: As specified herein.
- B. Door Accessories:
- 1. Door Vision Lite Frames (where scheduled): Steel sheet matching door face material; minimum 0.032-inch base-metal thickness
 - a. Profile: Flush type, with beveled stops.
 - b. Corner Construction: Mitered and welded.
 - c. Fasteners: Countersunk.
 - d. Fixed-Stop Location: Secure (key) side of door.
 - e. Fire-Rated Doors: Comply with requirements in NFPA 80.
 - f. Glass:
 - 1) Non-rated Doors: 1/4" fully tempered clear glass complying with the requirement of Section 08800 – GLAZING.
 - 2) Fire-Rated Doors (20-Minute):
 - a) Laminated glass made from 2 plies of clear, ceramic flat glass; 5/16-inch total nominal thickness; complying with testing requirements in 16 CFR 1201 for Category II materials. FireLite Plus; TGP, Nippon Electric Glass Co.
 - b) Fire Rating: 20 minutes
 - c) Glazing Tape: Closed cell polyvinyl chloride (PVC) foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent.
 - d) Labeling: Permanently label each piece of fire-rated glass with the appropriate marking.
 - 2. Door Louvers (where scheduled): SDI 111C; steel sheet matching door face material unless otherwise noted
 - a. Fire-Rated Automatic Louvers: Constructed with movable blades closed by actuating fusible link; listed and labeled for use in fire-rated door assemblies of type and fire-resistance rating indicated by same qualified testing and inspecting agency that established fire-resistance rating of door assembly.
 - b. Storm-Rated Louver: Stationary louvers constructed with 0.063-inch-thick extruded aluminum storm resistant blades, finished to match

door. Provide isolation material to prevent galvanic corrosion due to dissimilar metals.

2.05 STANDARD STEEL FRAMES

- A. Provide metal frames for doors of type and style as shown on drawings and schedules. Conceal fastenings, unless otherwise indicated. Fabricate frames of minimum 16 gauge cold-rolled furniture steel.
 - 1. Fabricate frames with mitered corners in the following type construction:
 - a. Exterior Door Frames: Full Welded construction.
 - b. Interior Door Frames: Knock-down (mechanical interlock joint) construction with hairline seam.
 - 2. Form all frames of hot dip galvanized steel.
 - 3. Frames shall comply with ANSI A250.4 "Performance Test Procedures for Steel Door Frames and Frame Anchors", Level A, one million cycle swing test performance for a 4070-door frame.
 - 4. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
 - 5. Transom Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
- B. Door Silencers: Except on weather-stripped frames, drill stops to receive 3 silencers on strike jambs of single-swing frames and 2 silencers on heads of double-swing frames.
- C. Plaster Guards: Provide 26-gauge steel plaster guards or mortar boxes, welded to frame, at back of finish hardware cutouts where mortar or other materials might obstruct hardware operation and to close off interior of openings.
- D. Template Hardware: Factory cut doors and frames for all template hardware including hinges, bolts, etc.
- E. Finish: As specified herein.

2.06 DOORS IN BEHAVIORAL HEALTH ASSEMBLIES

- A. Flush Steel Doors:
 - 1. Provide doors complying with the requirements indicated below by referencing ANSI 250.8 for level and model and ANSI A250.4 for physical-endurance level:
 - a. Interior Doors: Level 4, 14 gauge (0.067-inch); Physical Performance Level A (Maximum Duty), Model 2 (Seamless, Continuous Weld)
 - b. Exterior Doors: Level 4, 14 gauge (0.067-inch); Physical Performance Level A (Maximum Duty), Model 2 (Seamless, Continuous Weld).
 - 2. Construction, General:

- a. Doors shall be of the types and sizes shown on approved shop drawings.
 - b. Door face sheets shall be joined at their vertical edges with no visible seams on their faces. Minimum door thickness shall be 1-3/4-inches.
 - c. Face sheets shall be 0.067-inch thick, stiffened by continuous vertical formed steel sections which, upon assembly span the full thickness of the interior space between the door faces. These stiffeners shall be not less than 0.032-inch thick, spaced so that the vertical interior webs shall be no more than 6-inches apart and securely fastened to both face sheets by spot welds spaced at a maximum of 5-inches o.c. vertically. Spaces between stiffeners shall be filled with fiberglass or mineral rockwool batt-type material.
 - 1) Full Glass Doors shall have a core consisting of 1-inch cell Kraft honeycomb.
 - d. Door faces shall be joined together at their vertical edges by a continuous weld extending the full height of the door. All such welds to be ground, filled and dressed smooth to make them invisible and provide a smooth flush surface.
 - e. Reinforce the vertical edges continuously using steel, not less than the thickness of the face sheets extending the full length of the door.
 - f. Top and bottom edges of all doors shall be closed with continuous steel channels not less than the thickness of the face sheets, spot welded to both faces a maximum of 4-inches o.c. Continuously weld the closing end channel to the vertical edge reinforcing at all four corners producing a fully welded perimeter reinforcing.
 - g. Edge profiles shall be provided on both vertical edges of doors as follows:
- 3. Single-acting swing doors - beveled 1/8-inch in 2-inches.
 - 4. Glazing Trim and Stops:
 - a. Where glass lites are scheduled or specified, provide doors with steel moldings to secure glazing by others in accordance with security glazing sizes and thicknesses shown on the contract documents. Provide reinforcing channels not less than the thickness of the face sheets around the perimeter of the opening.
 - b. Fabricate fixed glazing molding of not less than 0.123-inch material thickness. Weld fixed glazing molding to both face sheets 5-inch o.c. maximum. Trim and stop shall be sized to accept 1/2-inch-thick glazing and have stop heights to provide 1-inch glazing engagement.
 - c. Provide pressed steel angle removable glazing stops of not less than 0.123-inch material thickness. Fabricate angle stops such that they are mitered or notched; are tight fitting at the corner joints; and are secured in place using 1/4 – 20 or 1/4 – 28 button head tamper resistant, corrosion-resistant machine screws spaced not less than 2-inch from the ends and 9-inches o.c.

February 27, 2026

5. Glazing: 1/2-inch-thick polycarbonate glazing with UV and abrasions resistant coating.
 - a. Acceptable Manufacturer's:
 - 1) AZ Polymers, LLC; AZCARB AR 15 Polycarbonate Glazing
 - 2) Plaskolite, LLC; Tuffak 15 Polycarbonate Glazing
 - 3) Polyvantis, LLC, SL4855 Polycarbonate Glazing.
 - b. Provide setting blocks and continuous glazing tape per glazing manufacturer's recommendations.

2.07 FRAMES IN BEHAVIORAL HEALTH ASSEMBLIES

- A. Provide metal frames for doors borrowed lites, transoms and windows of type and style as shown on drawings and schedules. Conceal fastenings, unless otherwise indicated. Fabricate frames of minimum 14 gauge (0.067-inch) galvanized steel.
 1. Fabricate frames with mitered corners in the following type construction:
 - a. Exterior and Interior Door Frames: Full Welded construction.
 - b. Interior Borrowed Lite, Transom and Window Frames: Full Welded construction.
- B. Fabricate frames such that all finished work is neat in appearance, square, and free of defects, warps and buckles. Form pressed steel members such that they are straight and of uniform profile throughout their lengths.
- C. Fabricate jamb, header and sill profiles in accordance with the frame schedule and as shown on the approved submittal drawings.
- D. Fabricate corner joints such that all of their contact edges are closed tight with faces mitered and stops either butted or mitered. Continuous weld faces and soffits and finish the faces smooth. The use of gussets or splice plates as a substitute for welding is not acceptable.
- E. Continuously weld all other face joints and finish them smooth.
- F. Provide continuous perimeter sealant using security sealant specified in Section 07925 – SECURITY SEALANTS at patient side to create flush, ligature-resistant condition.
- G. Minimum height of stops in door openings are required to be 0.625 in. Height of stops on security glazing openings are required to be as shown on approved submittal drawings.
- H. Fabricate frames for multiple openings using mullion members which, after fabrication, are closed shapes conforming to profiles shown on approved submittal drawings, and that have no visible seams or joints. Continuous weld and finish smooth all joints between faces of abutted. Weld all joints between stops of abutted members along the soffit such they are left neat and uniform in appearance.
- I. Floor Anchors
 1. Where applicable, provide floor anchors with two (2) holes for fasteners and fasten them inside jambs with at least four (4) spot welds per anchor.

February 27, 2026

2. Where so scheduled, install adjustable floor anchors, that provide not less than 2 -inches height adjustment, and fasten them in place with at least four (4) spot welds per anchor.
 3. Fabricate floor anchors of the same material thickness as frame.
- J. Jamb Anchors
1. Provide the number of anchors on each jamb as follows:
 - a. Borrowed light and Window frames: 2 anchors plus 1 for each 18-inches or fraction thereof over 36-inches, spaced at 18-inches maximum between anchors.
 2. Door frames: 2 anchors plus 1 for each 18-inches or fraction thereof over 54-inches, spaced at 18-inches maximum between anchors.
- K. Glazing Stops:
1. Where security glazing is scheduled or specified, provide pressed steel angle removable glazing stops of not less than 0.123-inch material thickness. Fabricate angle stops such that they are mitered or butted and tight fitting at the corner joints; and are secured in place using 1/4 – 20 or 1/4 – 28 button head tamper resistant, corrosion-resistant machine screws spaced not less than 2-inch from the ends and 9-inches o.c.
 - a. Where applicable don't locate removable stops on the patient side.
 2. Stops in borrowed lite, transom and window frames shall have a height to provide 1-inch security glazing engagement. Stops shall be sized and located to accept 1/2-inch-thick glazing.
- L. Glazing: 1/2-inch-thick polycarbonate glazing with UV and abrasions resistant coating.
1. Acceptable Manufacturer's:
 - a. AZ Polymers, LLC; AZCARB AR 15 Polycarbonate Glazing
 - b. Plaskolite, LLC; Tuffak 15 Polycarbonate Glazing
 - c. Polyvantis, LLC, SL4855 Polycarbonate Glazing.
 2. Provide setting blocks and continuous glazing tape per glazing manufacturer's recommendations.

2.08 FIRE-RATED ASSEMBLIES

- A. Assemblies shall bear the listing identification label of the Underwriters Laboratories, Inc. (UL), Factory Mutual Engineering Corp. (FM), Warnock Hersey International (WHI), or a nationally recognized testing laboratory qualified to perform tests of fire assemblies in accordance with ANSI/UL 10C and NFPA 252 and having a listing for the tested assemblies. Listing identification labels shall be constructed and permanently applied by a method which results in their destruction should they be removed. Labels shall be metal with raised letters and shall bear the name and file number of the frame manufacturer. Labels shall not be painted.

PART 3 - EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.
- B. Drill and tap doors and frames to receive non-templated, mortised, and surface-mounted door hardware.

3.03 INSTALLATION, DOORS

- A. General: Install steel doors and frames in accordance with final shop drawings, manufacturer's data, and as herein specified.
- B. Placing Frames: Comply with provisions of SDI-105 "Recommended Erection Instructions for Steel Frames", unless otherwise indicated.
 - 1. Anchors: Provide sufficient anchorage to attach to wall in accordance with ANSI A250.4 Test compliance Level A of one million cycles, or anchorage as detailed on drawings to specific wall conditions.
 - 2. Except for frames located at in-place concrete and masonry installations, place frames prior to construction of enclosing walls and ceilings. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders leaving surfaces smooth and undamaged.
 - 3. Install fire-rated frames in accordance with NFPA 80.
 - 4. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
 - 5. Glazing: Comply with installation requirements in Section 08800 - GLAZING and with hollow metal door and frame manufacturer's written instructions
- C. Door Installation: Fit hollow-metal accurately in frames, with clearances specified in ANSI/SDI 100.
 - 1. Fire-Rated Doors: Install doors with clearances according to NFPA 80.

3.04 TOLERANCES

February 27, 2026

- A. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - 1. Squareness: Plus, or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - 2. Alignment: Plus, or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - 3. Twist: Plus, or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - 4. Plumbness: Plus, or minus 1/16 inch, measured at jambs at floor.

3.05 ADJUST AND CLEAN

- A. Factory Coat Touch-up: Immediately after erection, sand smooth any rusted or damaged areas of factory coating and apply touch-up of matching air-drying coating.
- B. Final Adjustments: Check and readjust operating finish hardware items, leaving steel frames undamaged and in complete and proper operating conditions.

END OF SECTION

SECTION 08210 - WOOD DOORS

PART 1 - GENERAL

1.01 SUMMARY

- A. Types of doors required include flush and stile and rail wood and doors.
 - 1. Interior Non-rated doors.
- B. Related Work Described Elsewhere:
 - 1. Steel door frame as specified in Section 08110 – STEEL DOORS AND FRAMES.
 - 2. Door Hardware as specified in Section 08710 – FINISH HARDWARE.

1.02 SUBMITTALS

- A. Submit under the provisions of Section 01330 – SUBMITTAL PROCEDURES.
- B. Manufacturer's Data: Door manufacturer's technical data for each type of door, including details of core and edge construction.
- C. Shop Drawings: Submit shop drawings indicating location and size of each door, door swing, stile and rail dimensions, veneers, elevation of each kind of door, details of construction, location and extent of hardware blocking, fire ratings, and other pertinent data.
- D. Samples:
 - 1. Sample for Verification: Submit three 12" x 12" verification corner samples of each different type of door, wood species and finish for approval.

1.03 QUALITY ASSURANCE

- A. Quality Standards: Comply with the following standards:
 - 1. WDMA Quality Standard:
 - a. Flush Wood Doors: WDMA I.S.-1A "Wood Flush Doors"
 - b. Stile and Rail Doors: WDMA I.S.-6A "Industry Standard for Architectural Stile and Rail Doors".
 - 2. AWS Quality Standards: "Architectural Woodwork Standards", including Section 4 "Sheet Products", Section 9, "Door" of Architectural Woodwork Standards (AWS) for grade of door, core construction, finish and other requirements exceeding those of WDMA quality standard
- B. WDMA Quality Marking: Mark each wood door with WDMA Wood Door Certification Hallmark certifying compliance with applicable requirements of WDMA I.S.-1A and WDMA I.S.-6A. For manufacturers not participating in WDMA Hallmark Program, a certification of compliance may be substituted for marking of individual doors.

February 27, 2026

- C. Safety Glazing Standard: 16 CFR 1201 for heat treated and laminated glass, permanently marked with Safety Glazing Certification Council label. Comply with applicable codes.
 - 1. Glazing lites more than 9 sq. ft. in exposed surface area of one side, provide glazing products that comply with Category II materials, for lites 9 sq. ft. or less in exposed surface area of one side, provide glazing products that comply with Category I or II materials, except for hazardous locations where Category II materials are required by 16 CFR 1201 and regulations of authorities having jurisdiction
- D. Factory seal all doors on all 6 sides using manufacturer's standard sealer.
- E. Manufacturer: Obtain from a single manufacturer for each type of wood door or all doors for one manufacturer.
- F. Hardware Mounting Heights and Clearances: The Contractor shall be responsible to coordinate all mounting heights of various finish hardware with all project requirements and door clearances required for scheduled hardware of each door.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Protect doors during transit, storage and handling to prevent damage, soiling and deterioration. Comply with requirements of referenced standards and recommendations of WDMA I.S.-1A Section J-1 "Job Site Information", and WDMA 1.S 6A.
- B. Identify each door with individual opening numbers which correlate with designation system used on shop drawings for door, frames, and hardware, using temporary, removable or concealed markings.
- C. Do not walk on or stack other materials on top of stacked doors. Do not drag doors across one another.
- D. For all doors not factory finished, seal all four edges immediately after delivery.
- E. Store doors away from threat of termite or other insect infestation.

1.05 PROJECT CONDITIONS

Conditioning: Do not deliver or install doors until conditions for temperature and relative humidity have been stabilized and will be maintained in storage and installation areas during remainder of construction period to comply with the following requirements applicable to project's geographical location: AWS Section 2 paragraph 1.2.3, "Relative Humidity and Moisture Content."

1.06 COORDINATION

- A. Coordinate installation requirements and templates for door hardware scheduled for doors on the Drawings and specified in Section 08710 – FINISH HARDWARE.

February 27, 2026

- B. Coordinate door hardware locations in wood doors with steel frames in Section 08110 – STEEL DOORS AND FRAMES where wood doors are scheduled to be installed in standard steel frames.
- C. Coordinate and field verify rough openings, steel frame size with wood door size prior to fabrication to ensure door fits within framed opening in accordance to the specified clearances and can operate freely with out binding.

1.07 WARRANTY

- A. General: Warranties shall be in addition to, and not a limitation of, other rights the Owner may have under the Contract Documents.
- B. Door Manufacturer's Warranty: Submit written agreement on door manufacturer's standard form signed by Manufacturer, Installer and Contractor, agreeing to repair or replace defective doors which have warped (bow, cup or twist) or that show telegraphing of core construction in face veneers, or do not conform to tolerance limitations of referenced quality standards.
 - 1. Warranty shall be in effect during following minimum period of time after date of Substantial Completion, unless longer warranty is standard with the manufacturer.
 - 2. Flush Interior Doors: Lifetime
 - 3. Stile and Rail Interior Doors: Lifetime
- C. Contractor's Responsibilities: Replace or refinish doors where Contractor's work contributed to rejection or to voiding of manufacturer's warranty.

PART 2 - PRODUCTS

2.01 INTERIOR WOOD FLUSH DOORS

- A. Basis-of-Design: The flush wood doors products indicated in this section and on the drawings are products of VT Industries, Inc. Subject to compliance with requirements and Architect's approval, products from the following manufacturers may be substituted:
 - 1. Forte Opening Solutions
 - 2. Simpson Door Company
 - 3. Lynden Doors, Inc.
- B. Performance Grade: ANSI/WDMA I.S.1A Heavy Duty
- C. ANSI/WDMA I.S.1A Quality Grade: Custom.
- D. Flush Doors: Comply with the following requirements:
 - 1. Core: Structural composite lumber core
 - 2. Construction: Five plies with stiles and rails bonded to core, then entire unit abrasive planed before veneering.
 - 3. Faces:
 - a. Faces: Plain-sliced Maple.

February 27, 2026

- b. Stiles: Applied wood-veneer edges of same as interior faces and covering edges of faces.
- c. Veneer Matching: Book Matched
 - 1) Veneer grain direction: vertical
- 4. Glass Lites: Where scheduled or indicated provide, Kind FT (Fully Tempered), Condition A, Type 1, Class 1, Quality q3, 1/4-inch thick unless indicated or required otherwise complying with testing requirements in 16 CFR 1201 for Category II materials.
 - a. Size: As indicated on the Drawings
 - b. Wood Beads for Light Openings: Provide manufacturer's standard wood beads unless otherwise indicated.
 - 1) Wood Species: Same species as door faces.
 - 2) Profile: Flush rectangular beads
- 5. Finish: As specified herein.

2.02 WOOD STILE AND RAIL DOORS

- A. Basis-of-Design: The flush wood doors products indicated in this section and on the drawings are products of VT Industries, Inc. Subject to compliance with requirements and Architect's approval, products from the following manufacturers may be substituted:
 - 1. Forte Opening Solutions
 - 2. Simpson Door Company
 - 3. Lynden Doors, Inc.
- B. Performance Grade: ANSI/WDMA I.S.6A Heavy Duty
- C. ANSI/WDMA I.S.6A Quality Grade: Custom
- D. Stile and Rail Doors: Comply with the following requirements:
 - 1. Stile and Rail Construction: Hardwood veneer laminated over structural composite lumber core. Select veneer for similarity of grain and color and arrange for optimum match between adjacent pieces.
 - a. Faces: Plain-sliced Maple
 - 2. Edges: Solid hardwood edging and sticking of species matching the stile and rail faces.
 - a. Sticking Profile: Quarter Round
 - 3. Glass Panel: Kind FT (Fully Tempered), Condition A, Type 1, Class 1, Quality q3, 1/4-inch thick unless indicated or required otherwise complying with testing requirements in 16 CFR 1201 for Category II materials.

2.03 FABRICATION

- A. Wood Doors: Fabricate wood doors to produce doors in sizes indicated for job-site fitting. Use continuous length boards for stile of rails, NO finger joints will be allowed.
- B. Stile and Rail doors shall be fabricated with mortise and tenon or dowel joinery.
 - 1. Blind mortise and tenon shall be sized for a drive fit. Tenon shall be set in adhesive.
 - 2. Dowels to be 1/2-inch minimum diameter and shall have glue grooves and be sized for a drive fit. Provide 2 dowels for stile to top rail joinery and 3 dowels for bottom rail joinery.
 - 3. Alternative methods of joinery are acceptable provided they meet or exceed the structural performance and appearance of the joinery method described above.
- C. Openings in Flush Doors: Cut and trim openings through doors in factory.
- D. Glazing: Factory install glazing in doors indicated to be factory finished.
- E. Adhesives: Adhesives shall be in accordance with WDMA I.S.-1A, requirements for Type I Bond Doors (waterproof) for all doors. Adhesives shall contain no formaldehydes.
- F. Finish Hardware: Locate hardware to comply with DHI-WDHS-3 and each door that is an element of an accessible route shall comply with Americans with Disabilities Act and Architectural Barriers Act Accessibility Guidelines (ADA-ABA) Section 404.2.7. Comply with finish hardware schedules, doorframe shop drawings, DHI A115-W series standards, and hardware templates.

2.04 PRESERVATIVE TREATMENT

- A. Treat all solid core doors at factory with water repellent after manufacturing has been completed, in accordance with WDMA Industry Standard I.S.-4 "Water-Repellent Preservative non-Pressure Treatment for Millwork".

2.05 WOOD DOOR FINISH

- A. General: The entire finish of wood doors is work of this section, regardless of whether shop-applied or applied after installation.
 - 1. Shop finishing: To the greatest extent possible, finish wood doors at factory or shop. Defer only final touch-up, cleaning and polishing for time after delivery and installation.
- B. Preparations for Finishing: Comply with WDMA I.S. 6A "Industry Standard for Architectural Stile and Rail Doors", for sanding, sealing of concealed surfaces and similar preparations for finishing of wood doors, as applicable to each unit of work.
- C. Finish: Manufacturer's standard interior finish with performance requirements comparable to WDMA TR-8 UV Cured Acrylated Polyester Urethane topcoat.
 - 1. Stain Color: Custom stain to match Wilsonart HPDL indicated on the Door Schedule.

February 27, 2026

2. Topcoat Finish: Clear.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine installed door frames prior to hanging door:
 1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with plumb jambs and level heads.
 2. Reject doors with defects that cannot be repaired in a manner that is imperceptible. Replace doors which cannot be field repaired to match new as approved by the Architect at no additional cost to the Owner. Doors warped in excess of 1/4 inch when measured in accordance with WDMA I.S.-1A and WDMA I.S. 6A shall be rejected.
- B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Hardware: For installation see Section 08710 - FINISH HARDWARE.
- B. Manufacturers' Instructions:
 1. Install wood doors to comply with manufacturer's instructions and of referenced WDMA standards and as indicated.
- C. Job Fit Doors: Align and fit doors in frame with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted with fire-rated doors. Machine doors for hardware. Seal cut surfaces after fitting and machining.
 1. Fitting Clearances for Non-Rated Doors: Provide 1/8 inch at jambs and heads; and 1/2 inch from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 3/8-inch clearance from bottom of door to top of threshold unless indicated for undercut.
 2. Bevel non-rated doors 1/8 inch in 2 inches at lock and hinge edges.

3.03 ADJUSTING AND PROTECTION

- A. Operation: Rehang or replace doors which are hinge bound and do not swing or operate freely. Replace or rehang doors which are warped, twisted, or which are not in true planes.
- B. Repair damaged doors per manufacturer's instructions and guidelines. Doors that cannot be repaired to the manufacturer's standards of quality shall be replaced at no additional expense to the Owner.
- C. Protection: Protect doors as recommended by door manufacturer to assure that wood doors will be without damage or deterioration at time of Substantial Completion

END OF SECTION

SECTION 08305 - ACCESS DOORS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Provide access doors for walls and ceilings as shown or required by drawings as specified herein. Sizes of each type of access door required are indicated on the Drawings. Mechanical and electrical contractors shall furnish locations and numbers of required access doors to General Contractor.
2. Provide Behavioral Health ligature-resistant access door assemblies where indicated on the Drawings,

1.02 DEFINITIONS

- A. Behavioral Health Access Doors: Ligature-resistant access door assemblies located in areas that are accessible to the patients.

1.03 SUBMITTALS

- A. Submit under the provisions of Section 01330 – SUBMITTAL PROCEDURES.
- B. Manufacturer's Data: Submit manufacturer's technical data and installation instructions for each type of access door assembly, including setting drawings, templates, instructions and directions for installation of anchorage devices. Include complete schedule, including types, general locations, sizes, wall and ceiling construction details, finishes, latching or locking provisions, and other data pertinent to installation.
- C. Verification: Obtain specific locations and sizes for required access doors from trades requiring access to concealed equipment and indicate on submittal schedule.

1.04 QUALITY ASSURANCE

- A. Size Variations: Obtain the Architect's acceptance of manufacturer's standard size units which may vary slightly from sizes indicated.
- B. Coordination: Furnish inserts and anchoring devices which must be built into other work for installation of access doors. Coordinate delivery with other work to avoid delay.
- C. Fire Rated Assemblies: Fire rated assemblies shall comply with NFPA 80, "Standard for Fire Doors and Fire Windows" and labeled by Underwriters Laboratories, Intertek/Warnock Hersey or other testing facility acceptable to the authorities having jurisdiction.

PART 2 - PRODUCTS

2.01 STEEL MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
 - 1. ASTM A 123, for galvanizing steel and iron products.
 - 2. ASTM A 153, for galvanizing steel and iron hardware.
- B. Metallic-Coated Steel Sheet: ASTM A 653, Commercial Steel (CS) with A60 zinc-iron-alloy (galvannealed) coating or G60 mill-phosphatized zinc coating; stretcher-leveled standard of flatness; with minimum thickness indicated representing specified thickness according to ASTM A 924.
- C. Steel Finishes: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
 - 1. Surface Preparation for Metallic-Coated Steel Sheet: Clean surfaces with non-petroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.
 - a. Galvanizing Repair Paint: High-zinc-dust-content paint for re-galvanizing welds in steel, complying with SSPC-Paint 20
 - 2. Factory-Primed Finish: Apply shop primer immediately after cleaning and pre-treating.
- D. Drywall Beads: Edge trim formed from 0.0299-inch zinc-coated steel sheet formed to receive joint compound and in size to suit thickness of gypsum board.

2.02 STEEL FLUSH PANEL DOORS FOR WALLS AND CEILINGS

- A. Flush Access Doors and Frames with Exposed Trim: Fabricated from metallic-coated steel sheet with the exception of wet areas where they are to be fabricated from stainless-steel sheet.
 - 1. For use in wall and ceiling surfaces as indicated.
 - 2. Door: Minimum 16-gauge sheet metal, set flush with exposed face flange of frame.
 - 3. Frame: Minimum 16-gauge sheet metal with 1-inch wide, surface-mounted trim.
 - 4. Hinges: Concealed continuous hinge.
 - 5. Latch: Cam latch operated by spanner head wrench with interior release.
- B. For Gypsum Board Non-Rated Installation:
 - 1. Acudor; Model DW-5040.
 - 2. Milcor Style DW.
 - 3. J.L. Industries Model WB.

2.03 BEHAVIORAL HEALTH ACCESS DOORS

- A. Specialty Ligature-Resistant Access Door, Frames and Trim: Fabricated from metallic-coated steel sheet with the exception of wet areas where they are to be fabricated from stainless-steel sheet.
 - 1. For use in wall and ceiling surfaces in areas accessible by patients.
 - 2. Door: Minimum 14-gauge sheet metal, set flush with exposed face flange of frame. Formed door panel with reinforced edges and a concealed hinge, along with closed cell gasket between the door and frame.
 - a. Gasket: PemkoS88 adhesive backed bulb silicone gasket.
 - 3. Frame: Minimum 14-gauge sheet metal with 1-inch wide, surface-mounted trim. Fully welded frame flange, radiused corners.
 - 4. Hinges: Concealed continuous hinge.
 - 5. Latch/Lock: Cylinder lock. For access doors larger than 12" by 12" provide two cylinder locks.
- B. Acceptable Products:
 - 1. Acudor; AL-9500 Specialty Doors Anti-Ligature Access Door.

2.04 FABRICATION

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.
- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.
 - 1. Provide mounting holes in frames for attachment of units to metal framing.
 - 2. Provide mounting holes in frame for attachment of masonry anchors. Furnish adjustable metal masonry anchors.
- D. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Comply with manufacturer's instructions for installation of access doors.
- B. Coordinate installation with work of other trades.
- C. Set frames accurately in position and securely attach to supports with face panels plumb or level in relation to adjacent finish surfaces.

February 27, 2026

3.02 ADJUST AND CLEAN

- A. Adjust hardware and panels after installation for proper operation.
- B. Remove and replace panels or frames which are warped, bowed or otherwise damaged.

END OF SECTION

SECTION 08340 – BEHAVIORAL HEALTH DOORS AND FRAMES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. All labor, materials, equipment, and services necessary to complete the special function doors as shown on the drawings and/or specified herein, including, but not necessarily limited to, the following:
 - a. Ligature-resistant Seclusion door assemblies.
 - b. Anti-Barricade Ligature resistant door assemblies.

B. Related Work Described Elsewhere:

1. Section 08110 – STEEL DOORS AND FRAMES
2. Section 08710 - FINISH HARDWARE.
3. Section 09900 - PAINTING.
4. Section 18320 – ACCESS CONTROL SYSTEM

1.02 REFERENCES

A. American National Standards Institute (ANSI)

1. ANSI/SDI A250.8, Specifications for Standard Steel Doors and Frames
2. ANSI/SDI A250.10, Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
3. ANSI/SDI A250.11, Recommended Erection Instructions for Steel Frames.

B. American Society of Testing and Materials (ASTM)

1. ASTM A 653, Specification for Steel Sheet, Zinc-Coated, (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.
2. ASTM A 1008, Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability. Solution Hardened and Bake Hardenable.
3. ASTM A 1011, Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability and Ultra-High Strength.

1.03 QUALITY ASSURANCE

A. Manufacturer's Qualifications:

1. Provide evidence of having personnel and plant equipment capable of fabricating specialty door and frame products of the types specified.
2. Provide evidence of having a written quality control system in place.

February 27, 2026

- B. Provide assembly compliant to UL-1784 Standard for Air Leakage Tests of Door Assemblies and Other Opening Protectives.
- C. Doors to be pre-assembled with all hardware prior to arriving onsite.

1.04 SUBMITTALS

- A. Submit under the provisions of Section 01330 – SUBMITTAL PROCEDURES.
- B. Manufacturer's Data: Submit manufacturer's technical product data specifications, cut sheets and other data needed to prove compliance with the specified requirements.
 - 1. Materials list of items proposed to be provided under this Section.
- C. Shop Drawings: Submit for fabrication and installation of Behavioral Health doors and frames. Include details of each frame type, conditions at openings, details of construction, location and installation requirements of finish hardware and reinforcements, and details of joints and connections, gauges, and finishes. Show anchorage and accessory items.
- D. Manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the work.
- E. Schedule: Provide a schedule of doors and frames using same reference numbers for details and openings as those on contract drawings.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver hollow metal work cartoned or crated to provide protection during transit and job storage. Strap knock-down frames in bundles. Provide temporary steel spreaders securely fastened to the bottom of each welded frame.
- B. Inspect hollow metal work upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to the Architect; otherwise, remove and replace damaged items as directed.
- C. Store doors and frames at building site under cover in a dry, secure place. Place units on minimum 4-inch high wood blocking. Avoid use of non-vented plastic or canvas shelters which could create humidity chambers.

1.06 COORDINATION

- A. Coordinate Work with other directly affected sections involving manufacture or fabrication of internal cutouts and reinforcement for door hardware, electric devices and recessed items.
- B. Coordinate work with frame opening construction, door and hardware installation.
- C. Sequence installation to accommodate required door hardware.
- D. Coordination: Provide door manufacturer the hardware scheduled in Section 08710 – FINISH HARDWARE but not supplied by the door manufacturer and their templates to enable their installation prior to arriving onsite.

HAWAII HEALTH SYSTEMS CORPORATION – KAUAI DIVISION

Samuel Mahelona Memorial Hospital
Behavioral Health New Patient Facility
Project No. 221093-01

Behavioral Health Doors and Frames
08340-2

February 27, 2026

- E. Contractor responsible for coordination and installation of products covered under this Section shall:
 - 1. Verify and provide to the manufacturer, actual opening sizes and site conditions by field measurements before fabrication. Coordinate field measurements with fabrication and construction schedules to avoid delays.
 - 2. Verify that substrate conditions, whether existing or installed under other Sections, are as detailed in the Architect's drawings and are acceptable for product installation in accordance with the manufacturer's instructions.

1.07 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation, and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

1.08 WARRANTY

- A. Provide manufacturer's standard written warranty in which manufacturer agrees to repair or replace door assembly that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: One (1) year from the date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Galvanized Steel Sheets: Zinc coated commercial quality carbon steel, Type B; suitable for exposed applications, complying with ASTM A 1008.. Comply with ASTM A 653 coating designation A60 for doors and frames.
- B. Inserts, Bolts and Fasteners: Manufacturer's standard units, except hot-dip galvanize, complying with ASTM A 153/A 153M "Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware", Class C or D as applicable.
- C. Factory Applied Primer Paint: Rust-inhibitive enamel paint, either air-drying or baking, suitable as a base for specified finish paints conforming to ANSI A250.10 "Test Procedures and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames". Primers shall be free from asbestos, lead, mercury, chromate, and cadmium.
- D. Architectural Film for door finish: Vinyl 8 mil thickness (thickness includes film and adhesive, excludes liner).
 - 1. Liner: Silicone-coated poly paper, 6.2 mils
 - 2. Adhesive: Pressure-sensitive with air release channels, recommended by manufacturer.

February 27, 2026

2.02 MANUFACTURERS

- A. Behavioral Health Door and Frame Manufacturers (Basis-of-Design): Subject to compliance with requirements of this section, provide doorsets from Kingsway Group, Inc.

2.03 BEHAVIORAL HEALTH DOORSETS

- A. Ligature-Resistant Seclusion Doorset (**Door Type FG1**): SECLUSION High Strength Door System.
 - 1. Complete doorset delivered in two sections: door assembly, frame assembly.
 - 2. Door assembly consisting of 14ga steel stiffened door, ligature resistant 3-point mortise lockset, single acting hinge, optional 3-point secure hatch, and vision panel.
 - 3. Frame assembly to be constructed of minimum 12-gauge mild steel, fully welded.
 - 4. Hardware:
 - a. Single acting continuous hinge: KG111 continuous hinge by Kingsway Group
 - b. Ligature Resistant Mortise Lockset: Per Finish Hardware Schedule specified in Section 08710 – FINISH HARDWARE.
 - c. Clear Vision Panel: Pyrolux P8020 high-secure vision panel with 3/4-inch Trident tempered glass both sides by Kingsway Group.
 - d. Pass Through: High secure Tray Hatch, KG164 by Kingsway Group.
 - 5. Construction: Door to be made with steel stiffened interior & hardware reinforcements. Assembly to be completed with Pin Torx Security Fasteners throughout.
 - 6. Finish: Door and frame factory primed, field finished with paint specified in Section 09900 – PAINTING in color as scheduled.
- B. Anti-Barricade Ligature-Resistant Doorset (**Door Type FG2**): SWING Anti-Barricade Doorset with DTM.
 - 1. Complete doorset delivered in three sections: door assembly, frame assembly, and emergency stop assembly. Additional hardware provided separately with assembly.
 - 2. Door assembly consisting of HM Steel Stiffened Door, Door Top Monitor (DTM), ligature resistant mortise lockset, double acting hinge with 105-degree opening, and privacy vision panel operated by oval-drive staff key which also operates anti-barricade stop.
 - 3. Frame assembly to be constructed of minimum 14-gauge mild steel, fully welded, having single-rabbit strike jamb to coordinate with anti-barricade stop, flush hinge jamb, and flush header. Strike included.
 - 4. Emergency stop assembly to consist of hinged stop with two locking points on jamb, operated by oval drive staff key.

February 27, 2026

5. Hardware:
 - a. Double acting continuous hinge: KG202 Swing Hinge double acting continuous hinge by Kingsway Group
 - b. KG500 Door Top Monitor with alarm & K-Alert annunciation system by Kingsway Group
 - c. Ligature Resistant Mortise Lock set: Per Schedule
 - d. Privacy Vision Panel: Duralux D8200 high-secure privacy vision panel, with 3/4" tempered glass or poly carbonate on patient side, 3/8" tempered glass or poly carbonate on staff side, & 1/8" poly carbonate internal printed sliding privacy pane. All controls installed below glass panes to prevent weak points. Thumb turn patient side, Duralux by Kingsway Group.
 - e. Anti-barricade stop: Kingsway SwingStop anti-barricade stop with two locking points by Kingsway Group – KG207.
6. Construction: Door to be made having a steel stiffened core. Assembly to be completed with Pin Torx Security Fasteners throughout.
7. Finish: Door and frame finished with manufacturer's factory-applied powder-coat finish in color as scheduled on the Drawings.

2.04 DOOR FINISHES

- A. Factory Priming for SECLUSION door scheduled to receive field painted finish:
 1. Clean, phosphatize, and prime paint exposed surfaces of steel doors and frame units, including galvanized surfaces.
 2. Clean steel surfaces of mill scale, rust, oil, grease, dirt, and other foreign materials before application of paint.
 3. Apply factory coat of prime paint to an even consistency to provide a uniformly finished surface ready to receive finish paint.
- B. Factory Powder-Coat Finish for SWING door:
 1. Powder-Coat Finish: Prepare, treat, and coat galvanized metal to comply with resin manufacturer's written instructions and as follows:
 - a. Prepare galvanized metal by thoroughly removing grease, dirt, oil, flux, and other foreign matter.
 - b. Treat prepared metal with zinc-phosphate pretreatment, rinse, and seal surfaces.
 - c. Apply thermosetting polyester or acrylic urethane powder coating with cured-film thickness not less than 1.5 mils (0.04 mm).
 2. Color: As scheduled on the Drawings.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Examine the areas and conditions where special function doors are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.02 INSTALLATION, DOORS

- A. Coordinate as required with other trades to ensure proper and adequate provision in the work of those trades for interface with the work of this Section.
- B. Install the work of this Section in strict accordance with the original design, the approved Shop Drawings, pertinent requirements of governmental agencies having jurisdiction, and the manufacturer's recommended installation procedures.

3.03 TOLERANCES

- A. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - 1. Squareness: Plus, or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - 2. Alignment: Plus, or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - 3. Twist: Plus, or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - 4. Plumbness: Plus, or minus 1/16 inch, measured at jambs at floor.

3.04 ADJUST AND CLEAN

- A. Factory Coat Touch-up: Immediately after erection, sand smooth any rusted or damaged areas of factory coating and apply touch-up of matching air-drying coating.
- B. Final Adjustments: Check and readjust operating finish hardware items, leaving steel frames undamaged and in complete and proper operating conditions.

END OF SECTION

SECTION 08460 - AUTOMATIC ENTRANCE DOORS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Aluminum framed exterior, sliding, power-operated automatic doors with operator, motion/presence sensor control device that have been manufactured, fabricated and installed to maintain performance criteria specified without defects, damage or failure.

B. Related Sections:

1. Section 04810 – UNIT MASONRY ASSEMBLIES
2. Section 07910 – EXTERIOR WALL JOINT SEALANTS.
3. Section 08520 – GLAZED ALUMINUM SYSTEMS
4. Section 08710 – FINISH HARDWARE.
5. Section 08800 - GLAZING.
6. Section 16000 – GENERAL REQUIREMENTS FOR ELECTRICAL WORK

1.02 SYSTEM DESCRIPTION

A. Doors Powered to Open Position:

1. Doors powered by DC electric motor and mechanical gear assembly transmitted to active leaves by fiberglass-reinforced tooth drive belt transport system.
2. Power door to open position by signals received by microprocessor from the actuation controls.
3. The last portion of the opening cycle shall be controlled by a microprocessor generated signal that electronically reduces voltage to motor until door is fully open.
4. To permit safe passage if an obstruction is detected between opening doors and surrounding walls or interior fittings, the doors shall immediately stop and after a delay go to the full closed position.

B. Doors Powered to Closed Position:

1. The active leafs will only be powered to closed position when all actuating devices are cleared and after remaining in the open position for a preset time delay (per ANSI standards).
2. The last portion of the closing cycle shall be controlled by a microprocessor generated signal that electronically reduces voltage to the motor until door is fully closed.
3. To permit safe passage between closing doors, the doors immediately reverse to open position if an obstruction is detected, then resume their

interrupted movement at low speed to check whether the obstruction has disappeared or not.

C. Watchdog Monitoring:

1. Microprocessor Software: Constantly monitor drive train system operations.
2. Watchdog Control Circuit: Assume command of system and shut down automatic function by holding doors open, should door speed, motor function, or drive train operations deviate from design criteria ranges.
3. Secondary Supervisory Circuit: Monitor main Watchdog control circuit every 255 door cycles, ready to perform as a backup.

1.03 PERFORMANCE REQUIREMENTS

A. General: Provide package that has been designed and fabricated to comply with specified performance requirements, as demonstrated by testing manufacturer's corresponding standard systems.

B. Structural Performance: Automatic entrances shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated according to IBC 2018 and ASCE/SEI 7.

1. Wind Design Criteria: As indicated on the Structural Drawings
2. Design corners for simultaneous positive (inward) design pressures on both surfaces, and simultaneous negative (outward) design pressure on both surfaces.
3. Partial loading on one surface shall also be considered.
4. Deflection for metal members supporting glass, the performance criteria shall be as follows:
 - a. Perpendicular to the plane of the wall, net deflection of framing members shall be per AAMA TIR-A11 and shall not exceed 1/175 times span for spans up to 13' – 6".
 - 1) Where a sealant joint occurs between a framing member and a relatively stiff building element, framing member deflection shall not exceed 1/2 of the nominal joint width, or less if required by sealant manufacturer.
 - 2) Where a framing member runs continuously past a deflecting support, the support deflection shall be considered in the analysis.
 - b. In the plane of the wall, deflection of framing members shall not exceed 1/8 inch. This includes horizontal rail sag due to dead load. Any twist of the horizontal sill members due to dead load shall be limited to 1 degree.
 - c. At connection points of framing members to anchors, combined movement of anchor relative to building structure, and framing member relative to anchor, shall not exceed 1/16 inch in any direction.

- d. Stresses shall not exceed the allowable values established by the specifications listed in code standards. In no case shall allowable values exceed the yield stress. Where permitted by code, a 1/3 increase in allowable stress for wind or seismic load is generally acceptable, but not in combination with any reduction applied to combined loads.
 - e. Sealants and interior finishes shall not be assumed to contribute to framing member strength or stiffness.
 - 5. Performance criteria at safety loads (150% design load) for metal members supporting glass, the performance criteria shall be as follows:
 - a. For metal members supporting glass the net permanent deflection of framing members shall not exceed 1/1000 times span.
 - b. There shall be no failure or gross permanent distortion of framing members, anchors or connections.
 - c. At connection points of framing members to anchors, combined movement of anchor relative to building structure, and framing member relative to anchor, shall not exceed 1/16-inch set after load is removed
 - 6. Seismic Loads: As determined by IBC 2018 and ASCE/SEI 7.
 - C. Operating Temperature Range: Provide automatic entrances that operate within minus 20 to plus 122 deg F.
 - D. Air Infiltration: Maximum air leakage through fixed glazing and framing areas of 1.25 cfm/sq. ft. of fixed entrance system area when tested according to ASTM E 283 at a minimum static-air-pressure difference of 1.57 lbf/sq. ft.
 - E. Opening-Force Requirements:
 - 1. Power-Operated Doors: Not more than 50 lbf required to manually set door in motion if power fails, and not more than 15 lbf required to open door to minimum required width.
 - F. Entrapment Force Requirements:
 - 1. Power-Operated Sliding Doors: Not more than 30 lbf required to prevent stopped door from closing.
 - G. Forced-Entry Resistance for Aluminum Framed Doors: Performance Level 10 per ASTM F 842 tested per AAMA 1303.5.
- 1.04 SUBMITTALS
- A. Comply with Section 01330 - SUBMITTAL PROCEDURES.
 - B. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for automatic entrances. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
 - C. Shop Drawings: For automatic entrances. Include plans, elevations, sections, details, hardware mounting heights, and attachments to other work.

February 27, 2026

1. Wiring Diagrams: For power, signal, and control wiring.
 2. Activation and safety devices.
 3. Include hardware schedule and indicate hardware types, functions, quantities, and locations.
- D. Coordinated Calculation Submission:
1. Provide structural calculations, sealed by a Professional Engineer currently licensed in the State of Hawaii prepared in compliance with referenced documents and these specifications.
 2. Where specifications and code differ, the more severe requirements shall govern. Test reports are not an acceptable substitute for calculations. Calculations shall include the following information:
 - a. Analysis for all applicable loads on framing members.
 - b. Deflection limitations of glass framing system.
 - c. Analysis for all applicable loads on anchors, including anchors embedded in concrete.
 - d. Section property computations for framing members.
 - e. Certification of conformance with structural test pressures and design pressures indicated. Include evidence of compliance by submission of product test reports with notations as required by professional engineer.
- E. Samples for Verification: Submit manufacturer's samples of aluminum finishes in manufacturer's standard sizes.
- F. Qualification Data: For Installer, manufacturer and certified inspector.
- G. Product Certificates: For each type of automatic entrance, from manufacturer.
- H. Product Test Reports: Submit certified test reports from UL, CUL, and ICBO indicating doors comply with specified performance requirements.
- I. Field Quality-Control Reports: Submit manufacturer's field reports from AAADM certified technician of inspection and approval of doors for compliance with ANSI/BHMA 156.10 after completion of installation.
- J. Maintenance Data: For automatic entrances, safety devices, and control systems to include in maintenance manuals.
- K. Warranties: Sample of special warranties.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A manufacturer with company certificate issued by AAADM, continuously engaged in manufacturing of doors of similar type to that specified, with a minimum of 10 years successful experience.
1. Door, frame, operator, and sensor components from same manufacturer.
- B. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation and maintenance of units required for this Project.

February 27, 2026

1. Minimum of 3 years documented successful experience in installation of similar doors.
2. AAADM certified.
- C. Certified Inspector Qualifications: Certified by AAADM.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- E. Source Limitations for Automatic Entrances: Obtain each type of door, frame, operator and sensor components specified in this Section from a single source, same manufacturer unless otherwise indicated.
- F. Power-Operated Door Standard: BHMA A156.10.
- G. Preinstallation Conference: Conduct conference at Project site.
 1. Review methods and procedures related to automatic entrances including, but not limited to, the following:
 - a. Construction schedule. Verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - b. Coordination with electrical, glazing, and other trades.
 - c. Required testing, inspecting, and certifying procedures.

1.06 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings to receive automatic entrances by field measurements before fabrication.

1.07 COORDINATION

- A. Templates: Obtain templates for doors, frames, and other work specified to be factory prepared for installing automatic entrances, and distribute to parties involved. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing automatic entrances to comply with indicated requirements.
- B. Coordinate hardware with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish. Coordinate hardware for automatic entrances with hardware required for rest of Project.
- C. Electrical System Roughing-in: Coordinate layout and installation of automatic entrances with connections to power supplies and access-control system.

1.08 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of automatic entrances that fail in materials or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Faulty operation of operators, controls, and hardware.

- b. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
- 2. Warranty Period: Two (2) years from the date of Substantial Completion.

1.09 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, provide 12 months' full maintenance by skilled employees of automatic entrance Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper automatic entrance operation at rated speed and capacity. Provide parts and supplies the same as those used in the manufacture and installation of original equipment.
 - 1. Engage a certified inspector to perform safety inspection after each adjustment or repair and at end of maintenance period. Furnish completed inspection reports to Owner.
 - 2. Perform maintenance, including emergency callback service, during normal working hours.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Aluminum: Doors and Frames to be constructed of extruded aluminum, Alloy 6063-T5.
 - 1. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
 - 2. Sheet and Plate: ASTM B 209.
- B. Steel Reinforcement: With manufacturer's standard corrosion-resistant primer complying with SSPC-PS Guide No. 12.00 applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.
 - 1. Structural Shapes, Plates, and Bars: ASTM A 36.
 - 2. Cold-Rolled Sheet and Strip: ASTM A 1008.
 - 3. Hot-Rolled Sheet and Strip: ASTM A 1011.
- C. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 316 stretcher-leveled standard of flatness, in entrance manufacturer's standard thickness.
- D. Glass: Insulating Glass Units, 1-inch thick as specified in Section 08800 – EXTERIOR GLAZING
- E. Sealants and Joint Fillers: As specified in Section 07910 – EXTERIOR WALL JOINT SEALANTS.
- F. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, non-staining, nonbleeding fasteners and accessories compatible with adjacent materials.

2.02 SLIDING AUTOMATIC ENTRANCES

- A. General: Provide manufacturer's standard automatic entrances including doors, sidelites, framing, headers, carrier assemblies, roller tracks, door operators, activation and safety devices, and accessories required for a complete installation.
1. Operator Features:
 - a. Power opening and closing.
 - b. Drive System: Mechanical gear system or belt.
 - c. Adjustable opening and closing speeds.
 - d. Adjustable hold-open time between 0 and 60 seconds.
 - e. Obstruction recycle.
 - f. On-off/hold-open switch to control electric power to operator, key operated.
 - g. Energy-conservation switch that reduces door-opening width.
 2. Sliding Door Carrier Assemblies and Overhead Roller Tracks: Manufacturer's standard carrier assembly that allows vertical adjustment; consisting of nylon- or delrin-covered, ball-bearing-center steel wheels operating on a continuous roller track, or ball-bearing-center steel wheels operating on a nylon- or delrin-covered, continuous roller track. Support doors from carrier assembly by cantilever and pivot assembly.
 - a. Rollers: Minimum of two ball-bearing roller wheels and two antirise rollers for each active leaf.
 3. Sliding Door Threshold Configuration: No threshold across door opening and recessed guide track system at sidelites.
 4. Combination Activation and Safety Device: Combination motion/presence sensor.
 - a. Activation Device: Motion sensor mounted on each side of door header to detect pedestrians in activating zone and to open door.
 - b. Safety Devices: Presence sensor mounted on each side of door header to detect pedestrians in presence zone and to prevent door from closing.
 5. Sidelite Safety Device: Presence sensor, mounted above each sidelite on side of door opening through which doors travel, to detect obstructions and to prevent door from opening.
- B. Automatic Entrance:
1. Basis-of-Design: Subject to compliance with requirements, provide Besam Resilience, Overhead Concealed, bi-parting door with fixed sidelites as manufactured by ASSA ABLOY; or comparable product by one of the following:
 - a. Horton Automatics; Div. of Overhead Door Corporation.
 - b. Sierra Automatic Doors, Inc

2. Configuration:

- a. Identified on the drawings as (**SRG1**): Bi-parting-sliding doors, with two sliding leaves and sidelites on each side.
 - 1) Traffic Pattern: Two-way.
 - 2) Mounting: Between jambs.

2.03 ENTRANCE COMPONENTS

A. Aluminum Framed Automatic Doors:

- 1. Door and Sidelight Framing Members: Manufacturer's standard extruded aluminum, minimum 0.125-inch-thick and reinforced as required to support imposed loads.
 - a. Nominal Size: 1-3/4 by 6 inches.
- 2. Stile and Rail Doors: Manufacturer's standard 1-3/4-inch- thick glazed doors with minimum 0.125-inch- thick, extruded-aluminum tubular stile and rail members. Mechanically fasten corners with reinforcing brackets that are welded or incorporate concealed tie-rods that span full length of top and bottom rails.
 - a. Glazing Stops and Gaskets: Beveled, snap-on, extruded-aluminum stops and manufacturer's standard preformed gaskets.
 - b. Stile Design: Narrow stile; 2-1/8-inch.
 - c. Rail Design: Top rail to match stile width, 10-inch nominal height for bottom rail.

B. Headers: Fabricated from minimum 0.125-inch thick, extruded aluminum and extending full width of automatic entrance units to conceal door operators and controls. Provide hinged or removable access panels for service and adjustment of door operators and controls. Secure panels to prevent unauthorized access.

- 1. Mounting: Concealed, with one side of header flush with framing.
- 2. Capacity:
 - a. Aluminum Framed Doors: Capable of supporting doors up to 300 pounds per leaf over spans up to 14 feet without intermediate supports.
 - b. Provide sag rods for spans exceeding 14 feet.

C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

D. Signage: Affixed to both sides of each door as required by BHMA A156.10 for type of door and its operation.

- 1. Application Process: Decals.
- 2. Provide sign materials with instructions for field application after glazing is installed.

2.04 DOOR OPERATORS AND ACTIVATION AND SAFETY DEVICES

- A. Door Operators: Provide door operators of size recommended by manufacturer for door size, weight, and movement; for condition of exposure; and for long-term, maintenance-free operation under normal traffic load for type of occupancy indicated.
 - 1. Electromechanical Operators: Concealed, self-contained, overhead unit powered by fractional-horsepower, permanent-magnet dc motor; with closing speed controlled mechanically by gear train and dynamically by braking action of electric motor; with solid-state microprocessor controller; UL 325; and with manual operation with power off.
- B. Combination Motion/Presence Sensors: Self-contained units; consisting of both motion and presence sensors in a single metal or plastic housing; adjustable to provide detection field sizes and functions required by BHMA A156.10.
 - 1. Motion Sensor: K-band-frequency, microwave-scanner units; with relay hold time of not less than 2 to 10 seconds.
 - a. Provide capability for switching between bidirectional and unidirectional detection.
 - 2. Presence Sensor: Infrared-scanner units; with relay hold time of not less than 2 to 10 seconds. Sensors shall remain active at all times.
- C. Electrical Interlocks: Unless units are equipped with self-protecting devices or circuits, provide electrical interlocks to prevent activation of operator when door is locked, latched, or bolted.

2.05 HARDWARE

- A. General: Provide units in sizes and types recommended by automatic entrance and hardware manufacturers for entrances and uses indicated. Finish exposed parts to match door finish unless otherwise indicated.
- B. Deadlocks: Manufacturer's standard deadbolt operated by exterior cylinder and interior thumb turn, with minimum 1-inch-long throw bolt; BHMA A156.5, Grade 1.
 - 1. Cylinders: As specified in Section 08710 – FINISH HARDWARE
 - a. Keying: Integrate into building master key system.
 - 2. Deadbolts: Steel, mortise type, BHMA A156.5, Grade 1.
- C. Dustproof Strikes: As specified in Section 08710 – FINISH HARDWARE
- D. Weather Stripping: Manufacturer's standard replaceable components.
 - 1. Sliding Type: AAMA 701, made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.

2.06 FABRICATION

- A. General: Factor-fabricate automatic entrance components to designs, sizes, and thicknesses indicated and to comply with indicated standards.
 - 1. Form aluminum shapes before finishing.

February 27, 2026

2. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
 3. Use concealed fasteners to greatest extent possible. Where exposed fasteners are required, use countersunk Phillips flat-head machine screws fabricated from stainless steel.
 - a. Where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
 - b. Reinforce members as required to receive fastener threads.
 4. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.
- B. Framing: Provide automatic entrances as prefabricated assemblies. Complete fabrication, assembly, finishing, hardware application, and other work before shipment to Project site.
1. Fabricate tubular and channel frame assemblies with manufacturer's standard welded or mechanical joints. Provide subframes and reinforcement as required for a complete system to support required loads.
 2. Perform fabrication operations in manner that prevents damage to exposed finish surfaces.
 3. Form profiles that are sharp, straight, and free of defects or deformations.
 4. Provide components with concealed fasteners and anchor and connection devices.
 5. Fabricate components with accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion.
 6. Fabricate exterior components to drain water passing joints and condensation and moisture occurring or migrating within system to the exterior.
 7. Provide anchorage and alignment brackets for concealed support of assembly from building structure.
 8. Allow for thermal expansion of exterior units.
- C. Doors: Factory fabricated and assembled in profiles indicated. Reinforce as required to support imposed loads and for installing hardware.
- D. Door Operators: Factory fabricated and installed in headers, including adjusting and testing.
- E. Glazing: Fabricate framing with minimum glazing edge clearances for thickness and type of glazing indicated, according to GANA's "Glazing Manual."
- F. Hardware: Factory install hardware to greatest extent possible; remove only as required for final finishing operation and for delivery to and installation at Project site. Cut, drill, and tap for factory-installed hardware before applying finishes.

February 27, 2026

1. Provide sliding-type weather stripping, mortised into door, at perimeter of doors.
- G. Activation and Safety Devices:
 1. General: Factory install devices in doors and headers as required by BHMA A156.10 for type of door and direction of travel.

2.07 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Apply organic finishes to formed metal after fabrication unless otherwise indicated.
- D. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- E. Finish: All exposed aluminum surfaces shall be free of scratches and other blemishes. Pre-clean surfaces and provide a conversion coating and provide exposed surfaces of aluminum with a three coat, Fluoropolymer (70 percent PVDF) Coating System, factory-applied, oven baked conforming to AAMA 2605, "Superior Performance Organic Coatings on Aluminum Extrusions and Panels", with a total dry film thickness of not less than 1.2 mils.
 1. Color: To match finishes specified in Section 08520 – GLAZED ALUMINUM SYSTEMS

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances, header support, and other conditions affecting performance of automatic entrances.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. General: Do not install damaged components. Fit frame joints to produce hairline joints free of burrs and distortion. Rigidly secure nonmovement joints. Seal joints watertight.
 1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.
 2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

February 27, 2026

- B. Entrances: Install automatic entrances plumb and true in alignment with established lines and grades without warp or rack of framing members and doors. Anchor securely in place.
 - 1. Install surface-mounted hardware using concealed fasteners to greatest extent possible.
 - 2. Set headers, carrier assemblies, tracks, operating brackets, and guides level and true to location with anchorage for permanent support.
 - 3. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within system to exterior.
- C. Door Operators: Connect door operators to electrical power distribution system as specified in Division 16 Sections.
- D. Activation and Safety Devices: Install and adjust devices to provide detection field and functions indicated.
- E. Glazing: Install glazing as specified in Section 08800 – GLAZING.
- F. Sealants: Comply with requirements specified in Section 07910 – EXTERIOR WALL JOINT SEALANTS to provide weathertight installation.
 - 1. Seal perimeter of framing members with sealant.
- G. Signage: Apply signage on both sides of each door as required by referenced door standards.
- H. Wiring within Automatic Entrance Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's written limitations on bending radii. Provide and use lacing bars and distribution spools.

3.03 FIELD QUALITY CONTROL

- A. Inspection: Engage Installer's AAADM certified inspector to test and inspect automatic entrances and prepare test and inspection reports.
 - 1. Certified inspector shall test and inspect each automatic entrance to determine compliance of installed systems with applicable BHMA standards.
 - 2. Inspection Report: Certified inspector shall submit report in writing to Architect and Contractor within 24 hours after inspection.
- B. Work will be considered defective if it does not pass tests and inspections.

3.04 ADJUSTING

- A. Adjust door operators, controls, and hardware for smooth and safe operation and for tight closure; comply with requirements in BHMA A156.10.
- B. Lubricate operating hardware and other moving parts as recommended by manufacturer.
- C. Readjust door operators and controls after repeated operation of completed installation equivalent to 3 days' use by normal traffic (100 to 300 cycles). Lubricate hardware, operating equipment, and other moving parts.

February 27, 2026

- D. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

3.05 CLEANING AND PROTECTION

- A. Clean glass and metal surfaces promptly after installation. Remove excess glazing and sealant compounds, dirt, and other substances. Repair damaged finish to match original finish.
 - 1. Comply with requirements in Section 08800 - GLAZING for cleaning and maintaining glass.

3.06 DEMONSTRATION

- A. Engage a certified inspector to train Owner's maintenance personnel to adjust, operate, and maintain automatic entrances.

END OF SECTION

SECTION 08410 - ALUMINUM STOREFRONT AND ENTRANCES

PART 1 - GENERAL

1.01 SUMMARY

- A. This section includes the provision and installation of Glazed Aluminum Systems including Aluminum Storefront Framing and Aluminum Entry Door, Multi-Sliding Pocket Doors, Exterior Glass and Glazing, and Exterior Wall Joint Sealants as well as a coordinated installation of this work with the fiber cement siding and sintered stone wall cladding systems.
 - 1. The reference to "Glazing Contractor" in this and related Sections shall be the single firm to assume undivided responsibility of the Work as described above and herein
- B. Coordination of the interface of the Glazed Aluminum Systems with other trades as necessary to provide for proper function of the combined exterior wall system components.
- C. Perform and provide all labor, engineering, materials, equipment and all supplementary items necessary to complete, as indicated by the Contract Documents, the proper installation of the Glazed Aluminum Systems. This work includes but is not limited to the following:
 - 1. All exterior Glazed Aluminum Systems, including vision glazing, exterior and interior aluminum trim, aluminum copings, and all other features.
 - 2. All glass and glazing for the above components, as specified in Section 08800 - GLAZING.
 - 3. All sealants, caulking, joint fillers and gaskets for a weathertight performance of the Glazed Aluminum Systems, as specified in Section 07910 – EXTERIOR WALL JOINT SEALANTS.
 - 4. All anchorage of above components, including pre-set inserts in concrete slab (installed by others), kickers, steel or aluminum reinforcing, etc.
 - 5. All vents, weeps, weep tubes, bellows, baffles, closures, end dams, gutters, flashings and trim as shown, or as may be required in conjunction with system or to join systems to adjacent construction.
 - 6. All design, engineering calculations and shop drawings for the complete design of the Glazed Aluminum Systems.
- D. Related work not included in this section:
 - 1. Section 03300 – CAST-IN-PLACE CONCRETE
 - 2. Section 04810 – UNIT MASONRY ASSEMBLIES
 - 3. Section 05120 – STRUCTURAL STEEL
 - 4. Section 07241 – DIRECT-APPLIED EXTERIOR FINISH SYSTEM
 - 5. Section 07600 – FLASHING AND SHEET METAL
 - 6. Section 07910 – EXTERIOR WALL JOINT SEALANTS
 - 7. Section 08800 – GLAZING

1.02 CODES AND STANDARDS

- A. The work of this section shall comply with the latest edition of the following standards. When conflicts arise between standards, the more stringent shall apply.
- B. AA – Aluminum Association
 - 1. Specifications for Aluminum Structures
- C. FGIA – Fenestration and Glazing Industry Alliance
 - 1. AAMA/WDMA/CSA 101/I.S.2/A440, NAFS 2011 – North American Fenestration Standard/Specification for Windows, Doors and Skylights.
 - 2. AAMA 501, Field Testing of Metal Curtain Walls.
 - 3. AAMA 501.1, Standard Test Method for Water Penetration of Windows, Curtain Walls and Doors Using Dynamic Pressure.
 - 4. AAMA 501.2, Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems.
 - 5. WSG.1, Window Selection Guide
 - 6. AAMA 2605, Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels
 - 7. AAMA 609 & 610, Voluntary Guide Specification for Cleaning and Maintenance of Painted Aluminum Extrusions and Curtain Wall Panels
 - 8. AAMA 800, Test Methods for Sealants
 - 9. AAMA 1503, Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.
 - 10. RPC, Rain Penetration Control.
 - 11. AAMA 620, Voluntary Specifications for High Performance Organic Coatings on Coil Coated Architectural Aluminum Substrates
 - 12. AAMA TIR A11-96, Maximum Allowable Deflection of Framing Systems for Building Cladding Components at Design Wind Loads
- D. ANSI – American National Standards Institute– Latest Edition
 - 1. ANSI Z97.1, Performance Specifications and Methods of Test for Transparent Safety Glazing Material Used in Buildings
- E. AISC – American Institute of Steel Construction– Latest Edition
 - 1. AISC, Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings", including commentary of the AISC Specifications, latest edition.
 - 2. AISC, Specifications for the Design of Cold - Formed Steel Structural Member", 9th Edition.
- F. ASCE – American Society of Civil Engineers– Latest Edition
 - 1. SEI/ASCE 7, Minimum Design Loads for Buildings and Other Structures
- G. ASTM – American Society for Testing and Materials

February 27, 2026

1. ASTM A 36, Standard Specification for Carbon Structural Steel
2. ASTM A 123, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
3. ASTM B 117, Practice for Operating Salt Spray (Fog) Apparatus
4. ASTM B 221, Specification for Aluminum - Alloy Extruded Bar, Rod, Wire, Profiles and Tubes
5. ASTM B 209, Specification for Aluminum and Aluminum-Alloy Sheet and Plate
6. ASTM B 210, Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes
7. ASTM B 211, Specification for Aluminum and Aluminum-Alloy Bar, Rod and Wire
8. ASTM C 509, Specification for Elastomeric Cellular Elastomeric Performed Gasket and Sealing Materials
9. ASTM C 864, Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks and Spacers
10. ASTM D 968, Test Method for Abrasion Resistance of Organic Coatings by Falling Abrasive
11. ASTM D 1654, Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments
12. ASTM D 2244, Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
13. ASTM D 2247, Practice for Testing Water Resistance of Coatings in 100% Relative Humidity
14. ASTM D 3363, Test Method for Film Hardness by Pencil Test
15. ASTM D 4214, Test Method for Evaluating Degree of Chalking of Exterior Paint Films
16. ASTM E 283, Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
17. ASTM E 330, Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference
18. ASTM E 331, Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
19. ASTM E 783, Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors.
20. ASTM E 1105, Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Curtain Walls and Doors by Uniform or Cyclic Static Air Pressure Difference.

H. SSPC-Society for Protecting Coatings.

February 27, 2026

1. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic")
- I. AWS – American Welding Society
 1. AWS D1.1, Structural Welding Code – Steel
 2. AWS D1.2, Structural Welding Code – Aluminum
- J. SMACNA – Sheet Metal and Air Conditioning Contractors National Association, Inc.
 1. Architectural Sheet Metal Manual
- K. NGA/GANA – National Glass Association/Glass Association of North America
 1. Glazing Manual
 2. Glazing Sealing Systems Manual
- L. IFI – Industrial Fasteners Institute
 1. Handbook on Bolt, Nut and Rivet Standards
- M. IBC 2018 with Kauai County amendments.

1.03 QUALITY ASSURANCE

- A. Glazing Contractor assumes undivided responsibility for fabrication, installation and total coordination of all components of the Work as described above and herein.
 1. Securing a weathertight seal with all systems, surfaces and related materials. Each individual system is to be designed and coordinated with the others to perform as one integrated unit with regards to air infiltration, the collection and removal of water infiltration, the resistance against vapor and performance under both structural and seismic events.
 2. This firm must demonstrate not less than 10 years consecutive successful experience in fabrication and installation of work similar to the work of this project. Individual experience does not qualify.
- B. Manufacturer Qualifications: Company with not less than 10 years' experience in manufacturing products similar to scope of this Project with a record of successful in-service performance systems.
- C. Fabricator Qualifications: Company with not less than 10 years' experience with successful production of specified work similar to scope of this Project; with a record of successful in-service performance; and with sufficient capability, facilities, and trained and skilled personnel.
- D. Installer Qualifications:
 1. Experience: Company with not less than 10 years' experience in performing specified work similar in design, products, and extent to scope of this Project; with a record of successful in-service performance; and with sufficient production capability, facilities, and trained and skilled personnel.

February 27, 2026

2. Supervision: Maintain a competent supervisor who is at Project during times specified work is in progress, and, who is experienced in installing work similar in design, products, and extent to scope of this Project.
 3. Manufacturer Certification: Installer shall be certified or approved by the manufacturer to install specified work.
 4. Manufacturer Training: Supervisor and installing personnel trained by technical representatives of manufacturer.
- E. The Owner, Architect and their representatives reserve the right to visit the fabricating and manufacturing facilities of the Glazing Contractor, sub-contractor or material supplier, and the testing laboratory at any time while the work is in progress.
- F. All shop and field materials as well as workmanship shall be subject to inspection by the Owner, Architect or their representatives at all times. Such inspections do not relieve the Glazing Contractor from obligations to provide the Glazed Aluminum Systems conforming to all requirements of the Contract Documents.
- G. Delegated Engineering Professional Qualifications: Professional engineer legally authorized to practice in jurisdiction where Project is located and experienced in providing engineering services of kind indicated that have resulted in work similar to this Project, and, who has a record of successful in-service performance.
- H. Manufacturers Technical Representative Qualifications: Direct employee of technical services department of manufacturer with minimum of 5 years experience in providing recommendations, observations, evaluations, and problem diagnostics. Sales representatives are not acceptable.
- I. Source Limitations: Obtain Glazed Aluminum Systems through one source from a single manufacturer or materials and components certified by the system manufacturer as compatible with other system components.
- J. Field Measurement: Wherever possible, take field measurements prior to preparation of shop drawings and fabrication, to ensure proper fitting of work. However, proceed with fabrication and coordinate installation tolerances as necessary when field measurements might delay work.
- K. Pre-Installation Conference: Before beginning work of this Section, conduct conference at Project to comply with requirements of appropriate Division 01 Sections.
1. Required Attendees:
 - a. Owner
 - b. Architect.
 - c. Contractor, including supervisor.
 - d. Glazed aluminum systems installer, including supervisor.
 - e. Installers of adjacent work, including supervisors.
 - f. Manufacturer's technical representative.
 2. Minimum Agenda:
 - a. Review Contract Document requirements.

- b. Review approved submittals.
 - c. Review installation procedures.
 - d. Review specified inspection and testing.
 - e. Review forecasted weather conditions and procedures for coping with unfavorable conditions.
 - f. Tour representative areas of required work, discuss and evaluate for compliance with Contract Documents and approved submittals, including substrate conditions, surface preparations, sequence of installation and other preparatory work performed by other installers.
3. Reports: Record discussions, including decisions and agreements reached, and prepare report.

1.04 DRAWINGS AND SPECIFICATIONS

- A. The character of these documents are intended to provide a performance type specification for the design, fabrication and installation of the Glazed Aluminum Systems. The Glazing Contractor is responsible for the engineering and design of all components as well as the fabrication, installation and performance of the systems.
- B. The architectural drawings are diagrammatic. The details shown are intended as a guide for the aesthetic and interfacing requirements of the various components of the exterior wall to and with other work; details are intended to establish basic dimensions of the module and the sight lines, jointing and profiles of members. The Glazing Contractor is responsible for the design and engineering of the system within these aesthetic parameters. The drawings are not to be construed as engineering design, or adequate to meet the engineering design requirements.
- C. It is recognized that the architectural design details do not cover some conditions or modifications, which may be required. It is, however, intended that conditions not detailed shall be developed through the Glazing Contractor's shop drawings to the same level of aesthetics and in compliance with performance criteria as indicated for detailed areas and as stipulated in these specifications. The Glazing Contractor, by accepting a contract for the work, acknowledges this and agrees that the Architect shall have the final say as to all matters whether detailed or not on the architectural design details.

1.05 SUBMITTALS

- A. Submit under the provisions of Section 01330 - SUBMITTAL PROCEDURES.
- B. Prior to submitting any documents required for approval, provide an itemized list of specification requirements and architectural drawing requirements which are not embodied in the contract, or intended contract, for work of this section. In the event that there are no deviations, provide a written statement of full compliance with architectural drawings and specifications.
- C. Manufacturer's Data: Submit complete manufacturer's technical literature, including full description of all materials and hardware including weather

February 27, 2026

resistance data and fabrication techniques. Submittals must also include but not be limited to:

1. General:
 - a. Product data for all components of the system.
 - b. Construction details and fabrication methods.
 - c. Instructions / recommendations for storage, protection and handling
 - d. Installation Instructions
 - e. Instructions / recommendations for repair and maintenance, including:
 - 1) Cleaning of the system
 - 2) Adjustment for doors, windows and other moving parts
 - 3) Detailed re-glaze procedures for all types of glass.
 - f. Certified test reports showing compliance with performance requirements where test methods are indicated.
 - g. Samples of all materials to be encompassed in the work in the size and quantity as required by the project documents.
2. Glass & Glazing
 - a. Comply with submittal requirements of Section 08800 –GLAZING.
 - b. Three (3) 12" x 12" sample of each glass type, manufacturer's published data for specified glazing material and recommended glazing requirement.
 - c. Three (3) 12" long glazing gasket sample including molded corners.
 - d. Provide glass manufacturers wind and thermal stress analysis, and center deflection calculations showing that specified maximum probabilities of breakage are not exceeded.
3. Sealants & Backer Rod
 - a. Comply with submittal requirements of Section 07910 – EXTERIOR WALL JOINT SEALANTS.
 - b. For each type of Sealant provide three (3) cured samples and four (4) copies of technical data and color selection charts.
 - c. Compatibility and Adhesion Test Reports: For each type of sealant manufacturer's report on compatibility, staining and adhesion tests.
 - d. Sealant Backer Rod (Section 07910): Four (4) 12" long samples and technical data.
4. Aluminum Finishes: (3) 2" x 4" samples of each extrusion, flat sheet or formed shapes showing color finish to be used on this project. Upon approval, submit 3 sets of 3 color sample of each finish identifying the color range variation.
5. Finished Aluminum Extrusions: (3) 12" long finished aluminum extrusion samples of the production run on all extrusion shapes involving a snap fit. Snap fits are to be designed using ½ standard tolerances.

February 27, 2026

- a. Per request only, provide (1) assembled cross shaped sample of any horizontal to vertical intersection.
6. Anchorage:
 - a. Fasteners: 3 of each fastener type along with technical data, mill certificates and test reports.
 - b. Product data for anchorage, setting accessories and other related materials.
7. Product data and test reports on hardware and related accessories for each type of door and window indicated. The Architect reserves the right to require samples that show fabrication techniques and workmanship and design of hardware and accessories.
8. Samples of fire knock-out decals or markings, if required.
- D. Architect reserves the right to require submittal of fabrication samples, showing prime members, joinery, anchorage, expansion provisions, glazing, sealant and similar details, profiles and intersections.
- E. Architect reserves the right to require a full size visual mock-up on site to demonstrate fabrication techniques, workmanship, and design of hardware and accessories.
- F. Shop Drawings: Submit complete shop drawings to the Architect for approval. Shop drawings shall include full scale detail sections of every typical composite member, fully drawn, not outlined. Also show method of anchorage, joint systems, expansion provisions, glazing details, and its attachment and other pertinent details, and indicate all materials and finishes. The shop drawings shall reflect and incorporate information from the structural calculations Do not fabricate prior to acceptance.
 1. Provide shop drawings showing materials in place on the building including coordination of related and adjoining work, insert drawings and erection diagrams. Show relative layout for all adjacent walls, beams, columns slabs, ceilings, etc.
 2. Resubmittals shall include requested corrections and shall respond to previous comments. Each sheet that is revised shall bear a revision date and number. Revisions shall be flagged with a conspicuous revision symbol and number and revised detail clouded.
 3. Drawings shall include elevations, floor plans, sections and full size details.
 4. Provide isometric details of any conditions, as requested by the Architect.
 5. Drawings shall include, but not be limited to, the following information:
 - a. Dimensioned dies and profiles of individual components, and dimensions of these components to adjacent materials.
 - b. Metal thickness (including tolerances), alloy, temper and finish.
 - c. Glass make-up, thickness, finish and rating.
 - d. Glazing materials identification.
 - e. Product name and manufacturer of all sealants.

February 27, 2026

- f. Field connections, weld sizes, anchorages, embedment length and edge distances.
 - g. Fastener manufacturer, alloy, plating, diameter, length, spacing, embedment and edge distances.
 - h. Hardware, accessories and finishes.
 - i. Insert/embed drawings and erection diagrams.
 - j. Dimensioned limits of movements for all moving joints and provisions for expansion and contraction.
 - k. Joint sizes of weather seal perimeters and internal/secondary seals, including minimum/maximum joint sizes required.
 - l. Indicate size of contact area or structural bite for structural sealant glazing required to withstand the Project load requirements.
 - m. Indicate the adjoining and abutting work, which is performed by other trades.
 - n. Dimension relative layout for all adjacent walls, beams, columns, slabs and ceilings. Dimension all tolerances required or which can be accommodated.
 - o. Seal and signature of Professional Engineer currently licensed in the State of Hawaii. This shall be same engineer who signs the calculations.
 - 6. Failure of a submittal to comply with the above, shall be cause for disapproval and return of documents without review, with the Glazing Contractor bearing full responsibility for any resultant delay.
 - 7. Failure to review comments or to note a noncompliance with plans and specifications shall not relieve the Glazing Contractor from his obligation to comply.
 - 8. Failure to review comments or to note a noncompliance on a given submittal shall not preclude a directive to comply on future submittals.
 - 9. Submit "As Built" Shop Drawings at completion of installation including and identifying all changes which were made to the system during the course of construction.
- G. Coordinated Calculation Submission
- 1. Provide structural calculations, sealed by a Professional Engineer currently licensed in the State of Hawaii prepared in compliance with referenced documents and these specifications.
 - 2. Where specifications and code differ, the more severe requirements shall govern. Test reports are not an acceptable substitute for calculations. Calculations shall include the following information:
 - a. Analysis for all applicable loads on framing members.
 - b. Deflection limitations of glass framing system.
 - c. Analysis for all applicable loads on anchors, including anchors embedded in concrete.

- d. Section property computations for framing members.
- e. Certification of conformance with structural test pressures and design pressures indicated. Include evidence of compliance by submission of product test reports with notations as required by professional engineer.
- H. Test Reports: Where manufacturer's data does not clearly indicate conformance with performance requirements submit test reports from an independent laboratory certifying performance requirements of all exterior systems.
- I. Certification: Supply certification by the manufacturer that the glazed aluminum system including finish, conform to specifications.
- J. Maintenance Manual: Submit 3 maintenance manuals for each type of system.

1.06 DELEGATED DESIGN REQUIREMENTS

- A. Delegated Engineering Requirements:
 - 1. Delegated Engineering Responsibility: Require glazed aluminum systems manufacturer to employ a delegated engineering professional to provide engineering for work of this Section to comply with concept expressed in Contract Documents.
 - 2. Engineer system to withstand structural design loads within limits and under conditions indicated, specified, or required, without material failure or permanent deformation of building structural frame or work specified.
 - 3. Inspect work as specified under PART 3 "Field Quality Control" Article
 - 4. Prepare engineering calculations, shop drawings, and other submittals and affix professional seal according to respective jurisdictional licensing regulations
- B. Delegated Engineering Assumptions:
 - 1. Allowable working stress no more than yield stress of material.
 - 2. A 1/3 increase in allowable working stress for wind or seismic loads is not acceptable.
 - 3. Glass, sealants and interior finishes shall not contribute to framing member strength, stiffness or lateral stability.
 - 4. Dead loads of glass and panels shall not extend through thermal breaks.

1.07 PERFORMANCE REQUIREMENTS

- A. Methods of fabrication and assembly (except as specified herein, or as recommended by the Architect as a consequence or result of testing), shall be at the discretion of the Contractor (subject to acceptance by the Architect) provided that the exterior and interior visible architectural effect is not changed, the work of other Contractors is not affected, and the weather tightness and strength qualities, as demonstrated by engineering calculations and measured by the results of the tests for performance requirements, are not reduced.

February 27, 2026

- B. Remedial measures, which may be necessary on the mock-ups or the building, shall maintain standards of quality and durability, and are subject to acceptance by the Architect, Owner, and their representatives.
- C. The Glazed Aluminum Systems, together with all components and sub-assemblies, shall be designed, engineered, fabricated and installed in such a manner to fully meet or exceed the minimum structural and weather resistance requirements specified herein, as demonstrated by engineering calculations and testing of mock-ups.
- D. Thermal Movements
 - 1. Thermal Movement: Fabricate exterior components from manufacturer's stock systems which have been designed to provide for expansion and contraction resulting from ambient temperature range of 120 degrees F and metal surface temperature extreme of 185 degrees F, without causing buckling stresses on glass, failure of glass, metal, or joint seals, undue stress on structural elements, damaging loads on fasteners, reduction of performance, or other detrimental effects.
 - 2. The amount of such movement that is accommodated in the wall design shall be identified on the shop drawings and shall be accompanied by thermal calculations to address current Code.
- E. Structural Properties
 - 1. The Glazed Aluminum Systems and their anchorage and related components shall be designed with adequate strength and stiffness to withstand the loads as determined by IBC 2018 and ASCE 7.
 - a. Wind Load Criteria: As indicated on the Structural Drawings.
 - b. Design corners for simultaneous positive (inward) design pressures on both surfaces, and simultaneous negative (outward) design pressure on both surfaces.
 - c. Partial loading on one surface shall also be considered.
 - 2. Deflection for metal members supporting glass, the performance criteria shall be as follows:
 - a. Perpendicular to the plane of the wall, net deflection of framing members shall be per AAMA TIR-A11 and shall not exceed 1/175 times span for spans up to 13' – 6" and $L/240 + 1/4$ inch for spans of 13' – 6" or greater.
 - 1) The exception to these criteria shall be that for any span with one light of glass in excess of 120" in height shall have net deflection of the framing members limited to 3/4 inch maximum, regardless of the overall span.
 - 2) Span is defined as the distance between anchor centerline. For cantilevers, span is defined as two times the distance between anchor centerline and end of cantilever.
 - 3) Where a sealant joint occurs between a framing member and a relatively stiff building element, framing member deflection shall not exceed 1/2 of the nominal joint width, or less if required by sealant manufacturer.

- 4) Where a framing member runs continuously past a deflecting support, the support deflection shall be considered in the analysis.
- b. In the plane of the wall, deflection of framing members shall not exceed 1/8 inch. This includes horizontal rail sag due to dead load. Any twist of the horizontal sill members due to dead load shall be limited to 1 degree.
 - 1) Glass or Panel Bite: Bite reduced no more than 75 percent.
 - 2) Glass or Panel Edge Clearance: Edge reduced no more than 25 percent, or not more than 1/8 in. Distance from glass edge to metal: no less than 1/4 in.
- c. Corner mullion in-plane deflection due to wind pressure shall be limited to 1/4 inch maximum at any time. Reduce deflection further if required for assembly and fit of component, or performance of sealant in joints.
- d. At connection points of framing members to anchors, combined movement of anchor relative to building structure, and framing member relative to anchor, shall not exceed 1/16 inch in any direction.
- e. The center deflection of the stool trim, when subjected to a 250-pound vertical concentrated load, is to be a maximum of 1/8 inch. No permanent set is allowed when load is removed.
- f. Stresses shall not exceed the allowable values established by the specifications listed in code standards. In no case shall allowable values exceed the yield stress.
- g. Sealants and interior finishes shall not be assumed to contribute to framing member strength or stiffness.
3. Performance criteria at safety loads (150% design load) for metal members supporting glass, the performance criteria shall be as follows:
 - a. For metal members supporting glass the net permanent deflection of framing members shall not exceed 1/1000 times span.
 - b. There shall be no failure or gross permanent distortion of framing members, anchors or connections.
 - c. At connection points of framing members to anchors, combined movement of anchor relative to building structure, and framing member relative to anchor, shall not exceed 1/16 inch set after load is removed.
- F. Uniform Load: A static air design load (Design Wind Load) of the value determined in the Coordinated Structural Calculations shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection in excess of L/175 of the span of any, framing member. At a structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur.
- G. Seismic Designation: As indicated on the Structural Drawings.
- H. The Glazed Aluminum Systems shall perform quietly at all times and without vibration harmonics, wind whistles, noises caused by thermal movement (including "popping" or "ticking"), thermal movement transmitted to other building

February 27, 2026

elements, loosening, weakening or fracturing of attachments or components of system.

I. Anchorage

1. Glazing Contractor shall be responsible for bracing structural steel when wall kickers induce rotation into structural members.
2. Headed concrete studs welded to steel elements and cast-in-place with structural concrete shall have a minimum safety factor of 2.0 against ultimate failure.
3. Drilled expansion or wedge type anchors shall have a minimum safety factor of 4.0 against ultimate failure.
4. Post-Installed Anchors in Concrete: 5 according to ASTM E 488.
5. Post-Installed Anchors in Masonry: 6 according to ASTM E 488
6. The use of 1/3 increase for allowable stresses is not acceptable unless written approval by manufacturer is provided.
7. Cold-Formed Steel: As determined by delegated engineering professional consistent with engineering quality standards.
8. No chemical anchors for overhead deadload connections shall be allowed on this project.

J. Provision for Movement of the Structure

1. When the Glazed Aluminum System is attached directly to the building structure, the work shall be designed to accommodate the differential live load deflection between floors in addition to the following:
 - a. Calculated thermal expansion of the system.
 - b. Floor Live Load Vertical Deflection
 - c. Lateral Deflection
 - d. Elastic shortening of the building, as may be anticipated.
 - e. Differential foundation settlement, when relative.
 - f. Glazing Contractor shall obtain all necessary projected data and make such provision in the work as may be necessary. The amount of such movement shall be identified on Glazing Contractor's shop drawings.

K. Lateral Displacement Resistance Criteria:

1. Elastic Seismic: Withstand up to 0.65-inch parallel and perpendicular to plane of wall.
 - a. The wall shall not experience any failure in materials, sealants, anchorage of any kind and shall be fully functional both air and water tight as well as structural.
2. Inelastic Seismic: Withstand up to 2.6-inches parallel and perpendicular to plane of wall.
3. The wall may experience localized material failures, sealant may tear, framing elements may warp and buckle however no anchor shall fail nor shall

February 27, 2026

any portion of the wall systems experience catastrophic failure by falling from the building.

L. Glass Strength

1. Comply with the performance requirements of Section 08800 – GLAZING
2. Glass thicknesses, when shown on Drawings, are for convenience of detailing only and are to be confirmed by subcontractor and glass manufacturer.

M. Air Infiltration

1. Air-Infiltration Rate for Fixed Windows: Not more than 0.06 cfm/ft² of fixed unit area for an inward test pressure of 6.24 psf pressure differential when tested in accordance with ASTM E283 and AAMA 101.
2. Air-Infiltration Rate for Operable Windows: Not more than 0.10 cfm/sq ft of operable area at static air pressure differential not less than 6.24 ft lbs/sq ft according to ASTM E 283.
3. Air-Infiltration Rate for Swing Doors: Not more than the following rate for an inward test pressure of 6.24 psf pressure differential when tested in accordance with ASTM E283 and AAMA 101.
 - a. 0.50 cfm/ft² of door area for single doors.
 - b. 1.0 cfm/ft² of door area for pair of doors.

N. Water Penetration for Aluminum Window, Aluminum Curtainwall and Storefront Framing

1. Water penetration or uncontrolled water leakage, in this specification, is defined as the appearance of uncontrolled water on the indoor face of any part of the work. "Controlled" water or condensation is defined as water which is demonstrably drained harmlessly to the exterior of the work without endangering or wetting adjacent surfaces or insulation, and not visible in the final construction.
2. Provision shall be made to drain to the exterior face of the work, any water entering at joints, and/or any condensation occurring within the work. The system shall be designed to collect and remove all secondary water from the surrounding conditions. At insulated areas, gutter shall extend to the inside vertical plane of the insulation.
3. No uncontrolled water penetration shall occur when the work is tested in accordance with ASTM E331 at a pressure differential of 10 psf.
4. No uncontrolled water penetration shall occur when the wall is tested in accordance with AAMA 501.1, using a dynamic pressure equal to 10 psf.

O. Forced-Entry Resistance: No entry shall be gained when a test load of 300 lbf is applied, as tested in accord with AAMA 1304.

1.08 WARRANTY

- A. Manufacturers Warranty: Submit written warranty (2 copies) before substantial completion signed by both the Glazed Aluminum System Manufacturer and Glazing Contractor agreeing to repair or replace defective Glazed Aluminum

February 27, 2026

System materials or components that fail in materials or workmanship during the warranty period.

1. The warranty shall include extrusions, gaskets, tape, trim, fasteners, finish and all other accessories.
2. This warranty shall cover all on-site labor to repair or replace all defective parts for the entire warranty period.
 - a. Warranty Period:
 - 1) Aluminum Curtainwall, Storefront and Entrances: Five (5) years after date of Substantial Completion.
 - b. Warranty Period for Fluoropolymer Metal Finishes: 10 years from date of Substantial Completion.
3. Defective materials and workmanship is hereby defined to include, but not be limited to, evidence of:
 - a. Water penetration into building interior, including excessive condensation.
 - b. Air infiltration exceeding specified limits.
 - c. Structural failure of components resulting from forces within specified limits.
 - d. Delamination of laminated glass or failure of insulated glass units.
 - e. Discoloration or fading, excessive non-uniformity, pitting, cracking, peeling, or crazing or corrosion of finish beyond normal weathering.
 - 1) "Discoloration or fading": means a change in appearance which is perceptible and objectionable as determined by the Architect when viewed visually in comparison with the original color range standards.
 - 2) "Excessive non-uniformity": means non-uniform fading during the period of the guarantee to the extent that adjacent parts have a color difference greater than the original acceptable color range.
 - 3) "Pitting, cracking, peeling, crazing or corrosion": means there shall be no pitting, surface cracks, blistering, bubbles, or non-uniform surface texture.
 - 4) or other type of corrosion discernible from a distance of 10', resulting from the natural elements in the atmosphere at the project site.
 - f. Glass breakage.
 - g. Secondary glass damage and/or damage due to failing window components.
 - h. Adhesive or cohesive failure of sealant.
 - i. Crazing on surface of non-structural sealant.
 - j. Staining of adjacent materials from sealant and/or sealant primers.
 - k. Non-structural sealant hardening beyond Shore A durometer 50 or softening below 20.
 - l. Failure of operating units and hardware to function normally.

- m. Failure to fulfill other specified performance requirements.
 - B. Unless stated otherwise in these specifications, the Glazing Contractor shall submit a warranty that states that all work is in accordance with the drawings and specifications, as amended by any changes thereto authorized by the Architect, Owner or their representatives, and free from defects in materials and workmanship and will remain weathertight for a period of 5 years from the date of final acceptance and payment of the work by the Owner. Glazing Contractor shall agree to repair or replace defective materials and workmanship to "like new condition," including such exploratory work, as necessary to determine the cause, during the guarantee period, at no additional cost to the Owner. Glazing Contractor shall include with bid copy of proposed warranty.
 - 1. The Glazing Contractor shall be responsible for continuing corrections to defective work beyond the 5 year guarantee period if initial corrective measures were executed per the requirements as noted above but later found to be inadequate and/or not acceptable after the specified 5 year guarantee period.
 - C. The warranty, the enforcement or lack of enforcement thereof, shall not deprive the Owner of other actions, rights or remedies available to him. Warranty shall be in form approved by the Owner. Warranty does not cover damage resulting from vandalism, acts of nature exceeding performance criteria, alterations, abuse of the work, failure of the supporting structure and other causes beyond the contractor's control. This warranty and its enforcement shall not deprive the Owner of other action right or remedy available to him.
 - D. Glazing Contractor shall be responsible for damage to the building and furnishings occasioned by defective materials or workmanship or damage as part of repairs to the wall.
- 1.09 DELIVERY, STORAGE AND HANDLING
- A. Deliver, store and handle all wall system assemblies so as to prevent damages at all times, as per manufacturer's recommendations.
 - B. All materials delivered to the site shall be stored in spaces provided on each floor of the building, where they will not be exposed to wetting or damage, and shall permit easy access to the handling of the materials. Materials shall be stored neatly, properly stacked, and protected.
 - C. Deliver other materials, except bulk materials, to project site in manufacturer's unopened containers with name, brand, type, grade and color fully indicated thereon. Store bulk materials as required to avoid any deleterious effects of weather, soiling or contamination.
- 1.10 PROJECT CONDITIONS
- A. Coordinate as required, and be totally responsible for, the full and satisfactory compatibility and performance between all sealants used under this section and those sealants used by other trades that may be in direct contact with or adjacent to sealants in this work.
 - B. Coordinate hardware locations and templates with the hardware specified in Section 08710 – FINISH HARDWARE.

February 27, 2026

- C. Take all required steps and precautions to properly isolate and prevent any degree of incompatibility between said sealants, all in strict accordance with manufacturer's specifications, recommendations and instructions.
- D. Periodically test sealants in place for adhesion, using methods recommended by sealant manufacturer. Promptly replace any sealant which does not adhere or fails to cure.
- E. Prior to commencement of work, conduct a pre-installation meeting with the Architect, Owner and their representatives, General Contractor, and any other related representative to review installation procedures, weather conditions under which work can be installed, storage, etc. Examine a sample installation of the wall which has been prepared and determine and record whether everyone present is in agreement that the proposed installation is equal to or superior to the mock up test specimen and is likely to perform as required. Accepted control section shall be standard to which other work must confirm.
- F. Field Measurements: Check window and door openings by field measurements before fabrication and show recorded measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the work.
- G. Where field measurements cannot be made without delaying the work, guarantee opening dimensions and proceed with fabricating glazed aluminum systems without field measurements. Coordinate wall construction to ensure that actual opening dimensions correspond to guaranteed dimensions. Beginning of installation means acceptance of existing surfaces.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Single Source Responsibility: Furnish each type of product through one source from single manufacturer.
- B. Following manufacturers listed are "acceptable" only if manufacturer can evidence product compliance with requirements of Contract Documents.
 - 1. Arcadia
 - 2. EFCO
 - 3. ESWindow
 - 4. Oldcastle Building Envelope
 - 5. Solar Innovations
 - 6. or approved equal.
- C. The basis-of-design products are based on products from the following:
 - 1. Arcadia, Inc.

2.02 ALUMINUM

- A. Provide aluminum shapes and thicknesses as shown and as required to fulfill performance requirements. Use suitable alloy and temper for extruding with

February 27, 2026

adequate structural characteristics, and suitable for finishing as specified, but not less than 22,000 psi ultimate tensile strength.

B. Comply with the following:

1. Sheet and Plate: ASTM B 209, thickness as required by delegated engineering, but not less than 3/16-inch.
2. Extruded Bars, Rods, Shapes, and Tubes: ASTM B 221, thickness as required by delegated engineering, but not less than 1/8 in at any location for main frame and sash members.
3. Extruded Structural Pipe and Tubes: ASTM B 429
4. Bars, Rods, and Wire: ASTM B 211
5. Welding Rods and Bare Electrodes: AWS A5.10.

C. Thermal Barrier Material: Poured-in-place two-part polyurethane.

2.03 CURTAIN WALL FRAMING

A. Curtain Wall Framing: Basis-of-Design Product; T500-OPG-1900 Curtain Wall as manufactured by Arcadia, Inc.

1. Comply with minimum CW-80 grade designation. Aluminum framing shall be Thermal, 2-1/4-inch sightline by 7-inch depth with pressure plate.
2. Offset captured glazed four sides as indicated on the Drawings; glass set forward of frame, jambs and vertical mullions continuous; head, sill, intermediate horizontal attached by screw spline joinery.
3. Provide continuous and wept sill flashing with end damming at jambs. Principal framing members will be a minimum 0.125-inch in thickness.
4. Extruded or formed trim components will be a minimum 0.060-inch thick.
5. Frames glazing pocket sized to accept 1-inch-thick insulated glass infill (**G1**) as specified in Section 08800 – GLAZING.

B. Glazing: Glazed by means of compression-type design, replaceable, molded or extruded santoprene, polyvinyl chloride (PVC), or ethylene propylene diene monomer (EPDM) designed to lock into gasket reglet in the interior frames and pressure plate.

2.04 STOREFRONT FRAMING

A. Storefront Framing: Basis-of-Design Product; TC470 Series Window Wall as manufactured by Arcadia, Inc.

1. Comply with minimum CW-80 grade designation. Aluminum framing shall be Thermal, 2-1/4-inch wide by 4-1/2-inch.
2. Offset captured glazed four sides as indicated on the Drawings; glass set forward of frame, jambs and vertical mullions continuous; head, sill, intermediate horizontal attached by screw spline joinery with standard cover caps.
3. Provide continuous and wept sill flashing with end damming at jambs. Principal framing members will be a minimum 0.125-inch in thickness.

February 27, 2026

4. Extruded or formed trim components will be a minimum 0.060-inch thick.
 5. Frames glazing pocket sized to accept glass infill as scheduled on the Drawings.
- B. Glazing: Glazed by means of compression-type design, replaceable, molded or extruded santoprene, polyvinyl chloride (PVC), or ethylene propylene diene monomer (EPDM) designed to lock into gasket reglet in frames.

2.05 ENTRY DOORS

- A. Aluminum Entry Doors: Basis-of-Design Product; MS362HD Heavy-Duty Medium Stile Entrance Door as manufactured by Arcadia, Inc.
1. Entry assembly shall meet the performance requirements and shall have a grade designation for Heavy Commercial SHD-CW-80
 2. Doors: 1-3/4-inch deep with stiles to be 3-1/2-inches wide, top rail to be 3-5/8-inch wide and bottom rails to be 10-inches. Fabricate door corners joined by concealed reinforcement secured with screws and sigma deep penetration welding. Principal members of the door stiles and rails to be a nominal 0.188 inches and glass stops 0.050 inches thick.
 - a. Door glazing pocket sized to accept glass infill as scheduled on the Drawings.
 - b. Weather-stripping: Manufacturer's standard elastomer type in replaceable rabbets for stiles and rails.
 - c. Hardware:
 - 1) Hinge: One continuous geared hinge with injected molded engineered nylon bearings, ANSI/BHMA 156.26, Grade 1 edge mounted hinge per leaf. Finish, to be selected by Architect.
 - 2) Lockset: (1) Adams Rite MS1850S-050 hook bolt lock on active leaf or single door. (1) Adams Rite 1870 Series Flushbolt on inactive leaf of double doors. Lock Cylinder as specified in Section 08710 - FINISH HARDWARE.
 - 3) AHT- 605 concealed closer with hold open
 - 4) Manufacturers standard Push/Pull Set.
 - 5) Manufacturer's standard aluminum threshold.
 3. Glazing: Glazed by means of EPDM glazing gaskets designed to lock into gasket reglet both exterior and interior.

2.06 ALUMINUM AWNING WINDOWS

- A. Awning Windows: Basis-of-Design Product; T200 Series Heavy Commercial Awning as manufactured by Arcadia, Inc. installed as stand-alone window and within storefront framing
1. Comply with minimum AW-80 grade designation. All aluminum frames shall be fabricated from extrusions having a nominal wall thickness of 0.125-inch.

February 27, 2026

Frames glazing pocket sized to accept a 1-inch infill (**G1**) and a 5/8-inch glass bite.

2. Aluminum awning window shall have a 2-inch- deep aluminum frame with a thermal isolation separation.
 3. Weatherstripping: EPDM bulb type conforming to ASTM D2000 AA515 and shall be keyed into extruded grooves.
 4. Hardware:
 - a. Hinges: Manufacturer's heavy-duty stainless steel four bar hinges.
 - b. Latch: Cam Handle latch, cast white bronze US-25D finish.
- B. Glazing: Back glazing two-sided adhesive, 15 lbs./ft.3 density, polyethylene tape. Glazing wedges shall be EPDM or Santoprene.

2.07 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Surface to be finished shall be free from mechanical imperfections such as scratches, scrapes, dents and die marks. Pretreatment of the aluminum surface shall be completed in accordance with the procedures recommended by the manufacturer.
- C. Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.
- D. Repair to finished surface by mechanical means (other than those specified) or by painting is strictly forbidden unless the procedure is submitted and approved by Architect (including a sample area repair).
 1. Material may be finished more than once provided that all specified requirements are satisfied. However, if still not acceptable, it shall be rejected.
- E. Adjacent parts of the same finish or within 6" of each other in the construction shall not vary in color by more than 1/2 the range so as the variation to be imperceptible to the naked eye under normal daylight conditions. Construct a visual mock-up or submit range samples defining the maximum variation of color that can be anticipated in the work. Samples shall be on lengths of extrusions not less than 12" and on sheet/plate/panels not less than 24" square.
- F. Submit for approval a quality control program, including procedures and processes, to assure compliance with the specified requirements.
- G. Do not ship any material that has not been inspected, tested and marked in the prescribed manner, does not fall within the prescribed color range, or has been rejected by the Architect.
- H. High-Performance Organic Finish: AA-C12C42R1x (Chemical Finish: Cleaned with inhibited chemicals; Chemical Finish: Acid-cromate-flouride-phosphate conversion coating; Organic Coating: As specified below). Prepare, pretreat and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

February 27, 2026

1. Fluoropolymer Three-Coat Coating System: Manufacturer's three-coat, thermos-cured system composed of specially formulated inhibitive primer and Fluoropolymer color coat and clear topcoat. Both color and clear topcoats containing not less than 70% polyvinylidene fluoride resin by weight; comply with AAMA 2605.
2. Resin Manufacturers: Subject to compliance with requirements, provide products containing resin by one of the following:
 - a. DuranarXL, PPG
 - b. Fluropon Premiere, Sherwin Williams.
 - c. Hylar 5000, Ausimont USA, Inc.
 - d. Kynar 5000, Elf Atochem North America, Inc.
3. Color: Duranar XL Dark Bronze, UC51602XL

2.08 GLASS AND GLAZING

- A. Comply with the requirements of Section 08800 - GLAZING

2.09 FASTENERS

- A. Any fasteners in wet or exposed areas of the wall shall be Type 316, non-magnetic stainless steel. All other fasteners shall be hot-dipped galvanized unless otherwise noted.
- B. The work shall be designed to conceal all fasteners, except where unavoidable for application of hardware. Finish exposed fasteners to match adjacent aluminum.
- C. Unexposed fasteners in dry areas shall be steel with cadmium and colored chromate plated and shall meet ASTM B 696 Class #5 and Federal Specification QQ-P-416E, Type II, Class #1. (.0005 inches thick plating).
- D. All non-stainless fasteners being used in a structural application must meet the minimum requirements of SAE J429 Grade 5.
- E. Grade 8.0 or higher fasteners, high strength bolts of non U.S. origin, or high strength bolts that are zinc plated shall not be used.
- F. Provide aluminum, nonmagnetic stainless steel, epoxy adhesive, or other materials warranted by manufacturer to be noncorrosive and compatible with aluminum window and door members, trim, hardware, anchors, and other components of window units.
- G. Where fasteners screw anchor into aluminum less than 0.125 inch thick, reinforce interior with aluminum or nonmagnetic stainless steel to receive screw threads or provide standard, noncorrosive, pressed-in, splined grommet nuts.
- H. Mill certificates and test reports for all structural grade bolts shall be submitted to the Architect, Owner and their representatives for approval prior to installation of those bolts on the job.
- I. Post-Installed Expansion Anchors: ACI 318, D.1 and ICC-ES AC193

February 27, 2026

1. Finish: Type 316 stainless steel.
2. Manufacturers and Products (Approved only with ICC Report)
 - a. ITW; Redhead Truebolt Wedge Anchor.
 - b. Powers; Bull Wedge Anchor.
 - c. Simpson; Strong-Bolt Wedge Anchor
- J. Threaded Concrete Anchors: Bi-Metal, 300 Series Stainless Steel head and shank fused to harden steel tapping threads and point with corrosion resistant coating with not less than 800 hours of salt-spray resistance according to ASTM B 117.
 1. Basis of Design: DeWalt.; Aggre-Gator; Hex Washer Head with Silver Stalgard finish.
 2. Not Acceptable: Self-drilling self-threading fasteners, screw in plugs, and powder actuated fasteners are not permitted in concrete.
- K. Self-drilling fasteners shall be Drill-Flex as manufactured by Dewalt or Kwik-Flex as manufactured by Hilti, Inc. No substitutions accepted. Self-drilling fasteners used in wet areas shall include Dewalt's Stal-Guard finish or Hilti's Kwik-Cote finish respectively.
- L. Nuts used at expansion or moving connections shall be designed to provide a positive means of preventing disengagement. Staking of bolts, use of lock washers, or threads being deformed are not acceptable.
- M. Matched bolts, nuts and washers shall be used at all friction connections.

2.10 SEALANT MATERIALS

- A. Comply with the requirements of Section 07910 – EXTERIOR WALL JOINT SEALANTS.
- B. Glazing method shall be in general accordance with the current edition of the AAMA Metal Curtainwall Manual and GANA Glazing Manual for specified glass type.
- C. All exterior sealants shall be silicone.
- D. All internal sealants that contact the perimeter sealants must be compatible with, and adhere to, the perimeter sealant. All internal sealants used to seal glass pockets, end dams and gutters shall be silicone.
- E. Splice details shall be designed using silicone or a combination of silicone and a non curing, nonhardening, non-skimming butyl. Splice joint to be designed to separate the different sealants. Splice details to be designed to accommodate the anticipated movement of the joint.

2.11 MISCELLANEOUS MATERIALS

- A. Provide stainless steel sleeve spacers and/or suitable bearing pads as required, to insure free movement between surfaces where expansion and deflection movements are intended. Provide "Eel Slip" or "Nylatron" washers or pads of sizes and thickness (minimum 1/16 inch except 1/8 inch for Eel Slip")

February 27, 2026

- recommended by the manufacturer to permanently prevent "freeze up" of joints. Provide high impact polystyrene shim pads for static shims.
- B. Flashing required within the system or to join the system to adjacent construction shall be aluminum or stainless steel of acceptable design and color.
 - 1. ASTM A 240 stainless steel, dead-soft, not less than 0.039 in thick.
 - 2. Aluminum Sheet (anodized / painted), not less than 1/16 in thick. Finish to match framing members when exposed.
 - C. Steel Reinforcement: Complying with ASTM A36 for structural shapes, plates, and bars; ASTM A 611 for cold-rolled sheet and strip and ASTM A 570 for hot-rolled sheet and strip.
 - D. Anchors, Clips, and Window Accessories: Fabricate anchors, brackets, clips, and window accessories of aluminum, nonmagnetic stainless steel, or hot-dip zinc-coated steel complying with requirements of ASTM B633 and ASTM A 123; shapes and thicknesses must provide sufficient strength to withstand design pressure indicated.
 - E. Thermal Barrier: The thermal barrier shall be extruded PVC or fiber-reinforced polyamide used as an applied thermal isolator unless otherwise noted.
 - F. All steel shall be given a shop prime coat of zinc chromate paint meeting FS TT-P-645. Touch up after steel welding in the field shall be in accordance with SSPC-Paint 20, zinc rich.
 - G. Baffles: Provide 30 to 40 ppi PVC coated open cell reticulated urethane foam baffles at all weep holes or vent tubes.
 - 1. Size, length and porosity to meet water and air infiltration design requirements.
 - 2. All baffles shall be mechanically restrained and compressed 30% - 50% in their final position.
 - H. Embeds shall be designed and furnished by the Glazing Contractor. Installation of embeds shall be by others per Glazing Contractor's shop drawings. Exposed surface of embeds shall be shop painted with specified primer.

2.12 FABRICATION

- A. Assembly/Fabrication Methods shall be at the discretion of the Exterior Wall Contractor (subject to acceptance by the Owner and Architect) provided that the visible architectural effect is not changed, the work of other Contractors is not affected, and the performance is not reduced.
- B. Follow conclusions and recommendations from Mock-up Testing, Consultants, Delegated Engineering, Manufacturer's written fabrication instructions, Contract Documents and Approved Submittals.
- C. General Requirements:
 - 1. Fully fabricate and finish units before shipping to Project.
 - 2. Components that are not required to be shop assembled shall be shop fitted and marked before disassembly to ensure proper assembly later at the Project site.

February 27, 2026

3. Make all cutouts for penetrations at the factory, whenever possible.
4. Comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details.
5. Fabricate to dimensions, profiles and details indicated.
6. Fabricated free of burrs, pitting, cutting edges, sharp corners, nicks, dents, and scratches.
7. Reinforce components as required to receive fastener threads; Aluminum less than 1/8 in thick must be reinforced.
8. Fabricate components and assemble units to comply with fire and performance requirements specified.
9. Painted surfaces shall be properly prepared. Comply with "FINISHES" Section.
10. Exposed fasteners are not acceptable unless indicated or approved in writing by Contracting Officer. If approved, fastener heads to be countersunk type, finished to match adjacent surfaces.
11. Furnish flat surfaces without bulges, oil-canning, or other physical deformities.
12. Fabricate components to allow for thermal expansion and contraction, and field adjustments.
13. Provide minimum clearances and depth of glazing pockets as recommended by glass manufacturer for thickness and type of glass indicated.
14. Make provisions to drain water entering at joints and condensation occurring within wall to exterior. Provide horizontal members with continuous gutters to drain moisture to exterior through protected weep holes.
15. Accurately cut products and fit to form hairline joint connections.
16. Finish seams, joints and splices on exposed surfaces shall be imperceptible in finished work.
17. Seal joints and connections on concealed side with concealed joinery sealant.
18. Do not drill or punch holes, including weep holes, through thermal break.
19. Welds shall be of adequate strength and durability, with jointing tight, flush, smooth and clean.
20. For snap trim more than 2-1/2 in deep, fabricate for flat-head fasteners with heads painted to match finish.
21. Assemble components into complete weathertight units with and watertight joints.
22. All welding shall be done with methods recommended by the suppliers of the metals being welded.
 - a. Welds behind finished surfaces shall be done as to minimize distortion and/or discoloration on the finished side. Telegraphing of welds through a

finished surface will not be accepted. Weld splatter and welding oxides on finished surfaces shall be removed by descaling and/or grinding.

- b. Welds of gutters and end dams shall not constitute a water seal. Seal welds in areas intended to retain and channel water.

- 23. Provide sealant continuity notches at all metal to metal joints including welded joints.
- 24. Aluminum extrusions for unitized or semi-unitized designs shall be manufactured to a minimum of 1/2 industry tolerances for bow, warp, twist or angularity.

D. Glazing

- 1. Follow GANA Manual Guidelines and Glass Manufacturer's recommendations.
- 2. Comply with specification Section 08800 – Glazing.
- 3. Check frames for squareness and trueness. Corners must be weathertight and sills must drained to outdoors.
- 4. Remove all protective coatings from framing surfaces.
- 5. Clean glazing pocket before setting glass with compatible solvents.
- 6. Retain setting blocks and side blocks in position. Glaze frames without inducing stress or deflection into the glass.
- 7. Provide a minimum nominal glass bite of 1/2 in. Where joint movement will result in variable glass bite, increase nominal bite as required and provide 1/2 in minimum edge clearance or greater, where lateral building movement is taken by the glazing seals.
- 8. Gaskets shall be vulcanized (injection molded) at corners where compatible with installation procedure. Where gasket joints occur, tightly butt end and seal with a compatible sealant.
- 9. Use pre-formed custom shape extruded silicone gasket at the butt glazed vision glass. Gasket is intended to prevent silicone contact with the PVB laminate. Gasket is to adhere to wet silicone.
- 10. Remove and replace stops and apply sealants as required for a complete glass installation.

E. Glass Replacement Requirements: Capable of allowing following:

- 1. Glass replacement of same nominal size unit after initial construction, reusing original gaskets, without cutting of framing members or removal of interior finishes.
- 2. Vision glass replaceable from interior or exterior. At the interior, however, must be without removal of adjacent finished conditions.

F. Design anchorage to accommodate 1 in three-dimensional maximum variation in the building structure.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. All work shall be performed by skilled workmen, especially trained and experienced in this type of work. If the Glazing Contractor chooses to subcontract the installation of work, the proposed subcontractors qualifications shall be approved by the Owner, Architect and their representatives.
- B. Bench marks for elevation and building line offset marks for alignment shall be established on each floor level by the General Contractor, who shall be responsible for their accuracy. Should any error be found in their location, the Glazing Contractor shall so notify the General Contractor in writing, and installation work shall not proceed in the affected area until the errors have been corrected.
- C. After lines and grades have been established, and before beginning installation in any area, the Glazing Contractor shall examine all parts of the structure on which the wall is to be placed. Should any conditions be found which, in his opinion, will prevent the proper execution of his work, he shall report such condition in writing to the Architect and the General Contractor. Installation work shall not proceed in that area until such conditions are corrected or adjusted to the satisfaction of the Architect and the Glazing Contractor. Commencement of work shall constitute acceptance of surrounding conditions.

3.02 INSTALLATION/ERECTION

- A. Installation Quality Standards: In addition to standards specified elsewhere, perform work according to following, unless otherwise specified:
 - 1. Delegated engineering.
 - 2. Respective manufacturer's written instructions, specifications, and recommendations.
 - 3. Approved submittals.
 - 4. Contract Documents.
 - 5. AAMA CWG-1 Installation of Aluminum Curtain Walls
 - 6. ASTM E 2112 Standard Practice for Installation of Exterior Windows, Doors and Skylights
- B. Install exterior wall components plumb, level, accurately aligned and accurately located in reference to column lines and floor levels.
- C. The glazed aluminum systems shall be designed to accommodate above tolerances. Provided irregularities do not exceed them, and clearances shown on approved shop drawings are maintained, all parts of the metal window wall, when completed, shall be within the following tolerances:
 - 1. Maximum misalignment between two adjoining members abutting in plane: 1/32".

February 27, 2026

2. Maximum deviation from approved shop drawings in plan or elevation, including deviation from plumb, level, or dimensioned angle: 1/8" inches per 12' run in any direction, or 1/2" in any total length.
 3. Maximum Variation from Plumb: 1/32" every 3' non cumulative or 1/4" per 100', whichever is less.
 4. Longitudinal or Diagonal Warp: $\pm 1/8$ " from 10' straight edge.
 5. Sealant Space Between aluminum frames and Adjacent Construction: Minimum of 1/4".
- D. Provide shims, slotted holes or other means necessary for leveling, plumbing and other required adjustments.
- E. All exposed work shall be carefully matched to produce weathertight units with flush, rigid, and hairline joints. Match components to ensure continuity of line and design. All anchoring, fastening, jointing and splicing of members shall be concealed, unless noted otherwise; where bolts or screws are permitted in work exposed to view, they shall match adjacent surfaces. Exposed edges shall be finished to match face of the work.
- F. All welding shall be done by skilled mechanics qualified or licensed in accordance with local building regulations, and shall conform to the recommended practices of the American Welding Society. All welds or damage to structural steel coating must be prepared and touched up with zinc rich primer as described herein.
- G. Protect glass, fiber cement siding, sintered stone and other finished surfaces from damage from welding. Glass or other exposed materials with weld splatter will be rejected and must be replaced at no cost to the Owner.
- H. Anchorage of the wall to the structure shall be in strict accordance with accepted shop and/or erection drawings. Any bolts or angles to be fixed to concrete shall be supplied and installed by the Glazing Contractor; he shall be responsible for coordinating with the General Contractor and for the installation of bolts or angles in the exact position.
- I. Attachment of the glazed aluminum systems anchorage at support walls shall occur inboard of the weather line. Supporting brackets shall be designed to provide three-dimensional adjustment and accurate location. Once wall is properly positioned, all connections so designated on accepted shop drawings shall be rigidly fixed by bolting, welding or other positive mechanical means.
- J. Expansion anchorage shall be so designated to provide for thermal and building movements. Molybdenum-disulfide filled nylon ("nylatron") slip pads or washers shall be used at all thermal or dynamic anchors.
- K. Protection against galvanic and shall be provided wherever dissimilar metals are in contact. This protection shall be provided by painting the dissimilar metal surfaces with a heavy coat of zinc chromate primer or by application of an appropriate sealant or tape or other approved galvanic isolator.
- L. Protection against corrosion or electrolytic action shall be provided wherever aluminum is to be in contact with cementitious or dissimilar materials. This protection shall be provided by applying a heavy coat of bituminous paint applied to the aluminum, or other permanent separator on concealed contact surfaces of

the aluminum before assembly or installation. Protection is not required in the case of aluminum in contact with galvanized steel, zinc or relatively small areas of stainless steel or nickel silver (white bronze).

1. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
 2. Cold-applied asphalt emulsion: ASTM D 1187.
- M. Items of carbon steel, unless galvanized or scheduled for other finish, shall be thoroughly cleaned of all loose scale, filings, dirt and other foreign matter and shall be painted with zinc chromate primer, complying with Specification FS TT-P-645 and SSPC- SP12.01. Surface preparation shall meet the minimum requirements of SSPC-SP6.
- N. Install all internal condensation gutters, including end dams and end seals. Back seals and bridge seals at gutters and between other systems to aluminum framing systems shall be installed as necessary.
- O. Provide weep holes and internal passages to drain to exterior all moisture entering joints and glazing spaces, and condensation occurring within frame construction. Fasteners shall not penetrate gutters or drainage systems.

3.03 SEALANTS

- A. Comply with Section 07910 – EXTERIOR WALL JOINT SEALANTS.
- B. Sealants shall be used in strict accordance with the manufacturer's printed instructions and shall be applied only by mechanics especially trained or experienced in their use.
- C. Before commencing sealant installation, check that joint dimensions are within limits specified for the sealant and the surfaces are smooth and undamaged. Inform the Architect if joints are not suitable to receive sealant and submit proposals for rectification.
- D. Install wet seals, heel beads, toe beads, interior wet seals and structural silicone seals as indicated by architectural details.

3.04 POSTPONEMENT OF COMPLETE ENCLOSURE

- A. If so directed by the Glazing Contractor, installation of the exterior wall shall be postponed in specific locations so as to facilitate moving material into and out of the building during construction.
- B. Defer glazing of openings which are obstructed during construction. Glaze such openings when obstructions are removed.

3.05 FIELD QUALITY CONTROL

- A. Pre-Testing Conference: Before beginning testing and inspections, conduct conference at Project to comply with requirements of appropriate Division 01 Sections.

February 27, 2026

- B. Field Testing and Inspections: Engage a qualified independent testing agency to perform field quality control testing and inspections to determine if installed work complies with specified requirements. Exterior Wall Contractor to provide powered scaffold, hose, water supply, communication system and manpower to perform tests.
 - 1. Required Attendees:
 - a. Owner or Owner's Representative.
 - b. Architect.
 - c. Exterior Wall Contractor, including supervisor.
 - d. Installers of adjacent work, including supervisors.
 - e. Testing agency personnel, including supervisors.
 - f. Manufacturer's technical representative.
 - 2. Minimum Agenda:
 - a. Tour areas representative of assemblies to be tested, discuss and evaluate for compliance with Contract Documents.
 - b. Review specified inspection and testing.
 - c. Review forecasted weather conditions and procedures for coping with unfavorable conditions.
 - 3. Reports: Record discussions and decisions, prepare and certify report, and distribute.
- C. Field Tests:
 - 1. Method:
 - a. Water Penetration:
 - i. Storefront, and Window systems: ASTM E1105.
 - ii. Provide powered scaffold, hose, water supply, communication system and manpower to perform tests.
 - b. Air Infiltration: ASTM E 783
 - 2. Locations: At locations determined by the Architect.
 - 3. Quantity and Size: Minimum of one entire unit for each type of window to be selected by the Architect
 - 4. Procedure: Test at 2/3 pressure reduction of design pressures specified under PART 1 for 15 minutes at each location.
 - 5. Reports: Record testing and inspection results and prepare certified reports according to ASTM E 575 format.
- D. Re-testing and Re-inspections Due to Failures: Exterior Wall Contractor responsible for expenses incurred, without additional cost to Owner, due to failure of work to pass testing and inspections.
- E. Delegated Engineering Field Inspection: Inspect work, including connection and attachment to building structural frame, for compliance with delegated engineering, and direct deficiencies to be corrected.

February 27, 2026

1. Certification: Upon resolution of deficiencies, certify work complies with delegated engineering, authorities having jurisdiction, applicable local building codes, specified requirements, and is in keeping with generally accepted engineering practices.
 2. Manufacturers Field Inspection: Manufacturers technical representative shall inspect first days work and periodically inspect work to ensure installation is proceeding in accordance with manufacturer's designs, recommendations, instructions and warranty requirements. Representative shall submit written reports of each visit indicating observations, findings and conclusions of inspection.
- F. Weepage System: Mask weeps and introduce water to interior areas to demonstrate weepage performance.
1. Fill gutters to average $\frac{3}{4}$ inch height and hold for 30 minutes.
 2. No leakage to interior spaces is allowed

3.06 PROTECTION AND CLEANING

- A. The Glazing Contractor shall remove from the installed work all mastic smears or other unsightly marks caused by his workmen, and shall be responsible for any damage to or disfigurement of the work caused at any time by other trades, as well as final cleaning and washing of glass and aluminum. The Glazing Contractor shall advise the Contractor of proper and adequate protection and cleaning procedures during remainder of construction period so that system will be without damage and deterioration at time of acceptance.
- B. Remove non-permanent labels and visible markings from glass surface.

3.07 ACCEPTANCE

- A. Installed materials, including glass, which are damaged, or which in the opinion of the Architect do not conform to the specification requirements, shall be removed and replaced with acceptable material at no additional cost to the Owner.
- B. Demonstrate proper cleaning methods and materials to Owner's maintenance personnel.
- C. Provide "As built" shop drawings and maintenance manuals per requirements of the project documents.
- D. Prior to installation of any insulation, the secondary gutter system shall be inspected for cleanliness. The insulation shall not be installed until the Architect or the Owner's representative accepts the condition of the gutter system.

END SECTION

SECTION 08565 – BEHAVIORAL SECURITY WINDOWS

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide behavioral security windows including, but not limited to, the following:
 - 1. Extruded aluminum window frames, integral security sashes, with integral blinds.
 - 2. Tamper-resistant hardware and accessories.
- B. Coordination of the interface of the Behavioral Security windows with other trades as necessary to provide for proper function of the combined exterior wall system components.
- C. Perform and provide all labor, engineering, materials, equipment and all supplementary items necessary to complete, as indicated by the Contract Documents, the proper installation of the Behavioral Security Windows. This work includes but is not limited to the following:
 - 1. All Behavioral Security Windows, including vision glazing, exterior and interior aluminum trim, aluminum copings, and all other features.
 - 2. All glass and glazing for the above components.
 - 3. All sealants, caulking, joint fillers and gaskets for a weathertight performance of the Aluminum Windows, as specified in Section 07910 – EXTERIOR WALL JOINT SEALANTS.
 - 4. All anchorage of above components, including pre-set inserts in concrete slab (installed by others), kickers, steel or aluminum reinforcing, etc.
 - 5. All vents, weeps, weep tubes, bellows, baffles, closures, end dams, gutters, flashings and trim as shown, or as may be required in conjunction with system or to join systems to adjacent construction.
 - 6. All design, engineering calculations and shop drawings for the complete design of the Behavioral Security Windows.
 - 7. Field testing for water leakage per ASTM E 1105 and air infiltration per ASTM E 783. No pressure reduction allowed; design pressure shall be as specified herein.
- D. Related Work Specified in Other Sections:
 - 1. Section 05400 – COLD-FORMED METAL FRAMING
 - 2. Section 07600 – FLASHING AND SHEET METAL
 - 3. Section 07910 – EXTERIOR WALL JOINT SEALANTS
 - 4. Section 08800 – GLAZING.

1.02 CODES AND STANDARDS

- A. The work of this section shall comply with the latest edition of the following standards. When conflicts arise between standards, the more stringent shall apply.
- B. FGIA – Fenestration and Glazing Industry Alliance
 - 1. AAMA/WDMA/CSA 101/I.S.2/A440, NAFS 2011 – North American Fenestration Standard/Specification for Windows, Doors and Skylights.
 - 2. AAMA 501.8, Standard Test Method for Determination of Resistance to Human Impact of Window Systems Intended for Use in Psychiatric Applications.
 - 3. AAMA 502, Voluntary Specification for Field Testing of Newly Installed Fenestration Products. No pressure reduction allowed; design pressure shall be as specified herein.
 - 4. AAMA 907: Voluntary Specification for Corrosion Resistant Coatings on Carbon Steel Components Used in Windows, Doors and Skylights
 - 5. AAMA CW-10: Care and Handling of Architectural Aluminum from Shop to Site.
 - 6. AAMA 2603, Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels
 - 7. AAMA 2604, Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels
 - 8. AAMA 2605, Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels
 - 9. AAMA 609 & 610, Voluntary Guide Specification for Cleaning and Maintenance of Painted Aluminum Extrusions and Curtain Wall Panels
 - 10. AAMA 611-14, Voluntary Specification for Anodized Architectural Aluminum.
 - 11. AAMA 620, Voluntary Specifications for High Performance Organic Coatings on Coil Coated Architectural Aluminum Substrates.
 - 12. AAMA 800, Test Methods for Sealants
- C. ASCE – American Society of Civil Engineers– Latest Edition
 - 1. SEI/ASCE 7, Minimum Design Loads for Buildings and Other Structures
- D. ASTM – American Society for Testing and Materials
 - 2. ASTM B 221, Specification for Aluminum - Alloy Extruded Bar, Rod, Wire, Profiles and Tubes
 - 3. ASTM B 209, Specification for Aluminum and Aluminum-Alloy Sheet and Plate

February 27, 2026

4. ASTM B 210, Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes
 5. ASTM B 211, Specification for Aluminum and Aluminum-Alloy Bar, Rod and Wire
 6. ASTM C 920: Standard Specification for Elastomeric Joint Sealants
 7. ASTM C 1036, "Flat Glass".
 8. ASTM C 1048, "Heat Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated".
 9. ASTM C 1172, "Standard Specification for Laminated Architectural Flat Glass".
 10. ASTM E90: Standard Test Method for Laboratory Measurement of Air-borne Sound Transmission Loss of Building Partitions and Elements.
 11. ASTM E 283, Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
 12. ASTM E 330, Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference
 13. ASTM E 331, Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference
 14. ASTM E 1105, Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Curtain Walls and Doors by Uniform or Cyclic Static Air Pressure Difference
 15. ASTM E1332: Standard Classification for Rating Outdoor-Indoor Sound Attenuation.
 16. ASTM E1300: Standard Practice for Determining Load Resistance of Glass in Buildings.
 17. ASTM E2190: Standard Specification for Insulating Glass Unit Performance and Evaluation.
- E. GANA – Glass Association of North America
1. Glazing Manual
 2. Glazing Sealing Systems Manual
- F. Safety Glazing Standard: 16 CFR 1201 for heat treated and laminated glass and ANSI Z97.1 for wired glass when used for safety glazing, permanently marked with Safety Glazing Certification Council label. Comply with applicable code.
1. Glazing lites more than 9 sq. ft. in exposed surface area of one side, provide glazing products that comply with Category II materials, for lites 9 sq. ft. or less in exposed surface area of one side, provide glazing products that comply with Category I or II materials, except for hazardous locations where Category II materials are required by 16 CFR 1201 and regulations of authorities having jurisdiction.
 2. Safety glazing is only required at the inboard lite of a full-height vision glass (without intermediate horizontals or rails) except on the ground floor or

other areas where there is a walking surface on both sides. Alternately, if an aluminum rail is used on the interior of the framing, neither lite need to be safety glazing.

- G. IFI – Industrial Fasteners Institute
 - 1. Handbook on Bolt, Nut and Rivet Standards
- L. IBC 2018 with Kauai County amendments

1.03 QUALITY ASSURANCE

- A. Manufacturer's Qualifications:
 - 1. Provide products by a firm specializing in the fabrication of behavioral security windows who has successfully produced work similar in design and extent to that required for the project, in not less than three (3) projects of similar size and scope and whose work has resulted in construction with a record of successful in-service performance of specified product for a minimum period of ten (10) years.
 - 2. Ensure security window manufacturer has sufficient production capacity, organized quality control and testing procedures, and published written and illustrated installation manuals to produce and properly install assemblies required without causing delay in progress of the Work.
- B. Installer's Qualifications: Engage a single firm to assume undivided responsibility for installation and total coordination of all components of the Work as described above and herein. This firm must demonstrate not less than 10 years consecutive successful experience in fabrication and installation of work similar to the work of this project. Individual experience does not qualify.
- C. Source Limitations: Provide materials of this Section from a single behavioral security window manufacturer or from sources approved by behavioral security window manufacturer.
- D. Field Measurement: Wherever possible, take field measurements prior to preparation of shop drawings and fabrication, to ensure proper fitting of work. However, proceed with fabrication and coordinate installation tolerances as necessary when field measurements might delay work.
- E. Pre-Installation Conference: Before beginning work of this Section, conduct conference at Project to comply with requirements of appropriate Division 01 Sections.
 - 1. Required Attendees:
 - a. Owner.
 - b. Architect.
 - c. Contractor, including supervisor.
 - d. Aluminum window installer, including supervisor.
 - e. Installers of adjacent work, including supervisors.
 - f. Manufacturer's technical representative
 - 2. Minimum Agenda

February 27, 2026

- a. Review Contract Document requirements.
 - b. Review approved submittals.
 - c. Review installation procedures.
 - d. Review specified inspection and testing.
 - e. Review forecasted weather conditions and procedures for coping with unfavorable conditions.
 - f. Tour representative areas of required work, discuss and evaluate for compliance with Contract Documents and approved submittals, including substrate conditions, surface preparations, sequence of installation and other preparatory work performed by other installers.
3. Reports: Record discussions, including decisions and agreements reached and prepare report.

1.04 DRAWINGS AND SPECIFICATIONS

- A. The character of these documents are intended to provide a performance type specification for the design, fabrication and installation of the Behavioral Security Windows. The Glazing Contractor is responsible for the engineering and design of all components as well as the fabrication, installation and performance of the systems.
- B. The architectural drawings are diagrammatic. The details shown are intended as a guide for the aesthetic and interfacing requirements of the various components of the exterior wall to and with other work; details are intended to establish basic dimensions of the module and the sight lines, jointing and profiles of members. The Glazing Contractor is responsible for the design and engineering of the system within these aesthetic parameters. The drawings are not to be construed as engineering design, or adequate to meet the engineering design requirements.
- C. It is recognized that the architectural design details do not cover some conditions or modifications, which may be required. It is, however, intended that conditions not detailed shall be developed through the Glazing Contractor's shop drawings to the same level of aesthetics and in compliance with performance criteria as indicated for detailed areas and as stipulated in these specifications. The Glazing Contractor, by accepting a contract for the work, acknowledges this and agrees that the Architect shall have the final say as to all matters whether detailed or not on the architectural design details.

1.05 SUBMITTALS

- A. Submit under the provisions of Section 01330 – SUBMITTAL PROCEDURES.
- B. Product Data: Submit complete manufacturer's technical literature for behavioral security windows, including full description of all materials and hardware including performance criteria, physical sizes, finish and limitations. Submittals must also include but not be limited to:
 1. General:
 - a. Product data for all components of the system

February 27, 2026

- b. Typical construction details and fabrication methods.
 - c. Instructions / recommendations for installation and maintenance.
 - d. Certified test reports showing compliance with performance requirements where test methods are indicated.
 - e. Samples of all materials to be encompassed in the work in the size and quantity as required by the project documents.
- 2. Glass:
 - a. Comply with the requirements of Section 08800 - GLAZING for glazing.
 - b. Three (3) 12" x 12" sample of each glass type, manufacturer's published data for specified security glazing material and recommended glazing requirements.
 - c. Provide security glass manufacturers impact-resistance, wind and thermal stress analysis, and center deflection calculations showing that specified maximum probabilities of breakage are not exceeded.
- 3. Aluminum Finishes: Three (3) 2" x 4" samples of each color finished to be used on this project. Upon approval, submit three (3) sets of three (3) color sample of each finish identifying the color range variation.
- 4. Anchorage:
 - a. Fasteners: Three (3) of each fastener type along with technical data, mill certificates and test reports.
 - b. Product data for anchorage, setting accessories and other related materials.
 - c. Fastener and Anchor Test Reports: Certified reports of last completed set of mechanical tests for each device.
- 5. Certification of acceptance of installation procedures signed by the glass manufacturer and silicone sealant manufacturer.
- C. Shop Drawings: Submit complete shop drawings to the Architect for approval. Shop drawings shall include the followings:
 - 1. Indicate materials and details in full-size scale for head, jamb and sill, profiles of components, elevations of units, anchorage details, description of related components, fasteners, and junction with related components of the building envelope.
 - 2. Show details of fastening and sealing methods and product joinery to ensure proper performance of field installation. Clearly indicate details of field connections, anchorage, and their relationship to work of others for coordination of work by other building trades
 - 3. Do not fabricate work of this Section until Shop Drawings have been reviewed by Architect.
 - 4. Hardware, accessories and finishes.

February 27, 2026

5. Ensure Shop Drawings carry the stamp of a Professional Engineer currently licensed in the State of Hawaii. This shall be same engineer who signs the calculations.

D. Coordinated Calculation Submission

1. Provide structural calculations, sealed by a licensed professional engineer in the State of Hawaii prepared in compliance with referenced documents and these specifications.
2. Where specifications and code differ, the more severe requirements shall govern. Test reports are not an acceptable substitute for calculations. Calculations shall include the following information:
 - a. Analysis for all applicable loads on framing members.
 - b. Analysis for impact-resistance and forced entry.
 - c. Deflection limitations of glass framing system.
 - d. Anchor requirements specific to conditions of the project
 - e. Analysis for all applicable loads on anchors, including anchors embedded in concrete.
 - f. Section property computations for framing members.
 - g. Certification of conformance with structural test pressures and design pressures indicated. Include evidence of compliance by submission of product test reports with notations as required by professional engineer.

E. Field Quality Control Submittals

1. Field Quality Control Test Reports: Reports of testing and inspection specified in PART 3 "Field Quality Control" Article.
2. Manufacturers Field Inspection Reports: Reports of each visit to Project made by representatives of manufacturer specified in PART 3 "Field Quality Control" Article.
3. Delegated Engineering Field Inspection Certification: Statement, sealed by delegated engineering professional, specified in PART 3 "Field Quality Control" Article.

1.06 DELAGATED DESIGN REQUIREMENTS

A. Delegated Engineering Requirements:

1. Delegated Engineering Responsibility: Require behavioral security windows manufacturer to employ a delegated engineering professional to provide engineering for work of this Section to comply with concept expressed in Contract Documents.
2. Engineer system to withstand structural design loads within limits, impact-resistances and under conditions indicated, specified, or required, without material failure or permanent deformation of building structural frame or work specified.
3. Inspect work as specified under PART 3 "Field Quality Control" Article.

4. Prepare engineering calculations, shop drawings, and other submittals and affix professional seal according to respective jurisdictional licensing regulations.
- B. Design aluminum behavioral security windows with arrangements, alignment, and profiles of components and assemblies as they relate to sight lines, to one another, and to adjoining construction to meet design requirements.
- C. Design aluminum behavioral security windows such that all profiles are flush and vertical, with no flat horizontal surfaces.
- D. Design aluminum behavioral security windows with rugged construction and with integral components that cannot be broken off and separated from remainder of window assembly.
- E. Design aluminum behavioral security windows with removable and replaceable interior sashes that may only be disconnected from remainder of window assembly using manufacturer-provided special tools. Systems incorporating interior security sashes with hinges are not acceptable.
- F. All components shall be secured by concealed means. Attach in a manner which will permit replacement of components or units during construction and in subsequent usage of the building without dismantling or disturbing adjoining components or units. Such replacement must be able to be carried out without the use or addition of extra screws, splices, covers and similar items, that may alter original design features.
- G. Design glass and glazing to ASTM E1300.
- H. Comply with published recommendations of glass manufacturers and Glass Association of North America (GANA)'s "Glazing Manual" unless more stringent requirements are indicated.
- I. Design aluminum work as shown to provide rattle-free and noiseless movement of all components of assembly without buckling of any component and/or transmitting of stresses to any members.
- J. Thermal Movements: Provide aluminum windows, including anchorage, that allow for thermal movements resulting from the changes in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects.

1.07 PERFORMANCE REQUIREMENTS

- A. Thermal Movement
 1. Thermal Movement: Fabricate exterior components from manufacturer's stock systems which have been designed to provide for expansion and contraction resulting from ambient temperature range of 120 degrees F and metal surface temperature extreme of 185 degrees F, without causing buckling stresses on glass, failure of glass, metal, or joint seals, undue stress on structural elements, damaging loads on fasteners, reduction of performance, or other detrimental effects.

February 27, 2026

2. The amount of such movement that is accommodated in the wall design shall be identified on the shop drawings and shall be accompanied by thermal calculations to address current Code.

B. Structural Properties:

1. The Aluminum Windows and their anchorage and related components shall be designed with adequate strength and stiffness to withstand the loads as determined by IBC 2018, and ASCE 7
 - a. Windload Criteria: As indicated on the Structural Drawings
 - b. Design corners for simultaneous positive (inward) design pressures on both surfaces, and simultaneous negative (outward) design pressure on both surfaces.
 - c. Partial loading on one surface shall also be considered.
2. Wind Resistance Criteria: Withstand load effects of 150 percent (safety load) of inward positive and outward negative design wind load design pressures, as indicated in Contract Documents, acting inward and outward normal to plane of wall according to ASTM E 330.
 - a. Net permanent deformation of structural members not more than $L/1000$.
 - b. No failure or gross permanent distortion of framing members, anchors or connections, or any other portion of system.
 - c. Not more than $1/8$ in movement in any direction nor more than $1/16$ in set after load is removed under following conditions:
 - 1) Combined movement of anchor relative to building structural frame.
 - 2) Framing member relative to building structural frame.
 - 3) Framing member relative to anchor.
3. Deflection for metal members supporting glass, the performance criteria shall be as follows:
 - a. Perpendicular to the plane of the wall, net deflection of framing members shall be per AAMA TIR-A11 and shall not exceed $1/175$ times span for spans up to 13'-6" and $L/240 + 1/4$ inch for spans of 13'-6" or greater.
 - 1) The exception to these criteria shall be that for any span with one light of glass in excess of 120" in height shall have net deflection of the framing members limited to $3/4$ - inch maximum, regardless of the overall span.
 - 2) Span is defined as the distance between anchor centerline. For cantilevers, span is defined as two times the distance between anchor centerline and end of cantilever.
 - 3) Where a sealant joint occurs between a framing member and a relatively stiff building element, framing member deflection shall not exceed $1/2$ of the nominal joint width, or less if required by sealant manufacturer.

- 4) Where a framing member runs continuously past a deflecting support, the support deflection shall be considered in the analysis.
- C. The Aluminum Windows shall perform quietly at all times and without vibration harmonics, wind whistles, noises caused by thermal movement (including “popping” or “ticking”), thermal movement transmitted to other building elements, loosening, weakening or fracturing of attachments or components of system.
- D. Air Infiltration:
1. Air-Infiltration Rate for Fixed and Operable Windows: Not more than 0.20 cfm/ft² of unit area for an inward test pressure of 6.24 psf pressure differential when tested in accordance with ASTM E283 and AAMA 101.
- E. Water Penetration
1. Water penetration or uncontrolled water leakage, in this specification, is defined as the appearance of uncontrolled water on the indoor face of any part of the work. “Controlled” water or condensation is defined as water which is demonstrably drained harmlessly to the exterior of the work without endangering or wetting adjacent surfaces or insulation, and not visible in the final construction.
 2. Provision shall be made to drain to the exterior face of the work, any water entering at joints, and/or any condensation occurring within the work. The system shall be designed to collect and remove all secondary water from the surrounding conditions. At insulated areas, gutter shall extend to the inside vertical plane of the insulation.
 3. No uncontrolled water penetration shall occur when the work is tested in accordance with ASTM E331 at a pressure differential of 10 psf.
- F. Life Cycle Testing: No damage to fasteners, hardware, or other damage making door inoperable or allowing increase in air and water penetration when tested per AAMA 910.
1. Air infiltration and water resistance tests shall meet the primary performance requirements specified after completion of cycling.
- G. Impact-Resistance Performance Requirements:
1. Provide behavioral windows, including security glazing, to withstand impact loads and forces without damage to the glazing conforming to AAMA 501.8 for minimum impact test energy of 2000 ft-lbs.
 2. Provide behavioral windows, including security glazing, to withstand normal thermal movement, wind, and impact loads without failure, including loss or breakage.
 3. Anchor assemblies with framing members in such a way that they can resist without failure, levels of energy (force) equivalent to those to which the glazing is subjected per the stipulations of the glazing’s attack resistance test method.
- H. Acoustic Requirements:

February 27, 2026

1. Sound Transmission Class (STC): Provide window assemblies rated for not less than STC 44 (with trickle vent closed) when tested for laboratory sound transmission loss according to ASTM E90 and determined according to ASTM E413.
 2. Outside-Inside Transmission Class (OITC): Rated for not less than OITC 40 (with trickle vent closed) when tested for laboratory sound transmission loss according to ASTM E90 and determined by ASTM E1332.
- I. Seismic Design Criteria: As indicated on the Structural Drawings.
- J. Windborne-Debris-Impact Resistance Performance for Glazing:
1. Performance shall be tested in accordance with ASTM E1886 and information in ASTM E1996.
 - a. Large-Missile Impact: For glass located within 30 feet of grade.

1.08 DELIVERY, STORAGE AND HANDLING

- A. Quality Standard: AAMA CW-10
- B. Deliver, store and handle all wall system assemblies so as to prevent damages at all times, as per manufacturer's recommendations.
- C. All materials delivered to the site shall be stored in spaces provided on each floor of the building, where they will not be exposed to wetting or damage, and shall permit easy access to the handling of the materials. Materials shall be stored neatly, properly stacked, and protected.
- D. Deliver other materials, except bulk materials, to project site in manufacturer's unopened containers with name, brand, type, grade and color fully indicated thereon. Store bulk materials as required to avoid any deleterious effects of weather, soiling or contamination.
- E. Storage and Handling Requirements:
1. Store materials off the ground, and in a dry location and conforming to manufacturer's recommendations in clean, well-ventilated area.
 2. Store and protect behavioral security windows from nicks, scratches, and blemishes.
 3. Replace defective or damaged materials with new.

1.09 PROJECT CONDITIONS

- A. Coordinate as required, and be totally responsible for, the full and satisfactory compatibility and performance between all sealants used under this section and those sealants used by other trades that may be in direct contact with or adjacent to sealants in this work.
- B. Take all required steps and precautions to properly isolate and prevent any degree of incompatibility between said sealants, all in strict accordance with manufacturer's specifications, recommendations and instructions.

February 27, 2026

- C. Periodically test sealants in place for adhesion, using methods recommended by sealant manufacturer. Promptly replace any sealant which does not adhere or fails to cure.
- D. Prior to commencement of work, conduct a pre-installation meeting with the Architect, Owner and/or Owners Representative, General Contractor, and any other related representative to review installation procedures, weather conditions under which work can be installed, storage, etc. Examine a sample installation of the wall which has been prepared and determine and record whether everyone present is in agreement that the proposed installation is equal to or superior to the mock up test specimen and is likely to perform as required. Accepted control section shall be standard to which other work must confirm.
- E. Field Measurements: Check window and door openings by field measurements before fabrication and show recorded measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the work.
- F. Where field measurements cannot be made without delaying the work, guarantee opening dimensions and proceed with fabricating glazed aluminum systems without field measurements. Coordinate wall construction to ensure that actual opening dimensions correspond to guaranteed dimensions. Beginning of installation means acceptance of existing surfaces.

1.10 WARRANTY

- A. Manufacturer's Warranty: Submit written warranty (2 copies) before Substantial Completion signed by both the Behavioral Security Window Manufacturer and Glazing Contractor agreeing to repair or replace defective Behavioral Security Window materials or components that fail in materials or workmanship during the warranty period.
 - 1. The warranty shall include extrusions, gaskets, tape, trim, fasteners, finish and all other accessories.
 - 2. This warranty shall cover all on-site labor to repair or replace all defective parts for the entire warranty period.
 - a. Warranty Period: 2 years after the Substantial Completion date.
- B. Special Warranty on Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Exposed Sheet Metal Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

February 27, 2026

2. Finish Warranty Period: 10 years from the date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURER'S

- A. Basis-of-Design Product: Materials specified in this Section are based on Series MHW 6200 – Behavioral/Mental Health Security Windows by Sherwood Windows Limited.

2.02 ALUMINUM

- A. Provide aluminum shapes and thicknesses as shown and as required to fulfill performance requirements. Use suitable alloy and temper for extruding with adequate structural characteristics, and suitable for finishing as specified, but not less than 22,000 psi ultimate tensile strength.
- B. Comply with the following:
 1. Sheet and Plate: ASTM B 209, thickness as required by delegated engineering, but not less than 3/16-inch unless otherwise noted.
 2. Extruded Bars, Rods, Shapes, and Tubes: ASTM B 221, thickness as required by delegated engineering.

2.03 ALUMINUM WINDOWS

- A. Frames and Sashes: Fabricate frames, sashes, and muntins with an integral, concealed, low-conductance thermal barrier located between exterior materials and window members exposed on interior side in a manner that eliminates direct metal-to-metal contact.

2.04 GLASS AND GLAZING

- A. Thermal Sealed Insulated Glass Unit (Exterior): Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, conforming to ASTM E2190.
 1. Vacuum-Deposited Laminated/Insulating Glass Units (**G2**): ASTM C 1376, Manufacturer's glass units with one pane of glass coated with a durable nitride or metallic oxide coating (Soft Coat Low-E), of color and on surface indicated, by manufacturer's standard deposition process, and complying with the following requirements:
 - a. Exterior Pane: Float glass, FT (Fully Tempered), Condition C, Type 1, Class 1 (Clear), Quality q3.
 - 1) Low-E Coating: Guardian Sunguard SNX 60+ on the number two surface
 - 2) Thickness: 1/4-inch
 - b. Air Space: 1/2-inch.
 - c. Outer Lite: Float glass, Kind FT (Fully Tempered), Condition A, Type 1, Class 1 (Clear), Quality q3, 1/4-inch thick.

February 27, 2026

- 1) Plastic Interlayer: Kuraray SentryGlas Ionoplast or approved equal
 - a) Thickness: 0.090-inch
 - b) Color: Clear
 - d. Inner Lite: Float glass, Kind FT (Fully Tempered), Condition A, Type 1, Class 1 (Clear), Quality q3, 1/4-inch thick.
 - e. Performance Requirements:
 - 1) Visible Light Transmittance: 60 percent.
 - 2) Summer Daytime U value: 0.26 Winter Nighttime U value: 0.28
 - 3) Solar Heat Gain Coefficient: 0.25.
 - 4) Impact Resistance: Comply with the requirements of ASTM E 1886 and ASTM E 1996 for Large Missile Impact
- B. Interior Security Glass Unit (Patient/Threat Side):
1. Laminated Glass: ASTM C 1172, and complying with other specified requirements and with the following:
 - a. Interlayer: Plastic interlayer of thickness indicated with a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after laminating glass lites and installation.
 2. Laminated Glass Unit: Kind LA, consisting of two lites of fully tempered float glass combined with a plastic interlayer for an overall thickness of 0.79-inches and complying with the following:
 - a. Outer Lite: Float glass, Kind FT (Fully Tempered), Condition A, Type 1, Class 1 (Clear), Quality q3, 0.39-inch thick.
 - 1) Plastic Interlayer: Kuraray SentryGlas Ionoplast or approved equal
 - a) Thickness: 0.090-inch
 - b) Color: Clear
 - b. Inner Lite: Float glass, Kind FT (Fully Tempered), Condition A, Type 1, Class 1 (Clear), Quality q3, 0.39-inch thick.
- C. Exterior Glass-to-Interior Glass Air Space:
1. Provide minimum 4-1/4 inch glass-to-glass air space filled with patient controlled horizontal blinds.
 2. Horizontal Blinds: Provide manufacturer's standard, ligature-resistant, horizontal blinds with aluminum slats that are operated by non-removable anti-ligature hardware located on inside face of sash.
 - a. Color: As selected by Architect from manufacturer's standard range.
 3. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.
 4. Hardware: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other

corrosion-resistant material compatible with adjacent materials; designed to operate smoothly, tightly close, and securely lock windows, and sized to accommodate sash weight and dimensions. Provide removable, ligature-resistant hardware unless indicated otherwise.

5. Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.

2.05 ACCESSORIES

- A. Integral Ventilating System/Device: Where indicated, provide tamper- and ligature-resistant, weather-stripped, adjustable, lockable, horizontal fresh-air vent, with free airflow slot, complying with AAMA/WDMA/CSA 101/I.S.2/A440.
 1. Basis-of-Design: "Aero-Vent" by Sherwood or approved equivalent.
- B. Receptor System: Two-piece, snap-together, thermally broken, extruded-aluminum receptor system that anchors windows in place.
- C. Subsills: extruded-aluminum subsills in configurations as standard with manufacturer.
- D. Equip window frames with air and water resistive barrier material for sealing to building air and water resistive barrier as follows:
 1. Material: identical to, or compatible with, building air and water resistive barrier materials to provide required airtightness and watertightness throughout exterior envelope assembly.

2.06 FASTENERS

- A. All fasteners shall be tamper-resistant, Type 316, non-magnetic stainless steel unless otherwise noted.
- B. The work shall be designed to conceal all fasteners, except where unavoidable for application of hardware. In this case, exposed fasteners shall be Type 316, non-magnetic stainless steel unless approved otherwise. Finish exposed fasteners to match adjacent aluminum.
- C. Post-Installed Expansion Anchors: ACI 318, D.1 and ICC-ES AC193
 1. Finish: Stainless steel, mechanically deposited ASTM B 695 or hot-dip zinc coating ASTM A153. Thickness not less than 0.002 in (2 mils).
 2. Manufacturers and Products (Approved only with ICC Report)
 - a. ITW; Redhead Truebolt Wedge Anchor.
 - b. Powers; Bull Wedge Anchor.
 - c. Simpson; Strong-Bolt Wedge Anchor
- D. Self-drilling Fasteners: Tamper-resistant, Bi-Metal, 300 Series Stainless Steel head and shank fused to harden steel tapping threads and point with corrosion resistant coating with not less than 1000 hours of salt-spray resistance according to ASTM B 117.
 1. Basis-of-Design: Dewalt; Bi-Flex with Stal-Guard GB finish.
 2. Subject to the requirements, the following fastener may be acceptable:

- a. Hilti, Inc.; Kwik-Flex with Kwik-Cote finish
- E. Nuts used at expansion or moving connections shall be designed to provide a positive means of preventing disengagement. Staking of bolts, use of lock washers, or threads being deformed is not acceptable.
- F. Matched bolts, nuts, washers shall be used at all friction connections.

2.07 SEALANT MATERIALS

- A. Comply with the requirements of Section 07910 – EXTERIOR WALL JOINT SEALANTS.
- B. All exterior sealants shall be silicone.
- C. All internal sealants that contact the perimeter sealants must be compatible with, and adhere to, the perimeter sealant. All internal sealants used to seal glass pockets, end dams and gutters shall be silicone. Where sealant is exposed, provide tamper-resistant types.
- D. Splice details shall be designed using silicone or a combination of silicone and a non-curing, nonhardening, non-skimming butyl. Splice joint to be designed to separate the different sealants. Splice details to be designed to accommodate the anticipated movement of the joint.

2.08 MISCELLANEOUS MATERIALS

- A. Provide stainless steel sleeve spacers and/or suitable bearing pads as required, to insure free movement between surfaces where expansion and deflection movements are intended. Provide "Eel Slip" or "Nylatron" washers or pads of sizes and thickness (minimum 1/16 inch except 1/8 inch for Eel Slip") recommended by the manufacturer to permanently prevent "freeze up" of joints. Provide high impact polystyrene shim pads for static shims.
- B. Shim Material:
 - 1. For Structural Connections: 300 series stainless steel or ASTM A 36 or ASTM A 283 hot-dipped galvanized steel.
 - 2. For Static Connections: Korolath high impact polystyrene pads.
 - 3. For Non-Structural Connections: U-shape polystyrene.
 - 4. For Dynamic Connections: Molybdenum disulfide filled nylon (Nylatron) lubricated pads or washers.
 - 5. Not Acceptable: Fiber shims or wood shims.
- C. Flashing required within the system or to join the system to adjacent construction shall be aluminum or stainless steel of acceptable design and color.
 - 1. ASTM A 240 stainless steel, dead-soft, not less than 0.039 in thick.
 - 2. Aluminum Sheet (anodized / painted), not less than 1/16 in thick. Finish to match framing members when exposed.
- D. Anchors, Clips, and Window Accessories: Fabricate anchors, brackets, clips, and window accessories of aluminum, nonmagnetic stainless steel, or hot-dip zinc-coated steel complying with requirements of ASTM B633 and ASTM A 123;

February 27, 2026

shapes and thicknesses must provide sufficient strength to withstand design pressure indicated.

- E. Baffles: Provide 30 to 40 ppi PVC coated open cell reticulated urethane foam baffles at all weep holes or vent tubes.
 - 1. Size, length and porosity to meet water and air infiltration design requirements.
- F. All baffles shall be mechanically restrained and compressed 30% - 50% in their final position.
- G. Control of Corrosion and Staining:
 - 1. Prevent galvanic, and other forms of corrosion as well as staining by isolating metals from direct contact with incompatible surfaces. Comply with SSPC-SP COM, rust inhibitive enamel or paint, either air dried or baked.
 - 2. Items of carbon steel, unless galvanized or scheduled for other finish, shall be thoroughly cleaned and painted with zinc chromate primer.
 - 3. Materials:
 - a. Zinc Chromate Primer: Specification FS TT-P-645, SSPC- SP COM. Minimum dry film thickness of 3 mil for each coat.
 - b. Sealant, tape or approved galvanic isolator.
- H. Bituminous Paint:
 - 1. SSPC-Paint 12 and ASTM D1187, cold applied asphalt mastic paint formulated for 30 mil thickness for each coat.

2.09 FINISH

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Surface to be finished shall be free from mechanical imperfections such as scratches, scrapes, dents and die marks. Pretreatment of the aluminum surface shall be completed in accordance with the procedures recommended by the manufacturer.
- C. Apply coatings uniformly to coating manufacturer's recommended thicknesses so that there are no streaks, runs, sags, absence of coating, blisters, "orange peel" or similar imperfections.
- D. Concealed members may be mill finish, providing that they cannot be seen through the glass, do not contact any structural silicone or are not continually exposed to water immersion.
- E. Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.
- F. Repair to finished surface by mechanical means (other than those specified) or by painting is strictly forbidden unless the procedure is submitted and approved by Architect (including a sample area repair).

February 27, 2026

1. Material may be finished more than once provided that all specified requirements are satisfied. However, if still not acceptable, it shall be rejected.
- G. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- H. Adjacent parts of the same finish or within 6" of each other in the construction shall not vary in color by more than 1/2 the range so as the variation to be imperceptible to the naked eye under normal daylight conditions. Construct a visual mock-up or submit range samples defining the maximum variation of color that can be anticipated in the work. Samples shall be on lengths of extrusions not less than 12" and on sheet/plate/panels not less than 24" square.
- I. Submit for approval a quality control program, including procedures and processes, to assure compliance with the specified requirements.
- J. Do not ship any material that has not been inspected, tested and marked in the prescribed manner, does not fall within the prescribed color range, or has been rejected by the Architect.
- K. High-Performance Organic Finish (Exterior): AA-C12C42R1x (Chemical Finish: Cleaned with inhibited chemicals; Chemical Finish: Acid-cromate-flouride-phosphate conversion coating; Organic Coating: As specified below). Prepare, pretreat and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 1. Fluoropolymer Two-Coat Coating System: Manufacturer's standard two-coat, thermos-cured system composed of specially formulated inhibitive primer and Fluoropolymer color topcoat. Both color and clear topcoats containing not less than 70% polyvinylidene fluoride resin by weight; comply with AAMA 2605.
 2. Resin Manufacturers: Subject to compliance with requirements, provide products containing resin by one of the following:
 - a. Duranar, PPG
 - b. Fluropon Classic, Valspar Corp.
 - c. Hylar 5000, Ausimont USA, Inc.
 - d. Kynar 5000, Elf Atochem North America, Inc.
 3. Color: As selected by Architect from manufacturer's full range..
- L. Baked-Enamel Organic Finish (Interior), complying with AAMA 2603
 1. Color: As selected by Architect from manufacturer's full range.

2.10 FABRICATION

- A. Fabrication Quality Standards: In addition to standards specified elsewhere, perform work according to following, unless otherwise specified:
 1. ANSI/AAMA 402.9
 2. AAMA/WDMA/CSA 101/I.S.2/A440
 3. GANA Manual and Glass Manufacturer's recommendations.

February 27, 2026

4. Approved submittals and Contract Documents
- B. General Requirements
 1. Fabricate windows conforming to manufacturer's standard requirements. As a minimum conform to the following:
 - a. Fabricate units square and true with maximum tolerance of plus or minus 1/16 inch for units with a diagonal measurement of 5.9 feet or less, and +/- 1/8 inch for units with a diagonal measurement over 5.9 feet.
 - b. Frame Sections: Fabricate from minimum 0.062-inch thickness except sill extrusion at 0.0768-inch nominal thickness
 - c. Brace frames to maintain squareness and rigidity during shipment and installation.
 - d. Finish steel clips and reinforcement with [shop coat primer to MPI#79] [zinc coating to MPI#20].
 - e. Isolate aluminum from following components, using isolation coating:
 - 1) Dissimilar metals.
 - 2) Concrete, mortar and masonry.
 - 3) Wood
- C. Glazing
 1. Follow GANA Manual Guidelines and Glass Manufacturer's recommendations.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Site Verification of Conditions: Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions.
- B. Verify openings are sized to receive behavioral security window units and sill plate is level in accordance with manufacturer's acceptable tolerances. Verify field measurements for fixed aluminum window installation.
- C. Examine wall flashings, air and water resistive barriers, and other built-in components to ensure weathertight window installation.
- D. Proceed with installation only after discrepancies and unacceptable conditions have been remedied.

3.02 PREPARATION

- A. General: Surfaces shall have no conditions which would cause faulty work or failures, or result in potentially defective installation.

February 27, 2026

- B. Isolate and prevent any degree of incompatibility between all sealants used under this section and those sealants used by other trades that may be in direct contact with or adjacent to sealants in this work.
- C. Examine a sample installation of the wall which has been prepared and determine and record whether everyone present agrees that the proposed installation is likely to perform as required. Accepted control section shall be standard to which other work must confirm.
- D. Adjacent Surfaces Protection: Protect adjacent work areas and finish surfaces from damage during product installation.

3.03 INSTALLATION

- A. Installation Quality Standards: In addition to standards specified elsewhere, perform work according to following, unless otherwise specified:
 - 1. Delegated engineering.
 - 2. Respective manufacturer's written instructions, specifications, and recommendations.
 - 3. Approved submittals.
 - 4. Contract Documents.
 - 5. ASTM E 2112 Standard Practice for Installation of Exterior Windows, Doors and Skylights.
- B. Install windows to manufacturer's instructions.
- C. Install component parts level, plumb and true to line with uniform joints. Do not use defective parts (warped, twisted, bowed, dented or abraded). Secure to structure with non-staining non-corrosive shims, anchors, fasteners, spacers and fillers. Use care in erection so as not to mar, abrade or stain finished surfaces. Where aluminum is to be placed in contact with steel, concrete, concrete block and other dissimilar surfaces, back paint the aluminum before erection with an acceptable bituminous paint.
- D. Seal joints between windows and window sills with sealant. Bed sill expansion joint cover plates and drip deflectors in bedding compound. Caulk between sill upstand and window-frame. Caulk butt joints in continuous sills.
- E. All exposed work shall be carefully matched to produce weathertight units with flush, rigid, and hairline joints. Match components to ensure continuity of line and design. All anchoring, fastening, jointing and splicing of members shall be concealed, unless noted otherwise; where bolts or screws are permitted in work exposed to view, they shall match adjacent surfaces. Exposed edges shall be finished to match face of the work.
- F. Anchorage of the window to the structure shall be in strict accordance with accepted shop and/or erection drawings and structural calculations. Any bolts or angles to be fixed to concrete shall be supplied and installed by the Glazing Contractor; he shall be responsible for coordinating with the General Contractor and for the installation of bolts or angles in the exact position
- G. Anchors: Anchors of the sizes and shapes required shall be provided for securing aluminum frames to adjacent construction. Anchors shall be placed near top and

bottom of each jamb and at intermediate points as indicated on approved shop drawings.

- H. Attachment of the window anchorage at support walls shall occur inboard of the weather line. Supporting brackets shall be designed to provide three-dimensional adjustment and accurate location. Once window is properly positioned, all connections so designated on accepted shop drawings shall be rigidly fixed by bolting, welding or other positive mechanical means.
- I. Coordinate the work of this Section with other trades adjacent to work of this Section, in particular the work of Division 07, Division 08 and Division 09. Ensure a uniform, continuous thermal, air barrier and vapor barrier effect. Where adjacent insulation and, air and water resistive barriers are to be provided under other Sections, coordinate work such that thermal, air and water resistive barrier continuity is achieved.
- J. Seal frames with an elastomeric sealant in color to match frames, making a neat fully weatherproof job complying with requirements of Section 07910 – EXTERIOR WALL JOINT SEALANTS for sealant (**JS-01**).
- K. Install glazing as specified in Section 08800 - GLAZING. Prepare surfaces that will contact sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.
- L. Provide weep holes and internal passages to drain to exterior all moisture entering joints and glazing spaces, and condensation occurring within frame construction. Fasteners shall not penetrate gutters or drainage systems.
- M. Dissimilar Materials: Provide separation of aluminum materials and other corrodible surfaces from sources of corrosion or electrolytic action contact points by complying with AAMA 101, Appendix, titled "Dissimilar Materials".

3.04 FIELD QUALITY CONTROL

- A. Pre-Testing Conference: Before beginning testing and inspections, conduct conference at Project to comply with requirements of appropriate Division 01 Sections.
- B. Field Testing and Inspections: Engage a qualified independent testing agency to perform field quality control testing and inspections to determine if installed work complies with specified requirements. Exterior Wall Contractor to provide powered scaffold, hose, water supply, communication system and manpower to perform tests
 - 1. Required Attendees:
 - a. Owner and/or Owners Representative.
 - b. Architect.
 - c. Exterior Wall Contractor, including supervisor.
 - d. Installers of adjacent work, including supervisors.
 - e. Testing agency personnel, including supervisors.
 - f. Manufacturer's technical representative

February 27, 2026

2. Minimum Agenda:
 - a. Tour areas representative of assemblies to be tested, discuss and evaluate for compliance with Contract Documents.
 - b. Review specified inspection and testing.
 - c. Review forecasted weather conditions and procedures for coping with unfavorable conditions.
 - d. Reports: Record discussions and decisions, prepare and certify report, and distribute.
- C. Field Tests
 1. Method:
 - a. Water Penetration: ASTM E1105. Provide powered scaffold, hose, water supply, communication system and manpower to perform tests.
 - b. Air Infiltration: ASTM E 783.
 2. Locations: At locations determined by the Architect.
 3. Size: Minimum of one entire window unit to be selected by the Architect
 4. Frequency: Test one window unit.
 - a. Depending upon the prevalence or absence of leakage in initial air infiltration and water penetration test, and upon measures adopted by Glazing Contractor to eliminate source of leakage, Architect, Owner or their representatives will determine necessity for, and scope of additional tests and test methods. Remedial measures shall maintain standards of quality and durability and are subject to approval.
 5. Procedure: No pressure reduction allowed. Test at design pressures specified under PART 1 for 15 minutes at each location.
 6. Reports: Record testing and inspection results and prepare certified reports according to ASTM E 575 format.
- D. Re-testing and Re-inspections Due to Failures: Exterior Wall Contractor responsible for expenses incurred, without additional cost to Owner, due to failure of work to pass testing and inspections.
- E. Delegated Engineering Field Inspection: Inspect work, including connection and attachment to building structural frame, for compliance with delegated engineering, and direct deficiencies to be corrected.
 1. Certification: Upon resolution of deficiencies, certify work complies with delegated engineering, authorities having jurisdiction, applicable local building codes, specified requirements, and is in keeping with generally accepted engineering practices.
 2. Manufacturers Field Inspection: Manufacturers technical representative shall inspect first days work and periodically inspect work to ensure installation is proceeding in accordance with manufacturer's designs, recommendations, instructions and warranty requirements. Representative shall submit written reports of each visit indicating observations, findings and conclusions of inspection.

February 27, 2026

3.05 PROTECTION

- A. The Glazing Contractor shall remove from the installed work all mastic smears or other unsightly marks caused by his workmen, and shall be responsible for any damage to or disfigurement of the work caused at any time by other trades, as well as final cleaning and washing of glass and aluminum. The Glazing Contractor shall advise the Contractor of proper and adequate protection and cleaning procedures during remainder of construction period so that system will be without damage and deterioration at time of acceptance.
- B. Remove non-permanent labels and visible markings from glass surface.

3.06 ADJUSTING AND CLEANING

- A. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.
- B. Clean and maintain aluminum surfaces in accordance with AAMA 610.1, "Cleaning and Maintenance of Painted Aluminum Extrusions and Curtain Wall Panels".
- C. Clean surfaces promptly after installation, exercising care to avoid damage to protective finishes. Remove temporary coverings and protection from adjacent surfaces. Remove excess glazing and sealant compounds, dirt and other substances. Repair or replace damaged installed materials.
- D. After completion of all other work in the vicinity of the behavioral security windows, remove all masking and/or other covering used to protect the work and thoroughly clean the aluminum surfaces with plain water or a commercial product as recommended by the manufacturer. Do not use abrasive cleaning agents.

3.07 ACCEPTANCE

- A. Installed materials, including glass, which are damaged, or which in the opinion of the Architect do not conform to the specification requirements, shall be removed and replaced with acceptable material at no additional cost to the Owner.
- B. Demonstrate proper cleaning methods and materials to Hospital's maintenance personnel.
- C. Provide "As built" shop drawings and maintenance manuals per requirements of the project documents.
- D. Remove and replace units and/or materials which are damaged, do not comply with Contract Documents, or in the opinion of the Architect, do not conform to the Specification Requirements. Eliminate evidence of replacement, and replace material damaged in the process.
- E. Glass breakage during the guarantee period will be considered a form of faulty material or workmanship

END OF SECTION

SECTION 08710 - FINISH HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes commercial door hardware for the following:
 - 1. Swinging doors.
 - 2. Sliding doors.
 - 3. Other doors to the extent indicated.
- B. Door hardware includes, but is not necessarily limited to, the following:
 - 1. Mechanical door hardware.
 - 2. Electromechanical door hardware.
 - 3. Cylinders specified for doors in other sections.
- C. Related Sections:
 - 1. Section 08110 - STEEL DOORS AND FRAMES.
 - 2. Section 08210 – WOOD DOORS
 - 3. Section 08340 – BEHAVIORAL HEALTH DOORS AND FRAMES
 - 4. Section 08460 – AUTOMATIC ENTRANCE DOORS
 - 5. Section 08530 – GLAZED ALUMINUM SYSTEMS
- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
 - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
 - 2. ICC/IBC - International Building Code.
 - 3. NFPA 70 - National Electrical Code.
 - 4. NFPA 80 - Fire Doors and Windows.
 - 5. NFPA 101 - Life Safety Code.
 - 6. NFPA 105 - Installation of Smoke Door Assemblies.
 - 7. State Building Codes, Local Amendments.
- E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:
 - 1. ANSI/BHMA Certified Product Standards - A156 Series.
 - 2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
 - 3. ANSI/UL 294 - Access Control System Units.
 - 4. UL 305 - Panic Hardware.

1.02 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing, fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - 1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 - 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
 - 3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 - h. Warranty information for each product.
 - 4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Shop Drawings: Details of electrified access control hardware indicating the following:
 - 1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:
 - a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
 - b. Complete (risers, point-to-point) access control system block wiring diagrams.

c. Wiring instructions for each electronic component scheduled herein.

2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.

D. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.

E. Informational Submittals:

1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

1.03 CLOSEOUT SUBMITTALS

A. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

B. Project Record Documents: Provide record documentation of as-built door hardware sets in digital format (.pdf, .docx, .xlsx, .csv) and as required in Division 01, Project Record Documents.

1.04 QUALITY ASSURANCE

A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).

C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor,

Architect, and Owner concerning both standard and electromechanical door hardware and keying.

- E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
 - 1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
 - 2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.
- F. Each unit to bear third party permanent label indicating compliance with the referenced testing standards.
- G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
 - 1. Function of building, purpose of each area and degree of security required.
 - 2. Plans for existing and future key system expansion.
 - 3. Requirements for key control storage and software.
 - 4. Installation of permanent keys, cylinder cores and software.
 - 5. Address and requirements for delivery of keys.
- H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
 - 1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
 - 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
 - 3. Review sequence of operation narratives for each unique access controlled opening.
 - 4. Review and finalize construction schedule and verify availability of materials.
 - 5. Review the required inspecting, testing, commissioning, and demonstration procedures
- I. At completion of installation, provide written documentation that components were applied according to manufacturer's instructions and recommendations and according to approved schedule.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.06 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.07 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of the hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 4. Electrical component defects and failures within the systems operation.
- C. Warranty Period: Unless otherwise indicated, warranty shall be one year from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Hardware shall not have any visible manufacturer names on exposed materials, except cylinders, when the door is in a closed position.

2.02 BUTT HINGES

- A. Hinges: ANSI/BHMA A156.1 butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.

1. Quantity: Provide the following hinge quantity:
 - a. Two Hinges: For doors with heights up to 60 inches.
 - b. Three Hinges: For doors with heights 61 to 90 inches.
 - c. Four Hinges: For doors with heights 91 to 120 inches.
 - d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
 - a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
 - b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.
3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
 - a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
 - b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
4. Hinge Options: Comply with the following:
 - a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for all out-swinging lockable doors.
5. Manufacturers:
 - a. McKinney (MK) - TA/T4A Series, 5-knuckle.

2.03 CONTINUOUS HINGES

- A. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 continuous geared hinge. with minimum 0.120-inch thick extruded 6063-T6 aluminum alloy hinge leaves

and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Manufacturers:.

a. Pemko (PE).

- B. Pin and Barrel Continuous Hinges: ANSI/BHMA A156.26 Grade 1-600 pin and barrel continuous hinges with minimum 14 gauge Type 304 stainless steel hinge leaves, concealed stainless pin, and twin self-lubricated nylon bearings at each knuckle separation. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Manufacturers:

- a. Markar Products; ASSA ABLOY Architectural Door Accessories (MR).
b. Pemko (PE).

2.04 POWER TRANSFER DEVICES

- A. Concealed Quick Connect Electric Power Transfers: Provide concealed wiring pathway housing mortised into the door and frame for low voltage electrified door hardware. Furnish with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

1. Manufacturers:

- a. Pemko (PE) - EL-CEPT Series.
b. Securitron (SU) - EL-CEPT Series.

- B. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.

1. Provide one each of the following tools as part of the base bid contract:

- a. McKinney (MK) - Electrical Connecting Kit: QC-R001.
b. McKinney (MK) - Connector Hand Tool: QC-R003.

2. Manufacturers:

- a. McKinney (MK) - QC-C Series.

2.05 DOOR OPERATING TRIM

- A. Flush Bolts and Surface Bolts: Provide products conforming to ANSI/BHMA A156.3 and A156.16, Grade 1.
 - 1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
 - 2. Furnish dust proof strikes for bottom bolts.
 - 3. Surface bolts to be minimum 8" in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
 - 4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.
 - 5. Manufacturers:
 - a. Rockwood (RO).
- B. Coordinators: ANSI/BHMA A156.3 door coordinators consisting of active-leaf, hold-open lever and inactive-leaf release trigger. Model as indicated in hardware sets.
 - 1. Manufacturers:
 - a. Rockwood (RO).
- C. Door Push Plates and Pulls: ANSI/BHMA A156.6 door pushes and pull units of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.
 - 1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
 - 2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
 - 3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
 - 4. Pulls shall be provided with a 10" clearance from the finished floor on the push side to accommodate wheelchair accessibility.
 - 5. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets. When through-bolt fasteners are in the same location as a push plate, countersink the fasteners flush with the door face allowing the push plate to sit flat against the door.
 - 6. Manufacturers:
 - a. Rockwood (RO).

2.06 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.

February 27, 2026

- B. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:
 - 1. Threaded mortise cylinders with rings and cams to suit hardware application.
 - 2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
 - 3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
 - 4. Tubular deadlocks and other auxiliary locks.
 - 5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
 - 6. Keyway: Match Facility Standard.
- C. Large Format Interchangeable Cores: Provide removable cores (LFIC) as specified, core insert, removable by use of a special key, and for use with only the core manufacturer's cylinder and door hardware.
 - 1. Manufacturers:
 - a. Sargent (SA) – 6300 (Verify with Facility)
- D. Keying System: Each type of lock and cylinders to be factory keyed.
 - 1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
 - 2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
 - 3. Existing System: Field verify and key cylinders to match Owner's existing system.
- E. Key Quantity: Provide the following minimum number of keys:
 - 1. Change Keys per Cylinder: Two (2)
 - 2. Master Keys (per Master Key Level/Group): Five (5).
 - 3. Construction Keys (where required): Ten (10).
 - 4. Construction Control Keys (where required): Two (2).
 - 5. Permanent Control Keys (where required): Two (2).
- F. Construction Keying: Provide temporary keyed construction cores.
- G. Key Registration List (Bitting List):
 - 1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
 - 2. Provide transcript list in writing or electronic file as directed by the Owner.

2.07 KEY CONTROL

- A. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project.

February 27, 2026

1. Manufacturers:
 - a. Lund Equipment (LU).
 - b. MMF Industries (MM).
 - c. Telkee (TK).

2.08 MORTISE LOCKS AND LATCHING DEVICES

- A. Mortise Locksets, Grade 1 (Heavy Duty): Provide ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed mortise locksets. Listed manufacturers shall meet all functions and features as specified herein.

1. Manufacturers:
 - a. Sargent Manufacturing (SA) - 8200 Series.

2.09 HOSPITAL AND BEHAVIORAL HEALTH PRODUCTS

- A. Behavioral Health Locksets, Mortise: ANSI/BHMA A156.13, Series 1000, Operational and Security Grade 1 Certified Products Directory (CPD) listed mortise sets. Listed manufacturers shall meet all functions and features as specified herein.

1. Provide locksets with functions and features as follows:
 - a. Meets UL and CUL Standard 10C Positive Pressure, Fire Test of Door Assemblies with levers that meet A117.1 Accessibility Code.
 - b. Accepted by the New York State Office of Mental Health (OMH) for use in high risk areas.
 - c. Available with deadbolt or latchbolt monitoring and request to exit feature that monitors each lever independently.
 - d. Ten-year limited warranty.
2. Manufacturers:
 - a. Sargent Manufacturing (SA) - 8200 BHW/BHL Series.

2.10 LOCK AND LATCH STRIKES

- A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
 1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
 2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
 3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
 4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

B. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.
2. Strikes for Bored Locks and Latches: BHMA A156.2.
3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
4. Dustproof Strikes: BHMA A156.16.

2.11 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:

1. Exit devices shall have a five-year warranty.
2. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
3. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
4. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
5. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
6. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
 - a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
 - b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
7. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
8. Rim Exit Devices: Exit device rails shall release with less than 5 pounds of pressure per the California Building Code.
9. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
10. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
11. Rail Sizing: Provide exit device rails factory sized for proper door width application.
12. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

- B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed exit devices. Listed manufacturers shall meet all functions and features as specified herein.

1. Electromechanical exit devices shall have the following functions and features:
 - a. Universal Molex plug-in connectors that have standardized color-coded wiring and are field configurable in fail safe or fail secure and operate from 12vdc to 24vdc regulated.
 - b. EcoFlex or equivalent technology that reduces energy consumption up to 92% as certified by GreenCircle.
 - c. Options to be available for request-to-exit or enter signaling, latchbolt and touchbar monitoring.
 - d. Field configurable electrified trim to fail-safe or fail-secure that operates from 12-24VDC.
 - e. Five-year limited warranty for electromechanical features.
2. Manufacturers:
 - a. Sargent Manufacturing (SA) - 80 Series.

2.12 SURFACE DOOR CLOSERS

- A. All door closers specified herein shall meet or exceed the following criteria:
1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.
 2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
 3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.
 4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
 5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
 6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.
- B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.

February 27, 2026

1. Heavy duty surface mounted door closers shall have a 30-year warranty.
2. Manufacturers:
 - a. Norton Rixson (NO) - 7500 Series.

C. Door Closers, Surface Mounted (Cam Action): ANSI/BHMA 156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, high efficiency door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be of the cam and roller design, one piece cast aluminum silicon alloy body with adjustable backcheck and independently controlled valves for closing sweep and latch speed.

1. Manufacturers:
 - a. Norton Rixson (NO) - 2800ST Series.

2.13 OVERHEAD CONCEALED DOOR CLOSERS

A. Door Closers, Overhead Concealed (Heavy Duty): ANSI/BHMA 156.4 Grade 1 Certified Products Directory (CPD) listed overhead concealed door closers. Listed manufacturers shall meet all functions and features as specified herein.

1. Manufacturers:
 - a. Norton Rixson (NO) - 91 Series.

2.14 DOOR STOPS AND HOLDERS

A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.

B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

1. Manufacturers:
 - a. Rockwood (RO).
 - b. Accurate Lock & Hardware (AC)

C. Overhead Door Stops and Holders: ANSI/BHMA A156.8, Grade 1 Certified Products Directory (CPD) listed overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.

1. Manufacturers:

- a. Norton Rixson (RF).
- b. Rockwood (RO).
- c. Sargent Manufacturing (SA).

2.15 ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
 - 1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
 - 1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NFPA 252, Standard Methods of Fire Tests of Door Assemblies.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.
- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- F. Manufacturers:
 - 1. Pemko (PE).

2.16 ELECTRONIC ACCESSORIES

- A. Door Position Switches: Door position magnetic reed contact switches specifically designed for use in commercial door applications. On recessed models the contact and magnetic housing snap-lock into a 1" diameter hole. Surface mounted models include wide gap distance design complete with armored flex cabling. Provide SPDT, N/O switches with optional Rare Earth Magnet installation on steel doors with flush top channels.
 - 1. Manufacturers:
 - a. Securitron (SU) - DPS Series.

- B. Switching Power Supplies: Provide the least number of power supplies at the appropriate amperage level sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.

- 1. Power supplies shall meet all functions and features as specified herein.
 - a. UL listed dual voltage 12 or 24 VDC field selectable continuous output.
 - b. Tolerates brownout or overvoltage input $\pm 15\%$ of nominal voltage.
 - c. Thermal shutdown protection with auto restart.
 - d. Circuit breaker protection against overcurrent and reverse battery faults.
 - e. Integrated battery charging circuit to prevent overvoltage on locking devices.
 - f. Available with a single relay fire trigger or individually triggered relayed outputs.
 - g. Monitoring options as specified.
- 2. Manufacturers:
 - a. Securitron (SU) - AQD Series.

2.17 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.18 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. 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 by referenced standards for the applicable units of hardware
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.02 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
- B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.03 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
 - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. DHI TDH-007-20: Installation Guide for Doors and Hardware.
 - 3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
 - 4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- D. Push Plates and Door Pulls: When through-bolt fasteners are in the same location as a push plate, countersink the fasteners flush with the door face allowing the push plate to sit flat against the door.
- E. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- F. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.04 FIELD QUALITY CONTROL

- A. Field Inspection (Punch Report): Reference Division 01 Sections "Closeout Procedures". Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed,

operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.

1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

3.05 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.06 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.07 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.08 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
 1. Quantities listed are for each pair of doors, or for each single door.
 2. The supplier is responsible for handing and sizing all products.
 3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
- B. Manufacturer's Abbreviations:

1. MK - McKinney

February 27, 2026

2. PE - Pemko
3. MR - Markar
4. SU - Securitron
5. RO - Rockwood
6. SA - Sargent
7. RF - Rixson
8. NO - Norton
9. BM - Besam
10. KE - Keedex
11. AC – Accurate Lock
12. OT - Other

Hardware Sets

Set: 1.1

Doors: 1

Description: Exterior Alum Pair - Card Reader

1	Core	6300	US15	SA
1	Cylinder	60 34/40 as required	US32D	SA

Notes: Card reader by Div 28

Doors normally closed and locked with free egress at all times. Valid credential will momentarily unlatch active door leaf. Doors remain locked with loss of power.

Balance of hardware by door/frame manufacturer.

Set: 2.1

Doors: 41

1	Core	6300	US15	SA
1	Cylinder	60 34/40 as required	US32D	SA

Notes: Card reader by Div 28

Door normally closed and locked with free egress at all times. Valid credential will unlock door. Door remains locked with loss of power.

Balance of hardware by door/frame manufacturer.

Set: 2A.1

Doors: 6

1	Core	6300	US15	SA
1	Cylinder	60 34/40 as required	US32D	SA

February 27, 2026

Balance of hardware by door/frame manufacturer.

Set: 3.1

Doors: 71

3	Hinge (heavy weight)	T4A3386 NRP	US32D	MK	
1	Rim Exit Device, Storeroom	12 60 WS-8804 ETMD	US32D	SA	
1	Core	6300	US15	SA	
1	Surface Closer	CPS7500	689	NO	
1	Kick Plate	K1050 10" BEV CSK	US32D	RO	
1	Rain Guard (as req'd)	346C x Full Frame Width	AI	PE	
1	Gasketing	290AS Jambs / 2891AS Head		PE	
1	Sweep	315CN		PE	
1	Threshold	Per Detail		PE	
1	Position Switch	DPS-M-WH		SU	⚡

Set: 4.1

Doors: 75A

4	Hinge (heavy weight)	T4A3386 NRP	US32D	MK	
2	Electric Hinge (heavy weight)	T4A3386 QCx	US32D	MK	
1	Elec CVR Exit Device	WS-55-MD8610 exit only	US32D	SA	⚡
1	Elec CVR Exit Device	60 WS-55-56-MD8606 ETMD	US32D	SA	⚡
1	Core	6300	US15	SA	
2	Surface Closer	CPS7500	689	NO	
2	Kick Plate	K1050 10" BEV CSK	US32D	RO	
2	Split Astragal	29310CV		PE	
1	Rain Guard (as req'd)	346C x Full Frame Width	AI	PE	
1	Gasketing	290AS Jambs / 2891AS Head		PE	
2	Sweep	315CN		PE	
1	Threshold	Per Detail (Coordinate with Dr Mfr)		PE	
2	Frame Harness	QC-C1500		MK	⚡
2	Door Harness	QC-C__ (as required)		MK	⚡
2	Position Switch	DPS-M-WH		SU	⚡
1	Power Supply	AQDx (fire relay as required)		SU	⚡

Notes: Card reader by Div 28

Door normally closed and locked with free egress at all times. Valid credential will unlock active door.
Door remains locked with loss of power.

Set: 5.1

Doors: 21, 35B, 51B

3	Hinge (heavy weight)	T4A3386 NRP	US32D	MK	
1	Dormitory/Exit Lock	60 8225 LNMD	US32D	SA	
2	Core	6300	US15	SA	
1	Surface Closer	CPS7500	689	NO	

HAWAII HEALTH SYSTEMS CORPORATION – KAUAI DIVISION
Samuel Mahelona Memorial Hospital
Behavioral Health New Patient Facility
Project No. 221093-01

Finish Hardware
08710-19

February 27, 2026

1	Kick Plate	K1050 10" BEV CSK	US32D	RO	
1	Gasketing	290AS Jambs / 2891AS Head		PE	
1	Sweep	315CN		PE	
1	Threshold	Per Detail		PE	
1	Position Switch	DPS-M-WH		SU	⚡

Set: 6.1

Doors: 69

6	Hinge (heavy weight)	T4A3386 NRP	US32D	MK	
1	Dust Proof Strike	570	US26D	RO	
2	Flush Bolt	556WS	US32D	RO	
1	Storeroom/Closet Lock	23- 60 8251 LNMD	US32D	SA	
1	Core	6300	US15	SA	
1	Surface Closer	CPS7500	689	NO	
1	Surface OH Stop	598S	US26D	SAR	
2	Kick Plate	K1050 10" BEV CSK	US32D	RO	
1	Astragal	357C		PE	
1	Rain Guard (as req'd)	346C x Full Frame Width	AI	PE	
1	Gasketing	290AS Jambs / 2891AS Head		PE	
2	Sweep	315CN		PE	
1	Threshold	Per Detail		PE	
2	Position Switch	DPS-M-WH		SU	⚡

Set: 7.1

Doors: 76A, 76B

3	Hinge, Full Mortise, Hvy Wt	HT-T4A3386 (NRP)	US32D	MK	
1	Storeroom/Closet Lock	60 8204 BHW	US32D	SA	
1	Core	6300	US15	SA	
1	Concealed Closer	PH 91BHN	689	RF	
1	Gasketing (perforated)	S88BL P		PE	
1	Threshold	Per Detail		PE	

Set: 8.1

Doors: 3, 10, 16A, 27, 73A

2	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK	
1	Electric Hinge	TA2714 QCx	US26D	MK	
1	Fail Secure Lock	60 RX-8271 LNMD	US26D	SA	⚡
1	Core	6300	US15	SA	
1	Surface Closer	7500	689	NO	
1	Kick Plate	K1050 10" BEV CSK	US32D	RO	
1	Wall or Floor Stop	406/441H as required	US32D	RO	
3	Silencer	608-RKW		RO	
1	Frame Harness	QC-C1500		MK	⚡
1	Door Harness	QC-C__ (as required)		MK	⚡
1	Position Switch	DPS-M-WH		SU	⚡
1	Power Supply	AQDx (fire relay as required)		SU	⚡

February 27, 2026

Notes: Card reader by Div 28

Door normally closed and locked with free egress at all times. Valid credential will unlock door. Door remains locked with loss of power.

Set: 9.1

Doors: 4, 74

2	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK	
1	Electric Hinge	TA2714 QCx	US26D	MK	
1	Fail Secure Lock	60 RX-8271 LNMD	US26D	SA	⚡
1	Core	6300	US15	SA	
1	Surface Closer	7500	689	NO	
1	Kick Plate	K1050 10" BEV CSK	US32D	RO	
1	Wall or Floor Stop	406/441H as required	US32D	RO	
1	Gasketing	S88BL		PE	
1	Door Bottom	420APKL		PE	
1	Frame Harness	QC-C1500		MK	⚡
1	Door Harness	QC-C__ (as required)		MK	⚡
1	Position Switch	DPS-M-WH		SU	⚡
1	Power Supply	AQDx (fire relay as required)		SU	⚡

Notes: Card reader by Div 28

Door normally closed and locked with free egress at all times. Valid credential will unlock door. Door remains locked with loss of power.

Set: 10.1

Doors: 12

2	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK	
1	Electric Hinge	TA2714 QCx	US26D	MK	
1	Fail Secure Lock	60 RX-8273 LNMD	US26D	SA	⚡
2	Core	6300	US15	SA	
1	Surface Closer	7500	689	NO	
1	Kick Plate	K1050 10" BEV CSK	US32D	RO	
1	Wall Stop	406/441H as required	US32D	RO	
1	Silencer	608-RKW		RO	
1	Frame Harness	QC-C1500		MK	⚡
1	Door Harness	QC-C__ (as required)		MK	⚡
1	Position Switch	DPS-M-WH		SU	⚡
1	Power Supply	AQDx (fire relay as required)		SU	⚡

Notes: Card reader on both sides by Div 28

Door normally closed and locked with controlled egress at all times. Valid credential will unlock door from

HAWAII HEALTH SYSTEMS CORPORATION – KAUAI DIVISION
Samuel Mahelona Memorial Hospital
Behavioral Health New Patient Facility
Project No. 221093-01

Finish Hardware
08710-21

February 27, 2026

either side. Door remains locked with loss of power.

Set: 11.1

Doors: 23

6	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1	Flush Bolt	555 Top Bolt Only	US26D	RO
1	Storeroom/Closet Lock	60 8204 LNMD	US26D	SA
1	Core	6300	US15	SA
2	Wall Stop	406/441H as required	US32D	RO
1	Astragal	357C		PE
2	Silencer	608-RKW		RO

Set: 12.1

Doors: 13, 8

3	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1	Storeroom/Closet Lock	60 8204 LNMD	US26D	SA
1	Core	6300	US15	SA
1	Surface Closer	7500/CPS7500 as required	689	NO
1	Kick Plate	K1050 10" BEV CSK	US32D	RO
1	Wall or Floor Stop	406/441H as required	US32D	RO
3	Silencer	608-RKW		RO

Set: 13.1

Doors: 17, 18, 19, 20, 40C, 83, 84

3	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1	Office/Entry Lock	60 8205 LNMD	US26D	SA
1	Core	6300	US15	SA
1	Wall or Floor Stop	406/441H as required	US32D	RO
1	Gasketing	S88BL		PE
1	Door Bottom	STC411APK		PE

Set: 14.1

Doors: 22, 24, 25, 66, 67

3	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1	Office/Entry Lock	60 8205 LNMD	US26D	SA
1	Core	6300	US15	SA
1	Surface Closer	7500	689	NO
1	Kick Plate	K1050 10" BEV CSK	US32D	RO
1	Wall or Floor Stop	406/441H as required	US32D	RO
1	Threshold	2746A at Door 67 (8/A705)		PE
1	Gasketing	S88BL		PE

Set: 15.1

Doors: 5, 70, 85

3	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK

February 27, 2026

1	Classroom Lock	60 8237 LNMD	US26D	SA
1	Core	6300	US15	SA
1	Surface Closer	7500	689	NO
1	Kick Plate	K1050 10" BEV CSK	US32D	RO
1	Concealed O.H. Stop, HD	1-X36 (Door 70)	630	RF
1	Wall or Floor Stop	406/441H as required (Door 5 & 85)	US32D	RO
3	Silencer	608-RKW		RO

Set: 16.1

Doors: 14, 81A

3	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1	Classroom Lock	60 8237 LNMD	US26D	SA
1	Core	6300	US15	SA
1	Surface Closer	7500	689	NO
1	Kick Plate	K1050 10" BEV CSK	US32D	RO
1	Concealed O.H. Stop, HD	1-X36 (Door 14)	630	RF
1	Wall or Floor Stop	406/441H as required (Door 81A)	US32D	RO
1	Gasketing	S88BL		PE
1	Door Bottom	STC411APK		PE

Set: 17.1

Doors: 7, 9, 11, 15, 26

3	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1	Privacy Lock	LB V21 8265 LNMD	US26D	SA
1	Cam Action Surface Closer	2800ST	689	NO
1	Kick Plate	K1050 10" BEV CSK	US32D	RO
1	Mop Plate	K1050 6" BEV CSK	US32D	RO
1	Wall or Floor Stop	406/441H as required	US32D	RO
		Provide concealed O.H. stop at Door 15 in lieu of wall or floor stop.		
1	Gasketing	S88BL		PE

Set: 18.1

Doors: 16B, 28A, 28B, 42, 63B, 64B, 73B

1	Continuous Hinge	FM300 HT EL-CEPT	630	MR	
1	Fail Secure Lock	60 RX-8271 BHW	US32D	SA	⚡
1	Core	6300	US15	SA	
1	Concealed Closer	PH 91BHN	689	RF	
1	Kick Plate	K1050 10" BEV CSK TORX	US32D	RO	
1	Ligature Res. Wall Stop	LR-WS		AC	
1	Gasketing (perforated)	S88BL P		PE	
1	Door Bottom	420APKL		PE	
1	Frame Harness	QC-C1500		MK	⚡
1	Door Harness	QC-C__ (as required)		MK	⚡

February 27, 2026

1	Position Switch	DPS-M-WH	SU	⚡
1	Power Supply	AQDx (fire relay as required)	SU	⚡

Notes: Card reader by Div 28

Door normally closed and locked with free egress at all times. Valid credential will unlock door. Door remains locked with loss of power.

Set: 19.1

Doors: 40A, 40B, 72A, 72B

1	Continuous Hinge	FM300 HT EL-CEPT	630	MR	
1	Fail Secure Lock	60 RX-8271 BHW	US32D	SA	⚡
1	Core	6300	US15	SA	
1	Concealed Closer	PH 91BHN	689	RF	
1	Kick Plate	K1050 10" BEV CSK TORX	US32D	RO	
1	Ligature Res. Wall Stop	LR-WS		AC	
1	Gasketing (perforated)	S88BL P			
1	Frame Harness	QC-C1500		MK	⚡
1	Door Harness	QC-C__ (as required)		MK	⚡
1	Position Switch	DPS-M-WH		SU	⚡
1	Power Supply	AQDx (fire relay as required)		SU	⚡

Notes: Card reader by Div 28

Door normally closed and locked with free egress at all times. Valid credential will unlock door. Door remains locked with loss of power.

Set: 20.1

Doors: 33, 49

1	Continuous Hinge	FM300 HT EL-CEPT	630	MR	
1	Fail Secure Lock	60 RX-8273 BHW	US32D	SA	⚡
2	Core	6300	US15	SA	
1	Concealed Closer	PH 91BHN	689	RF	
1	Ligature Res. Wall Stop	LR-WS		AC	
1	Gasketing (perforated)	S88BL P		PE	
1	Door Bottom	420APKL		PE	
1	Frame Harness	QC-C1500		MK	⚡
1	Door Harness	QC-C__ (as required)		MK	⚡
1	Position Switch	DPS-M-WH		SU	⚡
1	Power Supply	AQDx (fire relay as required)		SU	⚡

Notes: Card reader on both sides by Div 28.

Doors normally closed and locked with controlled egress at all times. Valid credential will unlock door from either side. Door remains locked with loss of power.

February 27, 2026

Set: 21.1

Doors: 35A, 51A

1	Continuous Hinge	FM300 HT EL-CEPT	630	MR	
1	Fail Secure Lock	60 RX-8271 BHW	US32D	SA	⚡
2	Core	6300	US15	SA	
1	Concealed Closer	PH 91BHN	689	RF	
1	Kick Plate	K1050 10" BEV CSK TORX	US32D	RO	
1	Ligature-Res. Wall Stop	LR-WS		AC	
1	Gasketing (perforated)	S88BL P		PE	
1	Threshold	2746A (8/A705)		PE	
1	Frame Harness	QC-C1500		MK	⚡
1	Door Harness	QC-C__ (as required)		MK	⚡
1	Position Switch	DPS-M-WH		SU	⚡
1	Power Supply	AQDx (fire relay as required)		SU	⚡

Notes: Card reader by Div 28

Doors normally closed and locked with controlled egress at all times. Valid credential will unlock door.
Door remains locked with loss of power.

Set: 22.1

Doors: 65

2	Continuous Hinge	FM300 HT	630	MR	
1	Self latching top bolt only – Metal door	2805	US26D	RO	
1	Storeroom/Closet Lock	60 8204 BHW	US32D	SA	
1	Core	6300	US15	SA	
1	Coordinator	2672	US28	RO	
2	Concealed Closer	PH 91BHN	689	RF	
2	Ligature Res. Wall Stop	LR-WS		AC	
1	Gasketing (perforated)	S88BL P		PE	
2	Door Bottom	420APKL		PE	

Set: 23.1

Doors: 61

1	Continuous Hinge	FM300 HT	630	MR	
1	Storeroom/Closet Lock	60 8204 BHW	US32D	SA	
1	Core	6300	US15	SA	
1	Concealed Closer	PH 91BHN	689	RF	
1	Ligature Res. Wall Stop	LR-WS		AC	
1	Gasketing (perforated)	S88BL P		PE	

Set: 24.1

Doors: 53, 55, 57, 58, 68

February 27, 2026

1	Continuous Hinge	FM300 HT	630	MR
1	Storeroom/Closet Lock	60 8204 BHW	US32D	SA
1	Core	6300	US15	SA
1	Concealed Closer	PH 91BHN	689	RF
1	Ligature Res. Wall Stop	LR-WS		AC
		(Wall stop not required for Door 58)		
1	Gasketing (perforated)	S88BL P		PE
1	Door Bottom	420APKL		PE

Set: 25.1

Doors: 54A,56A, 56B, 59A, 59B, 63A, 64A, 77A, 77B, 79, 80, 81B

1	Continuous Hinge	FM300 HT	630	MR
1	Classroom Lock	60 8237 BHW	US32D	SA
1	Core	6300	US15	SA
1	Concealed Closer	PH 91BHN	689	RF
1	Ligature Res. Wall Stop	LR-WS		AC
		(Wall stop not required for Doors 63A, 64A & 79,verify at 81B)		
1	Gasketing (perforated)	S88BL P		PE
1	Door Bottom	420APKL (none at Door 80)		PE

Set: 25A.1

Doors: 29, 30,31, 32, 34, 36, 47, 48, 50, 52

1	Door Bottom	420APKL/STC411APK as required	PE

Balance of hardware by Anti-Barricade Door system manufacturer included in Behavioral Health Hardware Set BH1.0 at the end of this Section.

Set: 26.1

Doors: 62

1	Door Bottom	420APKL	PE

Balance of hardware by Seclusion Door System manufacturer included in Behavioral Health Hardware. Set BH2.0 at the end of this Section

Set: 27.1

Doors: 37, 38, 39, 43, 44, 45, 46, 78, 82

1	Continuous Hinge	FM300 HT	630	MR
1	Classroom Lock	60 8237 BHW	US32D	SA
1	Core	6300	US15	SA
1	Concealed Closer	PH 91BHN	689	RF
1	Ligature Res. Wall Stop	LR-WS		AC
1	Gasketing (perforated)	S88BL P		PE

February 27, 2026

Set: 28.1

Doors: 75B

1	Note	All Hardware by Door Manufacturer	OT

Set: 29.1

Doors: 54B

1	Continuous Hinge	FM300HT	630	MR
1	Asylum/Institutional Lock	60 8217 BHW	US32D	SA
1	Core	6300	US15	SA
1	Concealed Closer	PH 91 BHN	689	RF
1	Ligature Res. Stop	(verify)		
1	Gasketing (perforated)	S88BL P		PE

Set: 30.1

Gates: 86, 87, 88

1	Storeroom Lock	60 8204 LNMD	US32D	SA
		(60 8237 LNMD for ADA compliant)	U32D	SA
1	Mortise Gate Box	K-BXMOR1-AL		KE
1	Core	6300	US15	SA

Hinges and cane bolt on inactive leaf by gate manufacturer.

February 27, 2026

Behavioral Health Door Hardware

Set: BH1.0

Door Numbers: 29, 30, 31, 32, 34, 36, 47, 48, 50

Description: Single Opening – Patient Rooms – Anti-barricade, Ligature Resistant, Classroom Function

QTY	Type	Description	MFG
1	System	SWING Anti-barricade system	KG
1	HINGE	KG202EC	KG
1	Rescue Stop	KG207 Aluminum Stop	KG
1	Mortise Lock	MRX-A-05 w/5" backset. Classroom Function	TS
1	Core	Sargent 6300	By Others
1	Concealed Closer	KG35	KG
1	Gasket Kit		KG
1	Door Stop	KG184	KG
1	Door Top Monitor	KG500	KG
1	DTM Power Supply	KG512	KG
1	Alarm Interface (ATI)	KG511	KG
1	Alarm Commissioning	KG505	KG
1	K-Alert System		KG
1	Integration	Low Voltage Technician	SUB
1	Installation	Frame and Door Assembly Install	General

Notes: Refer to 08340- Behavioral Health Doors and Frames, complete system with hardware pre-installed by manufacturer. SWING barricade resistant door system by Kingsway Group

Set: BH2.0

Door Numbers: 62

Description: Single Opening – Seclusion Room – Single Acting, Ligature Resistant, Storeroom Function

QTY	Type	Description	MFG
1	System	SECLUSION Secure Door system	KG
1	HINGE	KG111	KG
1	Mortise 3pt Lock	SM01 SureLock McGill 3-point lock (Less I/S Trim)	SM
1	Core	Sargent 6300	By Others
1	Vision Panel	P5050 Clear Vision Panel	KG
1	Door Stop	KG184	KG
1	Secure Hatch	KG164	KG

Notes: Refer to 08340- Behavioral Health Doors and Frames, complete system with hardware pre-installed by manufacturer. Seclusion door system by Kingsway Group.

END OF SECTION 08710

SECTION 08800 - GLAZING

PART 1 - GENERAL

1.01 SUMMARY

- A. Work Includes: Provide all glass and glazing materials to complete all glazing work as shown and as specified herein.
- B. Related Work Described Elsewhere:
 - 1. Section 07910 – EXTERIOR WALL JOINT SEALANTS
 - 2. Section 08110 – STEEL DOORS AND FRAMES
 - 3. Section 08460 – AUTOMATIC ENTRANCE DOORS
 - 4. Section 08520 – GLAZED ALUMINUM SYSTEMS
 - 5. Section 08565 – BEHAVIORAL HEALTH WINDOWS

1.02 QUALITY ASSURANCE

- A. Glass Standards: In addition to standards specified elsewhere, all glass, except as noted otherwise, shall comply with:
 - 1. ASTM C 1036, "Flat Glass".
 - 2. ASTM C 1048, "Heat Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated".
 - 3. ASTM C 1172, "Standard Specification for Laminated Architectural Flat Glass".
 - 4. 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.
 - 5. ASTM E 1996, Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.
 - 6. GANA's Glazing Manual.
 - 7. IGMA SIGMA TM-3000 Insulating Glass Units.
- B. Safety Glazing Standard: 16 CFR 1201 for heat treated and laminated glass and ANSI Z97.1 for wired glass when used for safety glazing, permanently marked with Safety Glazing Certification Council label. Comply with applicable code.
 - 1. Glazing lites more than 9 sq. ft. in exposed surface area of one side, provide glazing products that comply with Category II materials, for lites 9 sq. ft. or less in exposed surface area of one side, provide glazing products that comply with Category I or II materials, except for hazardous locations where Category II materials are required by 16 CFR 1201 and regulations of authorities having jurisdiction.
 - 2. Safety glazing is only required at the inboard lite of a full height vision glass (without intermediate horizontals or rails) except on the ground floor or other

areas where there is a walking surface on both sides. Alternately, if an aluminum rail is used on the interior of the framing, neither lite need to be safety glazing.

- C. Limit glass deflection to 1/200 flexure limit of glass with full recovery of glazing materials.
- D. Sealants for glazing shall conform to AAMA 800, "Voluntary Specifications and Test Methods for Sealants" and AAMA 850, "Fenestration Sealant Guide Manual".
- E. Single source responsibility for glass: Provide materials produced by a single manufacturer or fabricator for each kind and condition of glass indicated and composed of primary glass obtained from a single source for each type and class required.

1.03 PERFORMANCE REQUIREMENTS

- A. Other Requirements: Coordinate and comply with applicable performance requirements included in specification Section 08520 GLAZED ALUMINUM SYSTEMS and ASTM E 2190.
- B. Glass Design: Glass and glazing capable of withstanding structural loads as specified in Contract Documents and applicable codes within limits and under conditions indicated, without material failure, or glass breakage of loss.
 - 1. Thickness Determination:
 - a. Design Quality Standard: ASTM E 1300.
 - b. Thickness: Those indicated are minimums and for detailing only, determine glass thicknesses based on project glazing analysis.
 - c. Probability of Breakage:
 - i. Vertical glazing or applications not more than 15 degrees off vertical: Not more than 8 per 1000 lites (Statistical Factor of 2.5), for 3 second load duration under conditions established by project glazing analysis.
 - d. Maximum Center Deflection: Flexure limit of glass on short side of lite or 1 in, whichever is less, supported on all 4 sides under conditions established by project glazing analysis, with full recovery of glazing materials.
 - 2. Human Impact Loads: Locations indicated glazed with safety glass as defined by authorities having jurisdiction.
 - 3. Glass Bite: Coordinated with glazing material and rabbet dimensions for glass bite and edge clearance required by glazing condition.
- C. Thermal and Optical Performance Properties: Glass with performance properties specified based on manufacturer's performance calculators or published test data, as determined according to following procedures:
 - 1. Monolithic Glass Lites: Properties based on units with lites 1/4-inch thick
 - 2. Sealed Insulating Glass Units: Properties based on units with the different unit makeups scheduled on the Drawings.

February 27, 2026

3. Center-of-Glass Thermal Values: Based on LBL-44789 WINDOW 5.0 computer program for following methodologies:
 - a. U-Factors: NFRC 100 expressed as Btu/ sq. ft. x h x deg F
 - b. Solar Heat Gain Coefficient: NFRC 200.
 - c. Solar Optical Properties: NFRC 300.
- D. Windborne-Debris-Impact Resistance Performance
 1. Performance shall be tested in accordance with ASTM E1886 and information in ASTM E1996.
 - a. Large-Missile Impact: For glass located within 30 feet of grade

1.04 SUBMITTALS

- A. Submit under the provisions of Section 01330 – SUBMITTAL PROCEDURES.
- B. Manufacturer's Data: Submit copies of manufacturer's product specifications, and instructions for handling, storing, installing, cleaning, and protecting each type of glass and glazing material. Provide data indicating structural and physical characteristics of each type of glass and glazing.
- C. Shop Drawings: Include following with glazed framing shop drawings required in Section 08460 – AUTOMATIC ENTRANCE DOORS, Section 08520 GLAZED ALUMINUM SYSTEMS AND Section 08565 – BEHAVIORAL HEALTH WINDOWS.
 1. Glass types, make-up, sizes, and thicknesses.
 2. Glazing materials manufacturers, products, types, and profiles.
 3. Glass bite, edge clearance, and depth of rabbet.
 4. Sealant thickness and profile.
- D. Samples: Submit 3 each 4 inches by 4-inch samples of each type and thickness of glass and glazing for acceptance prior to ordering.
- E. Installation Specifications: Submit manufacturer's and referenced glass and glazing manual, etc. for installation of field installed glazing.
- F. Delegated Engineering Calculations: Engineering calculations for portion of work designated as delegated engineering.
- G. Warranty: Copy of specified warranty.
- H. Glazing Certification: Certification of acceptance from primary glass manufacturer or fabricator for fabricated glass units certifying that glazing details, project conditions, installation procedures, and thicknesses and compositions of all glass, are suitable for the purpose intended and are in compliance with performance requirements and Contract Documents. Document to be signed by authorized representative.
- I. Product Testing Agency Qualifications: Accredited by NFRC CAP 1 Certification Agency Program.
- J. Product Test Reports: Reports based on evaluation of comprehensive tests performed by qualified testing agency for following:

February 27, 2026

1. Each primary glass type.
 2. Each fabricated glass unit.
 3. Glazing gaskets.
 4. Glazing sealants.
 5. Glazing accessories.
- K. Sealant Test Reports as specified in Section 07910 – EXTERIOR WALL JOINT SEALANTS.
- L. Maintenance Data: For inclusion maintenance manual required by appropriate Division 01 Section; include following:
1. Manufacturer's instructions for maintenance of installed work
 2. Methods and frequency recommended for maintaining optimum condition under anticipated use.
 3. Precautions against cleaning products and methods which may be detrimental to finishes and performance.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to the site in unopened containers, labeled plainly with manufacturers' names and brands. Store glass and setting materials in, safe, dry locations and do not unpack until needed for installation.
- B. Comply with manufacturer's instructions for shipping, handling, storing and protecting glass and glazing materials. Exercise exceptional care to prevent edge damage to glass.

1.06 LABELING

- A. Each piece of glass shall be of domestic manufacture and label, except as noted otherwise, showing the name of the manufacturer and the grade or quality thereof. The labels shall be intact before and after installations. When glass is not cut to size by the manufacturer, and is furnished unlabeled from local stock, the Contractor shall submit an affidavit stating the quality, thickness, type and manufacturer of the glass furnished.
- B. All safety glass shall bear a marking as specified in ANSI Z97.1 on each separate glass panel that shall remain visible after installation.

1.07 ENVIRONMENTAL REQUIREMENTS

- A. Provide ventilation to prevent condensation of moisture on glazing work during installation. Do not perform glazing work during damp or rainy weather.

1.08 WARRANTY

- A. Glass:
1. Fabricators Special Warranty: Furnish full replacement of work warranty, including products and installation of covering construction, for periods of time from date of substantial completion specified below due to defects,

February 27, 2026

faulty work and failures, signed by an authorized representative using manufacturer's standard form.

- a. Insulated Glass Unit Products: 10 years.
- b. Laminated Glass Products: 5 years.
- c. Monolithic Polycarbonate: 5 years

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. All glass products shall be of the quality as manufactured by Vitro Architectural Glass., Pilkington LOF, Guardian Industries, Viracon, Inc., or approved equal.
- B. Polycarbonate products shall be of the quality as manufactured by AZ Polymers, LLC, Plaskolite, LLC or approved equal.

2.02 GLASS TYPES AND BASIS-OF-DESIGN SELECTIONS

- A. As scheduled on the Drawings

2.03 TEMPERED GLASS UNITS

- A. Fully Tempered Glass: Kind FT (fully tempered), Condition A, Type 1, Class 1, Quality q3, 1/4-inch thick unless indicated or required otherwise.
 - 1. Condition C: For fully tempered glass to be treated with Low-E coating.

2.04 PLASTIC GLAZING

- A. Glazing Publication: Comply with published instructions of plastic glazing manufacturers and with NGA's "GANA Glazing Manual" unless more stringent requirements are indicated. See this manual for definitions of glazing terms not otherwise defined in this Section or in other referenced standards.
- B. Plastic Glazing Labeling: Identify plastic sheets with appropriate markings of applicable testing and inspecting agency, indicating compliance with required fire-test-response characteristics.
- C. Fire-Test-Response Characteristics of Plastic Glazing: As determined by testing plastic glazing by a qualified testing agency acceptable to authorities having jurisdiction.
 - 1. Self-ignition temperature of 650 deg F or higher when tested in accordance with ASTM D1929 on plastic sheets in thicknesses indicated for the Work.
 - 2. Smoke density of 75 or less when tested in accordance with ASTM D2843 on plastic sheets in thicknesses indicated for the Work.
 - 3. Burning extent of 1 inch or less when tested in accordance with ASTM D635 at a nominal thickness of 0.060 inch or thickness indicated for the Work, where Class CC1 is indicated.
- D. Monolithic Polycarbonate Security Glazing:

February 27, 2026

1. Coated Polycarbonate Sheet: ASTM C1349, Appendix X1, Type II (coated mar-resistant, UV stabilized), with coating on both sides.
 - a. Thickness: As scheduled on the Drawings
 - b. Combustibility Class: CC1

2.05 LAMINATED GLASS UNITS

- A. Laminated Glass: ASTM C 1172, and complying with other specified requirements and with the following:
 1. Interlayer: Polymeric interlayer of thickness indicated with a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after laminating glass lites and installation.
 - a. Ionoplast Interlayer: Kuraray; SentryGlas
- B. Laminating Process: Fabricate laminated glass to produce glass free of foreign substances and air or glass pockets.

2.06 SEALED INSULATING GLASS UNITS

- A. General: Preassembled units consisting of organically sealed panes of glass enclosing a hermetically sealed dehydrated air space.
 1. Comply with the following standards:
 - a. ASTM E 2190.
 - b. ASTM E 2188
 - c. IGMA TM-4000.
 - d. IGMA TR-1200.
 - e. IGMA TB-1400.
 2. For properties of individual glass panes making up units, refer to product requirements specified elsewhere in this section applicable to types, classes, kinds and conditions of glass products indicated.
 3. Unit composition and seals shall be designed to utilize load sharing between the two lites.
 4. Provide heat-treated panes of kind and at locations indicated or, if not indicated, provide heat-strengthened panes where recommended by manufacturer for application indicated and tempered where indicated or where safety glass is designated or required.
 5. Performance characteristics designated for coated insulating glass are nominal values based on manufacturer's performance calculators for the different unit makeups.
 6. U-values indicated are expressed in the number of Btu's per hour per sq. ft. per degree F difference.
- B. Insulating Glass Certification Program: Provide insulating glass units permanently marked either on spacers or at least one component pane of units

February 27, 2026

with appropriate certification label of inspecting and testing organization indicated below:

1. Insulating Glass Certification Council (IGCC).

C. Characteristics:

1. Thickness of Each Pane:
 - a. Exterior Lite: As indicated in the schedule on the Drawings
 - b. Interior Lite: As indicated in the schedule on the Drawings
2. Air Space Thickness: As indicated in the schedule on the Drawings.
3. Sealing System: Dual seal. Hermetically sealed with polyisobutylene (primary) and silicone (secondary) at the perimeter of the units.
4. Spacer System: Black anodized or painted aluminum spacer with three bent corners and one keyed-soldered corner or four bent corners. Only one seam is allowed in each spacer of each unit.

2.07 SECURITY FILMS

- A. Security Film: Optically clear, anti-fragmentation protective polymeric film, with an abrasion resistant coating on one side and a mounting adhesive on the other; 200 Series SL9 – clear as manufactured by Advanced Coatings Engineering, LLC.
1. Uniformity: No noticeable visual defects, such as pinholes, streaks, thin spots, scratches, or banding in accordance with the IWFA visual acceptance standard, after installation.
 2. Thickness: Nominal 9 mils (229 microns) with no evidence of coating voids, after the removal of the release liner.
 3. Tensile Strength: 28,000 lbs./inch
 4. Breakstrength: 221 lbs./inch
 5. Identification: Labeled in accordance with manufacturer's specifications.

2.08 GLASS COATINGS

- A. Reflective Low-E Coatings: ASTM C 1376, Metallic coating by chemical vapor deposition – CVD (Hard Coat) process or magnetron sputtering vacuum deposition – MSVD (Soft Coat) process.
1. Manufacturers
 - a. Guardian Sunguard SNX 60+

2.09 GLASS QUALITY CONTROL

- A. Bow and warp. Glass manufacturer shall provide a QC program to detect and discard any lites which exceed the following tolerances:
1. Glass that has any deviation from flat (bow) of 0.15% of the shortest glass dimension.

February 27, 2026

2. Where the heat-treating process results in essentially parallel ripples or waves, the deviation from flatness at any peak shall not exceed 0.0051-inch, and the difference between adjacent peaks shall not exceed 0.0031-inch.
 3. Where bow tolerance and wave tolerance differ, the stricter requirements shall govern.
 4. Direction of ripples shall be horizontal, consistent and in conformance with the architectural design.
- B. Edge quality. Glass manufacturer shall provide a QC program to detect and discard any lites which exceed the following tolerances:
1. Shark teeth shall not penetrate more than one-half of the glass thickness.
 2. Serration hackle may occur only within 6-inches of the corner.
 3. Flare shall not exceed 0.0394-inch as measured perpendicular to glass surface across the edge. Flare shall not occur at setting blocks.
 4. Bevel shall not exceed 0.0591-inch.
 5. Flake chips may occur only within 4-inch of corners; depth shall not exceed 0.0394-inch and length, or diameter shall not exceed 1/4-inch.

2.10 GLAZING MATERIALS

A. General:

1. All gaskets and weatherstripping shall be EPDM, neoprene or dense extruded silicone in compliance with ASTM C509 with shop molded corners.
2. Injection mold all corners of gaskets where compatible with installation procedures.
3. All gaskets, weatherstripping and spacers shall have a continuous mechanical engagement to framing members and factory molded corners.
4. All gasket corners shall be bed in an elastomeric sealant compatible with glazing gaskets.
5. When in direct contact with silicone sealants, all gaskets, spacers and setting blocks shall be heat cured silicone rubber-based material which is chemically compatible with the silicone sealant and with sufficient hardness for the specific purpose intended. Compatibility testing by the silicone sealant supplier/manufacturer shall be required.
6. As an alternate to extruded silicone gaskets for the gaskets used at structural silicone joints, Norton V2100 tape may be used as long as proper detailing is provided.
7. Interior and exterior gasket profiles shall be designed to produce a glass edge pressure of 12psf.
8. Refer to Section 07910 – EXTERIOR WALL JOINT SEALANTS for approved sealants and backer rods. Rod is not to be used in the glazing rabbet.
9. Cleaners, Primers and Sealers shall be type as recommended by manufacturers of sealant or gasket.

February 27, 2026

10. Where a wet seal is required, use a one-part non-acidic moisture-curing, neutral curing silicone sealant complying with F.S. TT-S-001543, Class A.

B. Glazing Tapes:

1. Shall be preformed macro-polyisobutylene with a continuous integral shim of a Shore "A" of 40 to 60.
2. Shall comply with AAMA 807.1.
3. Should compress to the shim without excessive force being required, as recommended by the glass manufacturer, to avoid pressure points or breakage.
4. Manufacturers:
 - a. Pecora Corporation: www.pecora.com.
 - b. Saint-Gobain Performance Plastics: www.plastics.saint-gobain.com.
 - c. Tremco, Inc.: www.tremcosealants.com

C. Gasket Glazing:

1. "Sponge" glazing gaskets shall be cellular neoprene or cellular EPDM complying with ASTM C509, Option 2. Sponge gaskets shall have a hardness of 40 ± 5 durometer Shore A and shall be compressed 20% to 35% in the final installed position.
2. "Wedge" glazing gasket shall be non-cellular neoprene, dense EPDM or dense extruded silicone complying with ASTM C864, Option 1. Wedge gaskets shall have a hardness of 75 ± 5 durometer Shore A for hollow profiles and 60 ± 5 for solid profiles.
3. Both gaskets shall be compatible for incidental point contact with structural or weatherseal silicones.

D. Setting Blocks:

1. Shall be neoprene or in the case of structural silicone glazing, use dense extruded silicone with a hardness of 85 ± 5 durometer Shore A, to comply with ASTM C864.
 - a. Setting blocks used for insulated glass units shall be silicone.
2. Shall have a minimum length of 4" and be located at quarter points, or as required by GANA and FGMA guidelines.
3. Minimum width shall correspond to the glass thickness and retaining member but, in no case, shall be less than the glass thickness at point of contact.
4. Shall be secured against migration.
5. Shims used in conjunction with setting blocks must be of the same material, hardness, length and width as the setting blocks.

E. Spacer Shims

1. Neoprene, EPDM, or Silicone, 60 to 70 Shore A durometer hardness, ASTM C 864 Option I. Minimum 3 inch (75 mm) long x one half the height of the glazing stop x thickness to suit application, self-adhesive on one face.

February 27, 2026

- a. Shims used for insulated glass units shall be silicone

F. Side Blocks

1. Locate side blocks where required within the upper half of each jamb for each light.
2. Blocks shall be 65 ±5 durometer Shore A neoprene, EPDM or dense silicone, sized and profiled for intended use, to comply with ASTM C864.
 - a. Side Blocks used for insulated glass units shall be silicone
3. Install block with 1/8" clearance between block and glass bearing surface.
4. Block shall be sufficient length to prevent point loading on the glass.
5. Locate side blocks where required within the upper half of each jamb for each light.
6. Side blocks are not required where an individual glass light is continuously sealed with silicone at two or more edges, when the sealant is installed immediately following the setting of the glass.

2.11 SEALANTS

- A. Silicone Glazing Sealant (**JS-01**) as specified in Section 07910 -EXTERIOR WALL JOINT SEALANTS
- B. Security Sealants: As specified in Section 07922 – SECURITY SEALANTS.

2.12 FABRICATION

- A. Fabricate glass to sizes required to comply with wind loads for glazed openings indicated with edge clearances, bite and tolerances complying with recommendations of product manufacturer and referenced glazing standard as required to comply with system performance requirements.

PART 3 - EXECUTION

3.01 GENERAL

- A. Perform all glazing in strict accordance with applicable provisions of the "Glazing Manual" and "Sealant Manual" published by the Flat Glass Marketing Association, Topeka, Kansas.
- B. Verify that openings for glazing are correctly sized, within tolerance, and glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.

3.02 INSTALLATION

- A. Glass shall be set true and tight by skilled glaziers. Glazing compound shall be neatly and cleanly run with corners carefully made, using putty knife for all work. Glazing stops shall be carefully handled and accurately secured in place.

- B. Install setting blocks of proper size in sill rabbet, located one quarter of glass width from each corner, but with edge nearest corner not closer than 6-inches from corner, unless otherwise required. Set blocks in thin course of sealant which is acceptable for heel bead use.
- C. Provide spacers inside and out, of correct size and spacing to preserve required face clearances, for glass sizes larger than 50 united inches (length plus height), except where gaskets or glazing tapes with continuous spacer rods are used for glazing. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width, except with sealant tape use thickness slightly less than final compressed thickness of tape.
- D. Provide edge blocking to comply with requirements of referenced glazing standard, except where otherwise required by glass unit manufacturer.
- E. Set units of glass in each series with uniformity of draw, bow and similar characteristics.
- F. Provide compressible filler rods or equivalent back-up material, as recommended by sealant and glass manufacturers, to prevent sealant from extruding into glass channel weep systems and from adhering to joints back surface as well as to control depth of sealant for optimum performance, unless otherwise indicated.
- G. Force sealants into glazing channels to eliminate voids and to ensure complete "wetting" or bond of sealant to glass and channel surfaces.
- H. Tool exposed surfaces of sealants to provide a substantial "wash" away from glass. Install pressurized tapes and gaskets to protrude slightly out of channel, so as to eliminate dirt and moisture pockets.
- I. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage to ensure that gasket will not "walk" out when installation is subjected to movement.
- J. Miter cut wedge-shaped gaskets at corners and install gaskets in manner recommended by gasket manufacture to prevent pull away at corners; seal corner joints and butt joints with sealant recommended by gasket manufacturer.
- K. Glass where secured by glazing stops, shall unless shown on drawings or specified herein, be set in full bed of glazing compound. Then force glazing stop into glazing compound on both sides and strikeoff flush.
- L. Glass where required or recommended by glass frame manufacturer shall be set in extruded vinyl or neoprene glazing strips provided by others and shall be installed in strict accordance with manufacturer's instructions.
- M. Sheet glass shall be cut and set with the visible lines or waves horizontal.

3.03 PROTECTION AND REPLACEMENT

All glass shall be immediately protected against damage. Glazed openings shall be identified with suitable warning tapes, cloth or paper flags, or other acceptable method that will not damage glazing or surrounding materials. At completion of work, all imperfect glass which cannot be properly cleaned shall be replaced in kind. All broken, chipped, abraded, cracked or otherwise damaged glass must be replaced subject to the acceptance of the Architect.

February 27, 2026

3.04 CLEANING AND WASHING

At the completion of construction, clean and wash glass provided, removing all labels, dirt, putty stains, paint, etc., and leave the glass perfectly cleaned and polished.

END OF SECTION

SECTION 09250 - GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.01 SUMMARY

- A. Work Includes: Gypsum board work including, but not limited to, the following:
 - 1. Gypsum board.
 - 2. Non-load bearing metal stud framing for gypsum board.
 - 3. Metal ceiling suspension system.
 - 4. Acoustical assemblies for gypsum board walls and ceilings.
- B. Related Work Described Elsewhere:
 - 1. Exterior metal wall and soffit framing is provided under Section 05400 – COLD-FORMED METAL FRAMING.
 - 2. Wood blocking is provided under Section 06100 – ROUGH CARPENTRY.
 - 3. Thermal and acoustical insulation are provided under Section 07210 - BUILDING INSULATION.
 - 4. Access panels are provided under Section 08305 - ACCESS DOORS.
 - 5. Sealants are provided under Section 07920 – SEALANTS.

1.02 QUALITY ASSURANCE

- A. Fire Resistive Design: The construction shall comply with the applicable provisions of 2018 IBC, including all local amendments thereto and shall have been tested according to ASTM E 119 by an independent testing and inspecting agency acceptable to the authorities having jurisdiction. Installation and materials shall be in strict accordance with the above-mentioned code.
 - 1. The Fire-Resistant Design shall be as indicated from UL's "Fire Resistance Directory", FM's "Approval Guide, Building Products", GA-600 "Fire Resistance Design Manual", or as listed otherwise.
- B. Industry Standard: Comply with applicable requirements of GA 216 "Application and Finishing of Gypsum Board" and GA 214, "Recommended Specification: Levels of Gypsum Board Finish" by the Gypsum Association, except where more detailed or more stringent requirements are indicated including the recommendations of the manufacturer.
- C. Transverse Loading: The non-load bearing metal framing shall be capable of carrying a transverse load of 5 psf without exceeding the allowable stress or a deflection of L/240. Increase stud gauge, decrease stud spacing, or provide hidden from view lateral bracing to comply with these requirements at no additional cost to the Owner
- D. STC-Rated Assemblies: For STC rated assemblies, provide materials and construction identical to those tested in assembly indicated according to

February 27, 2026

ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

- E. Gypsum Board Terminology: Refer to ASTM C 11, "Terminology Relating to Gypsum and Related Building Materials and Systems", for definition of terms for gypsum board assemblies not defined in this Section or in referenced standards.

1.03 SUBMITTALS

- A. Submit under the provisions of Section 01330 - SUBMITTAL PROCEDURES.
- B. Manufacturer's Data: Material description and manufacturer's recommended installation procedures for each material.
- C. Shop Drawings:
 - 1. Gypsum Products: Submit shop drawings indicating fabrications and location of control and expansion joints including plans, elevations, sections, details and attachment to adjoining work. Submit setting drawings for backing plates and anchors.
 - 2. Acoustical Assemblies: Shop drawings indicating layout, number and assembly of system to include floor section, perimeter detail and all other associated components.
- D. Material Safety Data Sheets (MSDS): Submit MSDS for each product.

1.04 PRODUCT HANDLING

- A. Deliver gypsum wallboard materials in sealed containers and bundles, fully identified with manufacturer's name, brand, type and grade; store in a dry well-ventilated space, protected from the weather, under cover and off the ground. Stack gypsum panels flat to prevent sagging. Joint materials shall be stored in accordance with manufacturer's printed instructions. Damaged or deteriorated materials shall be removed from jobsite.
- B. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. General: Provide panels in maximum lengths and widths available that will minimize joints and correspond with the applicable support system.
- B. Gypsum Wallboard: ASTM C 1396 "Standard Specification for Gypsum Board", 5/8 inch unless specifically noted as 1/2-inch thick, tapered edge type, 48 inches wide, Type "R" regular for all non-rated walls and Type "X" (Special Fire Retardant) for fire rated partitions and elsewhere as indicated.
- C. Soundproof Drywall: Multi-layered engineered drywall panel composed of gypsum, viscoelastic polymers and propriety sound isolation layers, 5/8-inch thick, with tapered edges, 48-iches wide, QuietRock ES as manufactured by Pabco.

February 27, 2026

1. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- D. Water Resistant Board: ASTM C 1396, Type "WR" water-resistant backing board, 5/8-inch thick unless indicated otherwise, with tapered edges, 48 inches wide, unless indicated otherwise (for walls only). Provide Type "WR-X" (Special Fire Retardant) for fire rated partitions.
 1. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- E. Impact Resistant Board: ASTM C 1629 "Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels"; Level 3, Impact resistant gypsum board with fiberglass mat facing, 5/8-inch thick with tapered edges, 48 inches wide, Type X(Special Fire Retardant).
 1. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- F. Tile Backer Unit: ASTM C 1178 "Standard Specification for Coated Glass Mat Water-Resistant, Gypsum Backing Panel", glass mat reinforced gypsum backer board, nominal 5/8 inch thick, for hard tile backing, equal to Dens-Shield Tile Backer by Georgia Pacific. Provide tape and joint compound materials as recommended by manufacturer.
 1. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- G. Soffit Board: ASTM C 1396, "Standard Specification for Gypsum Board", "Exterior Gypsum Soffit Board" 5/8-inch thick unless indicated otherwise with Manufacturer's standard edges. Provide Type "X" were required for fire rated soffits.
- H. Wallboard Fasteners: ASTM C 1002 "Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs", standard bugle head self-drilling, self-tapping corrosive-resistant drywall screws, Screws used in fire-resistive rated construction shall be of type approved for use by governing building code.
 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
- I. Joint Treatment Materials: ASTM C 475 "Joint Compound and Joint Tape for Finishing Gypsum Board", materials for treating joints and fastener heads shall be as manufactured or recommended by the Manufacturer of the wallboard used. Provide "setting" type joint compound that is unaffected by humidity for water resistant board.
 1. Tile Backer Board Joint Treatment:
 - a. Joint Compound: Same material specified in Section 09310 – CERAMIC TILE used to thinset tile to the backer board or type recommended by manufacturer for the application indicated.
 - b. Sealant: (**JS-06**) One-part mildew-resistant silicone, sealant conforming to ASTM C 920 as specified in Section 07920 - SEALANTS.

- J. Non-Load Bearing Studs: Comply with ASTM C 754 for conditions indicated. ASTM C 645 "Non-Load (Axial) Bearing Studs, Runners (Track), and Rigid Furring Channels for Screw Application of Gypsum Board", studs shall be 1-5/8, 2-1/2, 3-5/8, and 6 inches unless indicated otherwise on the drawings. Studs shall be rolled formed channel of 25, 20 and 16-gauge galvanized steel, ASTM A 653 "Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process", G60 coating. Provide holes and notches for conduit or electrical wiring. Typical stud gauge shall be 25 gauge unless noted otherwise in the Drawings or this section. Provide minimum 20 gauge at ceramic and stone tile partitions.
 - 1. Provide the appropriate gauge studs and stud spacing for the specified Transverse Loading of this Project based on the ASTM C 754, Maximum Stud Height Tables.
- K. Tracks: Metal floor and ceiling tracks shall be rolled formed channel of gauge electro-zinc plated steel of same gauge as stud with width dimensions suitable to corresponding stud sizes indicated on the drawings.
- L. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; same gauge as stud and in width to accommodate depth of studs. The U-shape track is 2-1/2-inches deep and has 1-1/2-inches vertical slots spaced 1" along both legs and is fabricated from hot-dipped galvanized steel complying with ASTM A653.
- M. Track Fasteners: Power-driven fasteners of size and material required to withstand loading conditions imposed on partition or shaft wall assemblies without exceeding allowable design stress of track, fasteners, or structural substrates in which anchors are embedded.
 - 1. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing according to ASTM E 1190 conducted by a qualified testing agency.
 - a. Products: Subject to compliance with the requirements, provide power actuated fasteners with top hat or washer to for larger bearing surface against track and increased resistance to pullover as manufactured by one of the following:
 - 1) ITW Ramset
 - 2) Hilti
 - 3) Powers
 - 4) or Approved Equal
- N. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel framing to top and bottom tracks and other substrates
- O. Furring Channels: ASTM C 645, hat-shaped, 7/8 inch deep, hot-dipped galvanized, 25 gauge or as required by specified partition or ceiling assembly.

February 27, 2026

- P. Wire for Ties: ASTM A 641/A 641 M "Zinc-Coated (Galvanized) Carbon Steel Wire", Class 1 zinc coating, soft temper, 8 gauge for hangers supporting up to 12.5 square feet and 6 gauge where supporting up to 16 square feet and 18 gauge for ties.
- Q. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.053-inch, depth of 1-1/2-inch and minimum 1/2-inch-wide flanges.
- R. Wallboard Accessories: ASTM C 1047 "Accessories for Gypsum Wallboard and Gypsum Veneer Base", Vinyl Corp., Plastic Components Inc., Vinyl Tech or approved equal.
 - 1. Standard Corner Bead: Vinyl Corp. Corner Bead CB 125 at all outside corners of wall, ceiling, and soffit as indicated.
 - 2. Casing Trim: Vinyl Corp. "L" Bead SB 58, "J" Bead MJB5B, or approved equal as indicated.
 - 3. Control Joint: Vinyl Corp. CJV 16 or approved equal.
 - 4. Other Accessories: As indicated or necessary for complete installation.
 - 5. Alt accessories shall be vinyl, PVC, or approved equal.
- S. Ceiling Support Materials and Systems:
 - 1. General: Size ceiling support components to comply with ASTM C 754 "Installation of Steel Framing Members to Receive Screw-Attached Gypsum" unless indicated otherwise.
 - 2. Direct Suspension Systems: Manufacturer's standard zinc-coated or painted steel system of furring runners, furring tees, and accessories designed for concealed support of gypsum drywall ceilings; of proper type for use intended. System Manufacturer: Equal to one of the following:
 - a. Armstrong World Industries, Inc.
 - b. Chicago Metallic Corp.
 - c. USG Interiors, Inc.
 - 3. Wire for Hangers and Ties: ASTM A 641/A 641 M "Zinc-Coated (Galvanized) Carbon Steel Wire", Class 1 zinc coating, soft temper, 8-gauge for hangers supporting up to 12.5 square feet and 6 gauge where supporting up to 16 square feet and 18 gauge for ties
- T. Laminating Adhesive: Special adhesive or joint compound specifically recommended for laminating gypsum boards.
- U. Backing Plates: 22-gauge galvanized steel sheet for blocking and bracing in length and width required.

PART 3 - EXECUTION

3.01 EXAMINATION

Examine 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

February 27, 2026

performance of drywall construction. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. General: Comply with ASTM C 840 "Application and Finishing of Gypsum Board", Gypsum Association GA 216 and ASTM C 754 as applicable to the type of substrate and drywall support system indicated.
- B. Tolerances:
 - 1. Maximum variation of finish surface from true flatness shall be 1/8-inch in 10-feet in any direction unless specified otherwise.
 - 2. Maximum variation of plumbness of wall shall be 1/8 inch in 10 feet of height.
 - 3. Maximum variation from true position shall be 1/8 inch.
- C. Ceiling Support Suspension Systems:
 - 1. Secure hangers to structural support by connecting directly to structure where possible, otherwise connect to inserts, clips or other anchorage devices or fasteners as indicated. Ensure that structural anchorage provisions have been installed to receive ceiling anchors in a manner that will develop their full strength and at spacing required to support ceiling.
 - 2. Coordinate installation of ceiling suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive ceiling hangers at spacing required to support ceilings and that hangers will develop their full strength.
 - 3. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, counter-splaying, or other equally effective means.
 - 4. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
 - 5. Secure hangers to structure, including intermediate framing members, by attaching to inserts, eye-screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 - 6. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eye-screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause them to deteriorate or otherwise fail.
 - 7. Sway brace ceiling to conform to the applicable seismic zone and uplift, applicable requirements of ASTM E 580, "Application of Ceiling Suspension

Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Seismic Restraint”, and the manufacturer’s recommendations.

8. Space main runners 4 feet on center and space hangers 4 feet on center along runners, except as otherwise shown.
9. Level main runners to a tolerance of 1/8 inch in 12 feet, measured both lengthwise on each runner and transversely between parallel runners.
10. Wire-tie or clip furring members to main runners and to other structural supports as indicated or as recommended by the manufacturer.
11. Direct-hung Metal Support System: Attach perimeter wall track or angle wherever support system meets vertical surfaces. Mechanically join support members to each other and butt-cut to fit into wall track.
12. Space furring member 16 inches on center, except as otherwise indicated.
13. Install auxiliary framing at termination of drywall work, and at openings for light fixtures and similar work, as required for support of both the drywall construction and other work indicated for support thereon.
14. Do not connect or suspend steel framing from ducts, pipes or conduit.
15. Keep hangers and braces 2 inches clear of ducts, pipes and conduits.

D. Non-Load Bearing Metal Wall Framing:

1. Install supplementary framing, blocking and bracing to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings and similar work which cannot be adequately supported on gypsum board alone 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.
2. Isolate stud system from transfer of structural loading to system, both horizontally and vertically. Provide slip or cushioned type joints to attain lateral support and avoid axial loading.
3. Install runner tracks at floors, ceilings and structural walls and columns where gypsum drywall stud system abuts other work, except as otherwise indicated.
4. Space studs and furring 16 inches on center, except as otherwise indicated.
5. Install steel studs so flanges point in the same direction and leading edge or end of each panel can be attached to open (unsupported) edges of stud flanges first.
6. Install 20-gauge studs spaced at 16-inches on center in walls scheduled to receive ceramic tile and in walls that support wall cabinets and shelving.
7. Frame door openings with vertical studs securely attached by screws at each jamb either directly to frames or to jamb anchor clips on door frame in accordance with door manufacturer’s recommendations; install runner track sections (for jack studs) at head and secure to jamb studs. Provide runner tracks of same gauge as jamb studs. Space jack studs same as partition studs.

February 27, 2026

8. Install 20-gauge studs at each jamb for all doors 2'-8" wide to 4 feet wide weighing not more than 200 pounds; and for all doors less than 2'-8" wide weighing more than 100 pounds but not more than 200 pounds.
9. Install double 20-gauge studs for single doors up to 4 feet wide, weighing more than 200 pounds but not more than 300 pounds; screw attach web of back-to-back studs direct to jamb anchor clips nested between flange of stud.
10. Frame openings other than door openings in same manner as required for door openings; and install framing below sills of openings to match framing required above door heads.
11. Install each steel framing and furring member so that fastening surface does not vary more than 1/8-inch from plane of faces of adjacent framing

E. Gypsum Wallboard, General:

1. Locate exposed end-butt joints as far from center of walls and ceilings as possible.
2. 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.
3. Locate either edge or end joints over supports, except in horizontal applications or where intermediate supports or gypsum board back-blocking is provided behind end joints. Position boards so that both tapered edge joints abut, and mill-cut or field-cut end joints abut. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
4. Attach gypsum board to framing and blocking as required for additional support at openings and cutouts.
5. Cover both faces of stud partition framing with gypsum board in concealed spaces (above ceilings, etc.), except in chase walls which are properly braced internally. Where concealed application is required for sound, fire, air or smoke ratings, coverage may be accomplished with scraps of not less than 8 square foot area, and may be limited to not less than 75 percent of full coverage.
6. Isolate perimeter of non-load-bearing drywall partitions at structural abutments. Provide 1/4 inch to 3/8-inch space and trim edge with J-type semi-finishing edge trim. Seal joints with acoustical sealant. Do not fasten drywall directly to stud system runner tracks.
7. Space fasteners in gypsum boards in accordance with referenced standards and manufacturer's recommendations, except as otherwise indicated.
8. Install insulation at framing as indicated. Size insulation to width of members spacing. Press friction fit insulation between members as recommended by the insulation manufacturer. Insulation is provided under Section 07210 - BUILDING INSULATION.

9. Tile Backer Unit: Install tile backer units in accordance with manufacturer's instructions and TCNA methods specified in Section 09310 – CERAMIC TILE.
10. For ceilings over showers and shower areas provide tile backer units and finish to a Level 5 finish and make ready to receive scheduled paint finish

F. Methods of Gypsum Wallboard Application:

1. On ceilings, apply gypsum board prior to wall/partition board application, to greatest extent possible and at right angle to framing, unless otherwise indicated.
2. Install ceiling board panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
3. Single-Layer Application:
 - a. On partitions/walls higher than 8'-1", apply gypsum board vertically (parallel), unless otherwise indicated, and provide sheet lengths which will minimize end joints.
 - b. On partitions/walls 8'-1" or less in height apply gypsum board horizontally (perpendicular); use maximum length sheets possible to minimize end joints.
4. Single-Layer Fastening Method: Apply gypsum boards to supports by fastening with screws, spaced not to exceed 16-inch centers for walls and 12-inch centers for ceilings.
5. Gypsum wallboard construction for fire rated and acoustical rated assemblies shall be in accordance with the design number indicated or if not indicated in accordance with 2012 IBC.
6. Multi-Layer Application on Partitions/Walls: Apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.

G. Installation of Trim Accessories:

1. General: Where feasible, use the same fasteners to anchor trim accessory flanges as required to fasten gypsum board to the supports. Otherwise, attach trim in accordance with manufacturer's instructions and recommendations.
2. Install corner beads at external corners.
3. Install edge trim whenever edge of gypsum board would otherwise be exposed or semi-exposed. Provide type with face flange to receive joint compound except where semi-finishing type is indicated. Install L-type trim where work is tightly abutted to other work, and install special kerf-type where other work is kerfed to receive long leg of L-type trim. Install

- U-type trim where edge is exposed, revealed, gasketed, or sealant-filled (including expansion joints).
- 4. Install J or LC-type semi-finishing trim where indicated.
- 5. Install control joints where indicated or necessary in large ceiling and wall expanses. Use door header to ceiling or floor to ceiling in long partitions and wall furring runs and from wall to wall in large ceiling areas. Where joint will be conspicuous, obtain approval prior to installation.
- H. Acoustical Rated Assemblies: Seal construction at perimeters, behind control and expansion joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM E 497, "Installing Sound-Isolating Gypsum Board Partitions", ASTM C 919, "Use of Sealants in Acoustical Applications", and manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through gypsum board assemblies, including sealing partitions above acoustical ceilings.

3.03 DRYWALL FINISHING

- A. General: Apply treatment at gypsum board joints (both directions), flanges of trim accessories, penetrations, fasteners heads, surface defects and elsewhere in accordance with ASTM C 840 and Gypsum Association GA 216 and GA 214 as required to prepare work for decoration. Prefill open joints, rounded or beveled edges, and damaged surfaces using type of compound recommended by manufacturer.
 - 1. Apply joint tape at joints between gypsum boards, except where a trim accessory is indicated that does not require tape.
 - 2. Apply joint compound in 3 coats (not including prefill of openings in base), and sand between last 2 coats and after last coat. Fastener heads, dents, gouges, and cut-outs shall be filled with joint compound and sanded.
 - 3. Accessories at exposed joints, edges, corners, openings, and similar locations shall be taped, floated with joint compound, and sanded to produce surfaces ready for gypsum board finishes.
 - 4. Treatment for water-resistant gypsum wallboard shall be as recommended by the gypsum wallboard manufacturer.
- B. 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 other concealed areas.
 - 2. Level 2: Where wall panels form substrates for tile.
 - 3. Level 4: For ceiling surfaces to receive flat paint, and wall surfaces to receive all grades of wallcovering.
 - 4. Level 5: For wall and ceiling surfaces scheduled to receive paint with an MPI Gloss Level greater than Level 2 and wall or ceiling scheduled to receive paint with any MPI Gloss Level in critical lighting areas as defined by GA-214

5. Where Level 5 gypsum board finish is indicated, 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.
 6. For Level 4 gypsum board finish, embed tape in joint compound and apply first, fill (second), and finish (third) coats of joint compound over joints, angles, fastener heads, and accessories. Touch up and sand between coats and after last coat as needed to produce a surface free of visual defects and ready for decoration.
 7. Where Level 2 gypsum board finish is indicated, embed tape in joint compound and apply first coat of joint compound.
 8. Where Level 1 gypsum board finish is indicated, embed tape in joint compound.
- C. Prevent finishes from coming into contact with surfaces not indicated to receive finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to the finish manufacturer's written recommendations.

3.04 BACKING PLATES AND ANCHORS

- A. Backing plates and anchors or blocking which are to be attached to studs or furring for anchoring items and work indicated on the drawings or specified in other Sections shall be installed and secured. Plates and anchors shall be welded or fastened in place in accordance with approved setting drawings

3.05 CLEANING AND REPAIRING

After installation and before painting, correct surface damage and defects. Leave surface clean and smooth, satisfactory to the painter. painting shall be done over gypsum board work until the joints are thoroughly dry. Joints and fastenings are to be invisible after painting.

END OF SECTION

SECTION 09310 – CERAMIC TILE

PART 1 - GENERAL

1.01 SUMMARY

- A. Work Includes: Complete all tile, accessories, and related work as indicated or required by drawings and as specified herein.
- B. Related Work Described Elsewhere:
 - 1. Sealants are specified under Section 07920 - SEALANTS.
 - 2. Tile backer board is provided under Section 09250 - GYPSUM BOARD ASSEMBLIES.
 - 3. Tile water proofing is specified under Section 09340 - TILE WATERPROOFING.

1.02 SUBMITTALS

- A. Submit under the provisions of Section 01330 - SUBMITTAL PROCEDURES.
- B. Manufacturer's Data: Submit manufacturer's technical information and installation instructions for selected tile, grout, and sealer materials.
- C. Qualification Data: For Installer and Manufacturer.
- D. Shop Drawings: Showing tile and pattern layout, including location and size of movement joints as required by this Section. Drawings include corner and transition details.
- E. Samples:
 - 1. Submit 4 samples each of the various tiles and accessories required to the Architect for approval and for color and pattern selection. Identify samples as to grade and manufacturer. Submit samples of selected tile and color required, not less than 12-inch square, mounted on plywood or hardboard backing, with selected colored grout. Include two or more units in each set of samples showing the full range of appearance characteristics to be expected in completed work.
 - 2. Backer Board: 12-inch square.
- F. Certificate: Before installation of tile, submit to the Architect the Standard Form of Master Grade Certificate signed by the Contractor and Manufacturer, stating grade and kind of tile.
- G. Sealant Compatibility Test Report: From sealant manufacturer, complying with requirements in Section 07920 - SEALANTS and indicating that sealants will not stain or damage tile.
- H. Maintenance Data: For ceramic and porcelain tile to include in maintenance manuals. Include Product Data for stone-care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

- I. Installation Specifications: Submit manufacturer's installation specifications.

1.03 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate ceramic tile similar in material, design, and extent to that indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
- B. Installer Qualifications: An installer who has completed ceramic tile and stone work similar in material, design, and extent to that indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
- C. Installation System Manufacturer: Company specializing in adhesives, mortars, grouts and other installation materials with ten (10) years minimum experience and ISO 9001 certification.
 1. Obtain installation materials system including but not limited to mortar bed, bonding mortar, joint sealant, undertile waterproofing from single source manufacturer to ensure consistent quality, full compatibility and to obtain the installation system warranty.

1.04 PERFORMANCE REQUIREMENTS

- A. Slip Resistance: Floor tiles without abrasive content:
 1. Interior, Wet Areas: Dynamic Coefficient of Friction (DCOF) AcuTest value shall not be less than 0.42 in accordance to ANSI A 137.1 and ANSI A326.3.
 2. Exterior, Wet Areas: Dynamic Coefficient of Friction (DCOF) AcuTest value shall not be less than 0.55 in accordance to ANSI A 137.1 and ANSI A326.3.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver all packages of tile to the job in sealed cartons bearing grade seals in compliance with ANSI A1 37.1.
- B. Protect tile, mortar materials and accessories during storage and construction against moisture, soiling, staining, and physical damage.
- C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

1.06 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions of construction to receive tile products by field measurements indicate measurements on Shop Drawings.
- B. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

1.07 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
- B. Floor and Wall Tile: Furnish quantity of full-size units equal to 3 percent of amount installed, for each type, composition, color, pattern, and size indicated.

1.08 WARRANTY

- A. Warranty: Warranty for a minimum of 2 years against defects resulting from the use of defective or inferior materials, equipment, or workmanship.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Ceramic Wall and Floor Tiles: Standard grade, complying with ANSI A 137.1. Submit test reports, from an independent laboratory, indicating conformance of the tile to ANSI A137.1 upon request by the Architect.
 - 1. Ceramic Floor, Wall Tile, and Trims: Dust-pressed, white non-vitreous body with cushion or semi-cushion edges in sizes and finishes as scheduled.
 - 2. Porcelain Tile: Porcelain wall tile and trim shall be glazed, and floor tile unglazed, in size and finish as scheduled.
 - 3. Trim Units: For each type of tile provide all trim shapes as detailed and/or as required. External corners shall be rounded convex unless otherwise noted in the details. Provide other shapes such as curbs, beads, shoes, round out corners and square in corners, etc. to achieve a neat complete installation.

2.02 SETTING MATERIALS

- A. Mortar Bed: Portland Cement Mortar, ANSI 108.02, preblended mixture of fine graded sand and Portland cement combined with latex additive:
 - 1. Subject to the requirements the following Manufacturer's and Products may be submitted for approval:
 - a. 226 Thick Bed Mortar; Laticrete International.
 - b. 4 to 1 Mud Bed Mix; Mapei (Basis-of-Design).
 - c. Or Approved Equal.
 - 2. Portland Cement: ASTM C 150, Type I or II.
 - 3. Aggregate: ASTM C 144.
 - 4. Cleavage Membrane: Polyethelene sheeting, ASTM D 4397, 4.0 mils thick.
 - 5. Reinforcing Wire Fabric: Galvanized, welded wire fabric, 2 by 2-inches by 0.062-inch diameter, comply with ASTM A 185 and ASTM A 82 except for minimum wire size.

6. Latex Additive: Manufacturer's standard water emulsion, serving as replacement for part or all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed portland cement and aggregate mortar bed.
 - a. 3701 Mortar Admix; Laticrete International.
 - b. Planicrete AC Latex Admix; Mapei (Basis-of-Design).
 - c. Or Approved Equal
- B. Bond Coat and Thin-Set Mortar: Latex-Portland cement mortar, ANSI A118.4, with manufacturer's standard latex additive (water emulsion) serving as a replacement for part or all gauging water.
- C. Large Heavy Tile (LHT), Modified-Portland Cement Mortar: Provide large heavy tile mortar; prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site. Comply with requirements in ANSI A118.4 H.
 1. Subject to the requirements the following Manufacturer's and Products may be submitted for approval:
 - a. LHT Plus; Laticrete International.
 - b. Keraflex Plus; Mapei (Basis-of-Design)
 - c. Or Approved Equal.
- D. Water: Fresh, clean, and drinkable.

2.03 GROUTING MATERIALS

- A. Cementitious Grout:
 1. High Performance Polymer-Modified Tile Grout: Factory-blended mixture of cement, graded aggregates, polymers and color-fast pigments to which only water must be added at Project site complying with ANSI A 118.7.
 - a. Polymer Type: Ethylene vinyl acetate or acrylic additive, in dry, redispersible form, prepackaged with other dry ingredients.
 - b. Sanded Grout for joints from 1/8-inch to 1/2-inch.
 - c. Un-Sanded Grout for joints less than 1/8-inch.
 2. Subject to the requirements the following Manufacturer's and Products may be submitted for approval:
 - a. Permacolor Grout; Laticrete International.
 - b. Ultracolor Plus FA; Mapei (Basis-of-Design).
 - c. Or Approved Equal.
 3. Colors: As Scheduled or if not scheduled as selected by the Architect from the manufacturer's full range.

2.04 SEALANTS

- A. Joint Sealants: Manufacturer's standard sealants of characteristics indicated below that comply with applicable requirements in Section 07920 – SEALANTS and will not stain the stone or porcelain tile they are applied to.
 - 1. Single-component, mildew-resistant, neutral curing silicone sealant (JS-XX) conforming to ASTM C 920 and ASTM C 794, Type S, Grade NS, Use NT, Class 25.
 - 2. Colors: Provide colors of exposed sealants to match colors of grout in stone adjoining sealed joints, unless otherwise indicated.
 - 3. Subject to the requirements the following Manufacturer's and Products may be submitted for approval:
 - a. Latasil; Laticrete International.
 - b. Mapesil T Plus; Mapei (Basis-of-Design)
 - c. Or Approved Equal.

2.05 MISCELLANEOUS MATERIALS

- A. Solid Surface Threshold: One-piece cast, non-porous, homogeneous blend of UV inhibited polyester-acrylic resin, and randomly dispersed polyester-acrylic and natural minerals as fillers, and is environmentally controlled oven-cured, vacuum mixed, abraded and/or sanded to a non-textured, slip resistant surface; that is not coated, laminated or of composite construction, meeting ANSI Z124.3 & .6.
 - 1. Fabricate threshold to the thickness and profile as indicated on the Drawings and of the appropriate length to fit the scheduled door size.
- B. Waterproofing Membrane: As specified in Section 09340 – TILE WATERPROOFING.
- C. Transition Strips, Cove Trims and Edge Trim: Edge trims shall be aluminum in sizes as indicated or required by thicknesses of materials including setting materials. Trim shall be Schluter Systems Inc. components or equal.
- D. Tile and Grout Sealer: Colorless, slip, and stain resistant sealer which will not affect color or physical properties of tile surface.
 - 1. 511 Impregnator Sealer as manufactured by Miracle Sealants Company.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates and areas where tile will be installed for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
 - 1. Verify that substrates for setting tile are firm, dry, clean, free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.

2. Verify that concrete substrates for tile floors installed with thin-set mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
 - a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
 - b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
 3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.
 4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Report unsatisfactory conditions to the Contractor for corrective measures; send copy of report to the Architect. Do not proceed with installation until unsatisfactory conditions have been corrected. Proceeding with tile work will imply acceptance of the substrate condition by the ceramic tile contractor. Wall substrate must be plumb to within tolerances specified in Section 09250 – GYPSUM BOARD ASSEMBLIES and in complete alignment.

3.02 PREPARATION

- A. Remove coatings that are incompatible with tile-setting materials from substrates, including curing compounds and other substances that contain soap, wax, oil, or silicone.
- B. Vacuum clean concrete substrates to remove dirt, dust, debris, and loose particles.
- C. Patch existing mortar beds that may have been damaged during the removal of existing tile flooring.
- D. For concrete substrates for tile floors installed with thin-set mortar, correct conditions that do not comply with flatness tolerances specified in referenced ANSI A108 Series of tile installation standards.
 1. Fill cracks, holes, and depressions with trowelable leveling and patching compound according to tile-setting material manufacturer's written instructions. Use product specifically recommended by tile-setting material manufacturer.
 2. Remove protrusions, bumps, and ridges by sanding or grinding.
 3. For existing concrete surfaces finished with sealers, remove sealer prior to installation of tile by shot blasting or scarifying the concrete surface to a surface profile recommended by the tile-setting material manufacturer or where waterproofing is indicated by the waterproofing membrane manufacturer. Sweep and vacuum dust and debris.
- E. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not

- factory blended, either return to manufacturer or blend tiles at Project site before installing.
- F. Install sound impact underlayment and perimeter isolation strips where indicated in strict accordance with the underlayment manufacturer's written instructions.
 - G. Install waterproofing membrane, where indicated, in accordance with Section 09340 – TILE WATERPROOFING.

3.03 INSTALLATION, GENERAL

- A. ANSI Tile Installation Standard: Comply with parts of ANSI 108 series of tile installation standards included under "American National Standard Specifications for the Installation of Ceramic Tile" that apply to type of setting and grouting materials and methods indicated.
- B. TCNA Installation Guidelines: TCNA "Handbook for Ceramic Tile Installation"; comply with TCNA installation methods indicated.
- C. Extend tile work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions except as otherwise shown. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so that plates, collars, or covers overlap tile.
- E. Jointing Pattern: Unless otherwise shown, lay tile in grid pattern. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths unless otherwise shown.
 - 1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so that extent of each sheet is not apparent in finished work.
- F. Movement Joints: Follow TCNA "Handbook for Ceramic Tile Installation" Section EJ171 Movement Joint Guidelines for Ceramic, Glass and Stone. Provide expansion, control, and pressure-relieving joints of widths and at locations indicated on the Drawings and approved shop drawings. If not shown or indicated, provide movement joints as indicated in the TCNA "Handbook for Ceramic Tile Installation".
 - 1. Space movement joints a maximum of 12-feet on center with a minimum joint width of 1/2-inch for exterior installations. Joint width may need to increase based on surface temperature of tile in accordance with TCNA EJ171. Movement joint widths for interior installations shall not be less than 1/4-inch.
 - 2. Install perimeter joints where tile abuts restraining surfaces such as perimeter walls, curbs, columns, and changes in plane and corners.
 - 3. Follow TCNA "Handbook for Ceramic Tile Installation" Detail EJ-171 Expansion Joints.

4. Sealing of expansion, control, and pressure-relieving joints is specified in Section 07920 – SEALANTS.
5. Keep expansion, control, and pressure-relieving joints free of plaster, mortar, grout, and other rigid materials.
- G. Grout: Grouts shall comply with ANSI A108.10 for cement grout and ANSI A108.6 for epoxy grout.
- H. Allow tiles to set a minimum of 48 hours prior to grouting. The grout shall be forced into the joints to the full depth. Take special care not to scratch glazed tile during this operation. Remove surplus grout before it has hardened and leave the face of the tile clean. Keep expansion and control joints free of grout.
- I. Sound tiles after setting to ensure proper bonding. Hollow sounding tiles shall be replaced.
- J. Curing Floors: Unless otherwise instructed by thinset and grout manufacturer, apply reinforced kraft paper over floor as soon as pointing or grouting is completed. Lap the paper not less than 6 inches and leave in place for 3 full days. Cure in accordance with applicable ANSI installation procedure.
- K. Tile and Grout Sealer: Apply 1-2 coats to tile and grout in accordance with the manufacturer's instructions.

3.04 CONSTRUCTION TOLERANCES

- A. Variation in Line: For positions shown in plan for edges of flooring and changes in color or finish, and continuous joint lines, do not exceed 1/8 inch in 96 inches, 1/4 inch in 20 feet, or 3/8 inch maximum.
- B. Variation in Surface Plane of Paving and Flooring: Do not exceed 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 3/8 inch maximum from level or slope indicated.
- C. Variation from Plumb: For vertical lines and surfaces, do not exceed 1/8 inch in 96 inches, 1/4 inch maximum.
- D. Variation in Joint Width: Do not vary joint thickness more than 1/16 inch or one-fourth of the nominal joint width, whichever is less.
- E. Variation in Plane between Adjacent Tiles (Lipping): Do not exceed 1/32-inch difference between planes of adjacent units.

3.05 FLOOR INSTALLATION METHODS

- A. Install types of tile to comply with requirements indicated below for setting bed methods, TCNA installation methods related to types of subfloor construction, and grout types:
 1. Latex Portland Cement Mortar (Exterior): ANSI A108.5 as indicated.
 - a. On-Ground Concrete: TCNA Installation Method F102 for ceramic tile installation with ANSI A118.4 Latex-Portland cement mortar bond coat. Use LHT mortar for large format tiles.
 2. Latex Portland Cement Mortar (Interior): ANSI A108.5 (Mortar Bed) as indicated.

- a. On-Ground Concrete: TCNA Installation Method F112 for mortar bed installation on slab-on-grade construction with ANSI A118.4 Latex-Portland cement mortar bond coat. Use LHT mortar for large format tiles.
 - b. Above-Ground Concrete Waterproof Membrane (For areas indicated to receive waterproofing): TCNA Installation Method F122A for waterproofing and tile installation with ANSI A118.4 Latex-Portland cement mortar bond coat. For large format tile with at least one edge dimension over 15-inches use LHT mortar.
3. Grout: Polymer Modified Tile Grout.
- B. Floor Installation
1. Apply thin-set mortar over concrete substrate or cured waterproofing membrane on top of concrete substrate using the appropriate type and size trowel recommended for the size tile by the tile manufacturer. Place only that amount of bonding mortar that can be covered with tile before initial set.
 2. Back butter the tiles to ensure 100 percent contact and firmly press tile in the mortar. Move them forward and back, perpendicularly across the ridges, approximately 1/8-inch to 1/4-inch to flatten ridges and fill the valleys.
 3. Tamp and beat tile with a wooden block or rubber mallet to obtain full contact with mortar and to bring finished surfaces within indicated tolerances. Set each unit in a single operation before initial set of mortar; do not return to areas already set and disturb tile for purposes of realigning finished surfaces or adjusting joints.
 4. Apply LHT mortar for setting large format tiles in accordance with the Ceramic Tile Institute of Americas recommended method and the TCNA.
 5. Rake out joints to depth required to receive grout as units are set.
- C. Solid Surface Thresholds: Install solid surface thresholds at locations indicated; Adhere threshold to substrate using silicone sealant per manufacturer's installation instructions. Seal joint between threshold and tile with sealant as specified in Section 07920 – SEALANTS. Threshold installation shall comply with ADAAG Section 4.13.8. Clean as recommended by the manufacturer.
- D. Joint Widths: Install tile on floors with the following joint widths:
1. Ceramic Tile: 1/16-inch, 1/8-inch is acceptable at showers and lanai floors.

3.06 WALL TILE INSTALLATION METHODS

- A. Install types of tile designated for wall application to comply with requirements indicated below for setting-bed methods, TCNA installation methods related to subsurface wall conditions, and grout types:
1. Latex-Portland Cement Mortar: ANSI A108.5.
 - a. Tile Backer Board: TCNA Installation Method W245.
 2. Grout:
 - a. Ceramic Tile: Polymer Modified Tile Grout.
 3. Wall Installation:

- a. Apply thin-set mortar over the gypsum tile backer board or waterproofing membrane over gypsum tile backer board at showers and bathtub conditions using the appropriate type and size trowel recommended for the size tile by the tile manufacturer. Place only that amount of bonding mortar that can be covered with tile before initial set.
 - b. Press tile into freshly combed mortar, insuring mortar contact with tile while maintaining joint alignment and spacing. Keep adequate joint depth open for grouting.
 - c. Contact area shall not be less than 80% except in shower walls where contact area shall not be less than 95% when not less than three tile or tile assemblies are removed for inspection.
4. Joint Widths: Install tile on walls with the following joint widths:
- a. Glazed Wall Tile: 1/16 inch.
- B. Where toilet accessories straddle ceramic tile wainscot and wall surface above, hold tile back from the area where the accessory is to be mounted leaving the wall substrate exposed. Once accessory is mounted finish the tile up to the accessory's edges leaving a 1/4-inch joint between the tile and the accessory edge. Fill joint with sealant as specified in Section 07920 – SEALANTS.

3.07 CONVENTIONAL SHOWER INSTALLATION

- A. Install types of tile to comply with requirements indicated below for setting bed methods, TCNA installation methods related to types of subfloor construction, and grout types:
1. Latex Portland Cement Mortar (Interior): ANSI A108.5 (Mortar Bed) as indicated
 - a. Shower Receptor: TCNA Installation Method B421
 2. Grout: Polymer Modified Tile grout.
- B. Install linear shower drain in the location indicated on the drawings following the manufacturers written instructions.
- C. Shower Floor Installation
1. Install shower pan waterproofing membrane in accordance with Section 09340 – TILE WATERPROOFING.
 2. Apply thin-set mortar over the waterproofing membrane on top of sloped concrete substrate or mortar bed using the appropriate type and size trowel recommended for the size tile by the tile manufacturer. Place only that amount of bonding mortar that can be covered with tile before initial set.
 3. Firmly press tile in the adhesive. Move them forward and back, perpendicularly across the ridges, approximately 1/8-inch to 1/4-inch to flatten ridges, fill the valleys.
 4. Back butter the tiles to ensure 100 percent contact and firmly press tile in the mortar. Move them forward and back, perpendicularly across the ridges, approximately 1/8-inch to 1/4-inch to flatten ridges, fill the valleys.

5. Tamp and beat tile with a wooden block or rubber mallet to obtain full contact with mortar and to bring finished surfaces within indicated tolerances. Set each unit in a single operation before initial set of mortar; do not return to areas already set and disturb tile for purposes of realigning finished surfaces or adjusting joints.
 6. Rake out joints to depth required to receive grout as units are set.
- D. Joint Widths: Install tile on floors with the following joint widths.
1. Where mosaic sheets are used, make joints between tile sheets same width as joints within tile sheets so that extent of each sheet is not apparent in finished work.

3.08 WATERPROOFING INSTALLATION

- A. Comply with the requirement specified in Section 09340 – TILE WATERPROOFING.

3.09 GROUTING JOINTS

- A. General:
1. Grout Stone, Cermic and Porcelain tile to comply with ANSI A108.10 for cement grout and ANSI A108.6 for epoxy and manufacturer's written instructions, including product technical bulletins and product package instructions.
 2. Remove temporary shims before grouting.
 3. Lightly dampen tile before grouting.
 4. Tool joints uniformly and smoothly with plastic tool.
- B. Flooring:
1. Grout joints as soon as possible after initial set of setting bed. Force grout into joints, taking care not to smear grout on adjoining stone and other surfaces. After initial set of grout, finish joints by tooling to produce a slightly concave polished joint, free of drying cracks.
 2. Work grout back and forth at 45-degree angle to the face of tile to ensure complete filling of joints.
 3. During grouting, clean surfaces according to manufacturer's written instructions so they are free of foreign matter.
 4. Cure Polymer Modified Tile grout by maintaining in a damp condition for seven days except as otherwise recommended by latex-additive manufacturer.
 5. Cure grout as recommended by grout manufacturer.
- C. Ceramic Wall Tile:
1. For ceramic wall tile with gloss finish test cement grout on small area prior to using on the entire wall to see if tile surface is scratched by the grout. If

scratches occur replace damaged tile and use alternate unsanded tile grout specified in Article 2.03.

3.10 JOINT-SEALANT INSTALLATION

- A. Prepare joints and apply sealants of type and at locations indicated to comply with applicable requirements in Section 07920 – SEALANTS. Remove temporary shims before applying sealants.

3.11 CLEANING AND PROTECTION

- A. Cleaning: Upon completion of placement and grouting, clean all tile surfaces so they are free of foreign matter.
 - 1. Remove grout residue from tile as soon as possible. Clean in accordance with applicable ANSI installation procedure.
 - 2. Unglazed tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's printed instructions, but no sooner than 14 days after installation. Protect metal surfaces, cast iron, and vitreous plumbing fixtures from effects of acid cleaning. Flush surface with clean water before and after cleaning.
 - 3. Remove temporary protective coating by method recommended by coating manufacturer that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent it from clogging drains.
- B. Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work.
- C. Provide final protection and maintain conditions in a manner acceptable to manufacturer and installer that ensure that tile is without damage or deterioration at time of Substantial Completion.
 - 1. When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.
 - 2. Prohibit foot and wheel traffic from tiled floors for at least 7 days after grouting is completed.
 - 3. Protect tiled corners and external angles with board corner strips in areas used as passageways by workers.
- D. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

END OF SECTION

SECTION 09340 – TILE WATERPROOFING

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes waterproofing for the following applications:
 - 1. Interior Waterproofing Applications: Showers, walls and under tile at bathroom and restroom floors.
 - 2. The waterproofing shall not allow for the passage of water through the waterproofing membrane.
 - 3. Fully coordinate with mechanical systems. All MEP penetrations through waterproofing, such as mixing valves, shall be coordinated with waterproofing, sheathing and tile so that they can be flashed watertight and not rely solely on sealant at the face of the tile to provide for the primary waterproofing.

1.02 SUBMITTALS

- A. Product Data: For each product indicated.
- B. Shop Drawings: Show extent of each type of waterproofing. Include details for treating substrate joints and cracks, flashings, deck penetrations, and other termination conditions. Any details included in the project documents are intended to be representational of the waterproofing systems at tile areas. The manufacturer and installer shall provide project specific details for each system and that represent all project conditions, including custom fabrications of premanufactured items if required.
- C. Samples for Verification: For each type of waterproofing required, prepared on rigid backing and of same thickness and material indicated for the Work.
 - 1. Provide stepped Samples on backing large enough to illustrate buildup of waterproofing.
- D. Qualification Data: For Installer.
- E. Material Test Reports: For each type of waterproofing.
- F. Material Certificates: For each type of waterproofing, signed by manufacturers.
- G. Field quality-control test reports.
- H. Maintenance Data: For waterproofing (as applicable) to include in maintenance manuals. Identify substrates and types of waterproofing applied. Include recommendations for periodic inspections, cleaning, care, maintenance, and repair of waterproofing membranes.
- I. Warranty: Special warranty specified in this Section.
- J. All items per 1.03.

1.03 QUALITY ASSURANCE & PERFORMANCE REQUIREMENTS

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of waterproofing required for this Project. This firm must demonstrate not less than 5 years successful experience in installation of work similar to the work of this project. Credential and substantiating data must be submitted to the Architect.
- B. Source Limitations:
 - 1. Obtain all waterproofing types from a single manufacturer.
 - 2. Obtain primary waterproofing materials, including primers, from a single manufacturer. Obtain secondary materials including sheet flashings, joint sealants, and substrate repair materials from primary material manufacturer or of type and from source recommended in writing by primary material manufacturer.
- C. Regulatory Requirements: Provide products that comply with local regulations controlling use of volatile organic compounds (VOCs).
- D. Materials shall comply with the following Standards:
 - 1. ASTM - American Society for Testing and Materials
 - a. ASTM C 627 - Standard Test Method for Evaluating Ceramic Floor Tile Installation Systems Using the Robinson-Type Floor Tester.
 - b. ASTM D 4068 - Standard Specification for Chlorinated Polyethylene (CPE) Sheeting for Concealed Water-Containment Membrane.
 - c. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials.
 - 2. ANSI – American National Standards Institute:
 - a. ANSI A108.13 – Installation of Load Bearing, Bonded, Waterproof Membranes for Thinset Ceramic Tile and Dimension Stone.
 - b. ANSI A118.10 – American National Standard Specification for Load Bearing, Bonded, Waterproof Membranes for Thinset Ceramic Tile and Dimension Stone Installation.
 - 3. IAPMO – International Association of Plumbing and Mechanical Officials.
- E. Membrane shall have maximum Moisture Vapor Permeance of 0.15 perms when tested in accordance with ASTM E 96 Procedure E.
- F. Membrane must have UPC and IPC ratings as shower pan receptor waterproofing.
- G. ANSI A108 Standards and TCNA recommendations shall be incorporated into work of this section.
- H. Fully coordinate all work of this section with tile installation and all other adjacent materials.
- I. Before submitting bids for work of this section, review all aspects and details of installation with the manufacturer to ensure that systems noted are the most appropriate and will function in concert with adjacent materials. Provide those

materials and systems, if not noted, as recommended by the manufacturer to achieve a watertight condition at all installation areas.

- J. Preinstallation Conference: Conduct conference at Project site.
 - 1. Before installing waterproofing, meet with representatives of authorities having jurisdiction, manufacturer's technical representative, Architect, consultants, independent testing agency, and other concerned entities. Review requirements for traffic coatings. Notify participants at least seven days before conference.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers with seals unbroken and bearing manufacturer's labels showing the following information:
 - 1. Manufacturer's brand name.
 - 2. Type of material
 - 3. Directions of manufacture and shelf life.
 - 4. Lot or batch number.
 - 5. Mixing and application instructions.
 - 6. Color.
- B. Store materials in a clean, dry location protected from exposure to direct sunlight. In storage areas, maintain environmental conditions within range recommended in writing by manufacturer.

1.05 PROJECT CONDITIONS

- A. Environmental Limitations: Apply waterproofing materials within the range of ambient and substrate temperatures recommended in writing by manufacturer. Do not apply waterproofing to damp or wet substrates.
- B. Do not install waterproofing until items that will penetrate membrane have been installed.

1.06 WARRANTY

- A. Special Warranty for Interior Tile Waterproofing: Manufacturer's standard form in which manufacturer agrees to repair or replace waterproofing materials that deteriorate during the specified warranty period.
 - 1. Deterioration of waterproofing includes the following:
 - a. Rotting
 - b. Cracking
 - c. Microorganism Deterioration
 - 2. Warranty Period: Life of the original installation.

PART 2 - PRODUCTS

2.01 INTERIOR TILE WATERPROOFING

- A. Material Compatibility: Provide primers, sealants and miscellaneous materials that are compatible with one another and with substrate under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
- B. Under Tile Waterproofing for Interior Applications: ANSI A118.10; composite sheet membrane made from one core layer of polyethylene (PE) with non-woven polypropylene (PP) outer layers laminated to both sides, minimum 0.020-inch nominal thickness.
- C. Products: Subject to compliance with requirements, provide one of the following:
 - 1. Hydro Ban Sheet Membrane, Laticrete
 - 2. Mapeguard WP 200, Mapei (Basis of Design)
 - 3. or approved equal.
- D. Miscellaneous Materials
 - 1. Bonding Mortar: As specified in Section 09310 – CERAMIC TILE.
 - 2. Pre-manufactured items for Interior Waterproofing: Whenever possible, utilize manufacturer's pre-manufactured items such as corners, and other similar items.
- E. Seam Tape: Waterproofing manufacturer's waterproofing sealing tape made from the same material as the waterproofing membrane with a thickness of 0.01-inch (10mils) and in manufacturers standard widths.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Hydro Ban Sheet Membrane Sealing Tape, Laticrete
 - b. Mapeguard WP ST, Mapei (Basis of Design)
 - c. or approved equal.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements and for other conditions affecting performance of waterproofing membranes.
 - 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance.
 - 2. Verify compatibility with and suitability of substrates.
 - 3. Verify that substrates are visibly dry and free of moisture if recommended by manufacturer.

- a. Test for moisture vapor transmission by plastic sheet method according to ASTM D 4263 if recommended by waterproofing manufacturer.
- b. Test for moisture content by method recommended in writing by manufacturer.
4. Application of waterproofing indicates acceptance of surfaces and conditions.

3.02 PREPARATION

- A. General: Before applying waterproof membranes, clean and prepare substrates according to manufacturer's written instructions to produce clean, dust-free, dry substrate for waterproof membrane application.
- B. Mask adjoining surfaces not receiving waterproofing, deck drains, and other deck substrate penetrations to prevent spillage, leaking, and migration of waterproofing materials.
- C. Substrates: Prepare surfaces to receive waterproofing per requirements and limitations of waterproofing materials and per manufacturer's recommendations.

3.03 INTERIOR TILE WATERPROOFING INSTALLATION

- A. Waterproofing Application
 1. Apply waterproofing systems per TCNA guidelines, ANSI requirements and per manufacturer's recommendations and in concert with tile systems to provide for a watertight condition at all areas where waterproofing is installed.
 2. Spread bonding mortar with appropriate size trowel as recommended by the manufacturer to achieve full contact of membrane to substrate. Trowel an area as wide as the sheet and as far as can be comfortably reached. Trowel mortar in parallel rows across the wide or length of the sheet to avoid trapped air pockets under the membrane.
 3. Embed sheet with firm pressure using a rubber or wooden float, plastic taping knife or hand roller, move slowly to apply pressure and ensure proper embedding of the membrane. Work from the middle to the outside edges to ensure that air is not trapped underneath the membrane.
 4. Periodically check to ensure that adhesive transfers to sheet from substrate.
 5. In the event that air is trapped under the sheet and cannot be removed, puncture sheet and press down. In wet areas, repair puncture with a patch sealed with seam sealant.
 6. Seams:
 - a. Overlap the edges of the waterproofing membrane by 2-inches and shingle the laps in the direction of drainage. Bond the two sheets together, using the Large and Heavy Tile Mortar applied to the seam lap with the manufacturer's recommend trowel. Apply mortar

over the top of the bonded seam with the appropriate trowel to finish the seam off.

- b. Alternative method, abut the two sheets of waterproofing membrane together leaving no gaps. or embed seaming tape over the abutted edges using Large and Heavy Tile Mortar and appropriate trowel. Center the tape over the seam with at least 2-inches on each side of the seam and apply the tape. Work the sealing tape overlap into the thin-set mortar with a grout float, plastic taping knife or the trowel's flat side while the thin-set is still workable.
7. Drains: Install membrane manufacturer's drain flashing sheet in accordance to the manufacturer's written instructions. Locate drain and cut a hole in the waterproofing membrane to the size so as to overlap the drain flashing membrane 2-inches. Seam the waterproofing membrane to the drain flashing by applying a 3/16-inch continuous bead of seam sealant, without skips or gaps, 3/4-inch from the edge of the drain flashing. Flattened seam with roller or flat side of trowel.
- B. Shower Walls Membrane Installation: Install sheet membrane over tile backer board up to the height of the shower head.
 1. At interface of wall membrane to shower pan lap wall membrane over shower pan upturn by 2-inches shingle fashion in the direction of water drainage using the aforementioned seaming method.
 2. If required seam wall membrane in the same fashion as the aforementioned seaming method.
- C. Terminations, Corners and Penetrations:
 1. Install manufacturer's pre-manufactured corners, end dams, and flashings at penetrations and hardware (custom fabricated if required). Use the aforementioned seaming procedure to weld on corners, end dams, and flashings.

3.04 FIELD QUALITY CONTROL

- A. Final Waterproofing Inspection: Arrange for manufacturer's technical personnel to inspect membrane installation on completion.
 1. Notify the Architect 48 hours in advance of date and time of inspection.
- B. Water Testing:
 1. Upon completion of sheet membrane waterproofing installation for each floor application perform water testing per guidelines established by ASTM D 5957 for a period of 24 hours.
 - a. Inspect waterproofing for leaks.
 - b. Repair leaks and re-test until watertight
 2. Coordinate testing with general contractor and monitor at all times to prevent damage to the structure if there is failure. If failures occur, testing shall take place until such time that all areas pass water test. Testing shall be documented in writing and presented for acceptance of successful water testing.

February 27, 2026

3.05 PROTECTING AND CLEANING

- A. Protect waterproofing from damage and wear during remainder of construction period.
- B. Clean spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION

SECTION 09510 – SUSPENDED ACOUSTICAL CEILING

PART 1 - GENERAL

1.01 WORK INCLUDES

- A. Acoustical Ceiling Systems
 - 1. Acoustical Ceiling Tiles.
 - 2. Exposed grid suspension system.
 - 3. Wire hangers, fasteners, main runners, cross tees, and wall angle moldings.

1.02 RELATED SECTIONS

- A. Section 07920 – SEALANTS for acoustical sealant.
- B. Section 15855 – DIFFUSERS, REGISTERS AND GRILLES for air diffusion devices.
- C. Section 16500 –LIGHTING for light fixtures.
- D. Section 16721 – FIRE ALARM SYSTEM for fire alarms and smoke detectors.

1.03 REFERENCES

- A. ASTM C 635 - Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
- B. ASTM C 636 - Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.

1.04 SYSTEM REQUIREMENTS

- A. Structural Characteristics: Suspension system to rigidly secure acoustical ceiling system including integral mechanical and electrical components with maximum deflection of L/360.
 - 1. Classification: ASTM C 635 Intermediate Duty Class.
 - 2. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, "Direct Hung" unless otherwise indicated. Comply with seismic design requirements.
- B. Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.
 - 1. Surface Burning Characteristics: Acoustical ceiling components shall comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency. Comply with ASTM E 1264 for Class B materials.
 - a. For Class B materials: Flame Spread: 26 – 75.
 - b. For Class B materials: Smoke Developed: 0 - 450.

February 27, 2026

C. Acoustical Performance:

1. Acoustical Panel (ACT-01):

- a. Noise Reduction Coefficient (NRC): 0.70
- b. Ceiling Attenuation Class (CAC): 35

D. Seismic Requirements:

- 1. Acoustical ceiling system to be install in accordance with ASTM E 580 "Practice for Application of Acoustical Suspension Systems for Acoustical Tile and Lay-In Panels in Areas Requiring Seismic Resistance".
 - a. Seismic Zone: As determined by 2018 IBC.

E. Optical Performance:

- 1. Acoustical Panel - Light Reflectance (LR) per ASTM E 1477: 0.86 or greater.

F. Source Limitations: Obtain each type of acoustical ceiling tile and supporting suspension system through one source from a single manufacturer.

1.05 SUBMITTALS

- A. Samples: Minimum 6 inch x 6 inch samples of each specified acoustical panel; 8 inch long samples of exposed wall molding and suspension system, including main runner and 4 foot cross tees.
- B. Shop Drawings: Layout and details of acoustical ceilings. Show locations of items which are to be coordinated with, or supported by the ceilings.
- C. Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards. For acoustical performance, each carton of material must carry an approved independent laboratory classification of NRC.
- D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- E. Warranties: Special warranties specified in this Section.

1.06 QUALIFICATIONS

- A. Grid Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum ten years documented experience.
- B. Acoustical Unit Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum ten years documented experience.

1.07 COORDINATION

- A. Coordinate acoustical ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

1.08 PROJECT CONDITIONS

- A. Space Enclosure: Do not install interior ceilings until space is enclosed and weatherproof; wet work in place is completed and nominally dry; work above ceilings is complete; and ambient conditions of temperature and humidity are continuously maintained at values near those intended for final occupancy. Building areas to receive ceilings shall be free of construction dust and debris.

1.09 EXTRA MATERIALS

- A. Extra Materials: For each type, furnish extra materials described below that match products installed. Packaged with protective covering for storage and identified with appropriate labels.
 - 1. Acoustical Ceiling Units: Furnish quantity of full-size units equal to 5.0 percent of amount installed.
 - 2. Exposed Suspension System Components: Furnish quantity of each exposed suspension component equal to 2.0 percent of amount installed.

1.10 WARRANTY

- A. Acoustical Tiles: Submit a written warranty executed by the manufacturer, agreeing to repair or replace acoustical tiles that fail within the warranty period. Failures include, but are not limited to:
 - 1. Acoustical Tiles: Sagging and warping.
 - 2. Grid System: Rusting and manufacturer's defects
- B. Warranty Period:
 - 1. Acoustical Tiles: One (1) year from date of substantial completion.
 - 2. Grid: Ten (10) years from date of substantial completion.
- C. The Warranty shall not deprive the Owner of other rights they may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Products described in this Section are products of USG Interiors, Inc. Products of one of the following manufacturers are acceptable subject to visual comparability and the requirements of this Section.
- B. Suspension System:
 - 1. Armstrong World Industries, Inc.
 - 2. Rockfon
 - 3. CertainTeed
 - 4. Or approved equal

February 27, 2026

C. Acoustical Tile Units:

1. Armstrong World Industries, Inc.
2. Rockfon
3. CertainTeed
4. Or approved equal.

2.02 ACOUSTICAL CEILING TILE TYPES

- A. Type (**ACT-01/02**): Mineral fiber, wet-formed with factory applied latex paint, protected to prevent sag when air conditioning is not in use and containing a bioblock to prevent mildew.
1. Size: As indicated.
 2. Pattern: 76575/ 78575 Eclipse, Square Lay-in, fine texture as manufactured by USG Interiors, Inc. or approved equal.
 3. Classification: ASTM E 1264, Type IV, Form 2, Pattern E, Fire Class A.
- B. Provide ceiling tiles that are SCS Indoor Advantage Gold or UL Greenguard Gold certified and qualify as low VOC emitting material.

2.03 SUSPENSION SYSTEMS

- A. Main beams and cross tees shall be hot dipped galvanized steel per ASTM A 653 and finished with baked on polyester paint, color to match the actual color of the selected ceiling tile.
1. Style for ACT-01/ 02: USG Donn Brand DX/ DXL, 15/16" exposed tee, ASTM C 635 rating of Heavy Duty as manufactured by USG Interiors, Inc.
 2. ACT-01: USG Donn Brand DX ,15/16" exposed tee, ASTM C 635 rating of Intermediate Duty, co-extrude aluminum, gasketed as manufactured by USG Interiors, Inc.
- B. Edge Moldings and Trim: Of types and profiles indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations, including light fixtures, that fit type of edge detail and suspension system indicated. Provide moldings with exposed flange of the same width as exposed runner. Finish to match exposed tees.
1. Provide USG Interiors M7 Wall Angle Molding at ceiling elevation changes with spring border clip as detailed.
- C. Wire for Hangers and Ties: ASTM A 641, Class I zinc coating, soft temper, prestretched, with a yield stress load of at least three times the design load, but not less than 12 gauge.
- D. Hold Down Clips: Manufacturer's standard hold-down clips designed and placed to secure acoustical tiles in place at secure ACT ceilings

2.04 ACCESSORIES

- A. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify site conditions.
- B. Verify that layout of hangers will not interfere with other work.

3.02 INSTALLATION GRID SUSPENSION SYSTEM

- A. Install suspension system in accordance with ASTM C 636 and as supplemented in this section. Install suspension system to comply with the seismic requirements indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook".
- B. Locate system on room axis according to reflected plan.
- C. Install after major above-ceiling and wet work is complete and humidity levels are stabilized in the building. Coordinate the location of hangers with other work.
- D. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- E. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
- F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- G. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
- H. Space hangers not more than 48 inches o.c. along each member supported directly from hangers, unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
- I. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability. Support fixture loads by supplementary hangers located within 6 inches of each corner; or support components independently.
- J. Do not eccentrically load system or produce rotation of runners.
- K. Install edge molding at intersection of ceiling and vertical surfaces, using longest practical lengths. Miter corners. Provide edge moldings at junctions with other interruptions.
 - 1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 - 2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet.

February 27, 2026

- L. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

3.03 INSTALLATION - ACOUSTICAL UNITS

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Lay directional patterned units one way with pattern parallel to longest room axis. Fit border trim neatly against abutting surfaces.
- D. Install units after above ceiling work is complete.
- E. Install acoustical units level, in uniform plane, and free from twist, warp and dents.
- F. Cut panels to fit irregular grid and perimeter edge trim. Field rabbet edge. Double cut and field paint exposed edges of tegular units.
- G. Where round obstructions occur, provide preformed closers to match edge molding.

3.04 ERECTION TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION

SECTION 09513 – SUSPENDED METAL SOFFIT/CEILING PANELS

PART 1 - GENERAL

1.01 WORK INCLUDES

- A. Metal Soffit/Ceiling Panel Systems
 - 1. Metal soffit panels.
 - 2. Concealed grid suspension system.
 - 3. Wire hangers, fasteners, main runners, cross tees, compression strut, bracing and wall angle moldings.
 - 4. Perimeter Trim

1.02 RELATED SECTIONS

- A. Section 01361 – SUSTAINABLE DESIGN REQUIREMENTS
- B. Section 07910 – EXTERIOR WALL JOINT SEALANTS.
- C. Section 16500 – LIGHTING for light fixtures.

1.03 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM A 641 - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire
 - 2. ASTM A 653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
 - 3. ASTM A 1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
 - 4. ASTM C 635 - Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
 - 5. ASTM C 636 - Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
 - 6. ASTM D 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
 - 7. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 8. ASTM E 580 Installation of Metal Suspension Systems in Areas Requiring Moderate Seismic Restraint.
 - 9. ASTM E 1264 Classification for Acoustical Ceiling Products.
- B. American Society of Civil Engineers (ASCE):

1. ASCE 7 American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures.

1.04 SYSTEM REQUIREMENTS

- A. Structural Characteristics: Suspension system to rigidly secure metal soffit system including integral mechanical and electrical components with maximum deflection of 1/360.
 1. Structural Classification: ASTM C 635 Heavy Duty Class.
 2. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, "Direct Hung" unless otherwise indicated. Comply with seismic design requirements.
- B. Wind Uplift Design: Provide metal soffit system and attachments that, can withstand wind uplift pressures that the soffit will be subjected to so as to not deform, come loose from its attachments and remain intact.
 1. Wind Uplift Design Criteria: As indicated on the Structural Drawings.
- C. Fire Performance Characteristics: Identify metal soffit components with appropriate markings of applicable testing and inspecting organization.
 1. Surface Burning Characteristics: As follows, tested per ASTM E 84 and complying with ASTM E 1264 for Class A products.
 - a. Flame Spread: 25 or less
 - b. Smoke Developed: 50 or less
- D. Seismic Requirements:
 1. Acoustical ceiling system to be install in accordance with ASTM E 580 "Practice for Application of Acoustical Suspension Systems for Acoustical Tile and Lay-In Panels in Areas Requiring Seismic Resistance".
 - a. Seismic Criteria: As indicated on the Structural Drawings and determined by the 2018 IBC.
- E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes:
 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C) material surfaces.
- F. Source Limitations: Obtain each type of metal soffit panel and supporting suspension system through one source from a single manufacturer.

1.05 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.
- B. Samples: Minimum 6 inch x 6 inch samples of each specified metal panel; 8 inch long samples of exposed wall molding and suspension system, including main runner and 4 foot cross tees.

- C. Shop Drawings: Layout and details of metal soffit panels. Show locations of items which are to be coordinated with, or supported by the ceilings.
- D. Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards.
- E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- F. Warranties: Special warranties specified in this Section.
- G. Sustainable Design Submittal
 - 1. LEED Credits MRc3 Building Product Disclosure and Optimization – Sourcing of Raw Materials, Option 2 – Recycled Content.

1.06 QUALITY ASSURANCE

- A. Panel and Metal Suspension System Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum ten years documented experience.
- B. Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacture.
- C. Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.
 - 1. Surface Burning Characteristics: ASTM E 84 and complying with ASTM E 1264 Classification.

1.07 DELIVERY, STORAGE AND HANDLING

- A. The ceiling planks should be stored in a dry interior location and shall remain in cartons prior to installation to avoid damage. The cartons shall be stored in a flat, horizontal position. The planks should not be removed from the carton until the suspension system is installed.
- B. Proper care should be taken when handling the planks to avoid damage and soiling. It is recommended to hold the planks in the vertical orientation to avoid possibly bending the plank.
- C. White cotton or latex gloves are recommended for handling. It is recommended that two installers handle the 96-inch planks.

1.08 COORDINATION

- A. Coordinate acoustical ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

1.09 PROJECT CONDITIONS

- A. Areas to receive ceilings shall be free of construction dust and debris. The ceilings should only be installed in closed and acclimatized buildings. This product is not intended for exterior purposes.
- B. Interior systems cannot be used where standing water is present or where moisture will come in direct contact with the ceiling.

1.10 EXTRA MATERIALS

- A. Extra Materials: For each type furnish extra materials described below that match products installed. Packaged with protective covering for storage and identified with appropriate labels.
 - 1. Metal Soffit Panel Units: Furnish quality of full-size units equal to 5.0 percent of amount installed.
 - 2. Suspension System Components: Furnish quantity of each exposed suspension component equal to 2.0 percent of amount installed.

1.11 WARRANTY

- A. Metal Soffit Panel System: Submit a written warranty executed by the manufacturer, agreeing to repair or replace panels that fail within the warranty period. Failures include, but are not limited to:
 - 1. Metal Panels: Sagging, warping and corrosion.
 - 2. Suspended Grid System: Rusting and manufacturer's defects
- B. Warranty Period:
 - 1. Metal panels: One (1) years from the date of Substantial Completion.
 - 2. Grid: One(1) year from the date of Substantial Completion.
- C. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Basis-of-Design Products: Products described in this Section are Metalworks Linear – Synchro Panels as manufactured by Armstrong World Industries, Inc.. Products of one of the following manufacturers are acceptable subject to visual comparability and the requirements of this Section.
- B. Suspension System:
 - 1. USG Interiors, LLC.
 - 2. Rockfon North America, Chicago Metallic

3. Or approved equal.
- C. Metal Soffit Units:
1. USG Interiors, LLC.
 2. Rockfon North America
 3. Or approved equal.

2.02 METAL SOFFIT PANELS

- A. Metal Soffit Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E1264 classifications as designated by types, patterns, and fire ratings unless otherwise indicated.
- B. Sheet Metal Characteristics: For metal components exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, roughness, stains, or discolorations.
- C. Metal Soffit Panel (MTL-01): Metal soffit panel fabricated from 0.028-inch thick electrogalvanized steel sheet (Unperforated) to size and shape indicated and having the following properties:
1. Panel size: 4-inches by 96-inches, 4-1/2" module.
 2. Panel edge: Manufacturer's standard square edge.
 3. Panel Depth: 1-inch
 4. Classification: ASTM E 1264; Type XX, Form 2, Pattern G, Fire Class A
 5. Finish: Manufacturer's factory-applied wood grain pattern powder coat finish.

2.03 SUSPENSION SYSTEMS

- A. Metal Suspension Systems Standard: Provide ceiling manufacturer's standard metal suspension systems of types and finishes indicated that comply with applicable ASTM C 635 requirements.
- B. Suspension Systems: Provide systems complete with carriers, splice sections, connector clips, alignment clips, leveling clips, hangers, molding, trim, retention clips, load-resisting struts, fixture adapters, and other suspension components required to support ceiling units and other ceiling-supported construction.
- C. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, Direct Hung, unless otherwise indicated.
1. Post-Installed Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing per ASTM E 488 or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.
 - a. Type: Post-Installed expansion anchors.

February 27, 2026

- b. Corrosion Protection: Stainless-steel components complying with ASTM F 593 and ASTM F 594, Group 1 Alloy 304 or 316 for bolts; Alloy 304 or 316 for anchors.
- D. Main beams and cross tees shall be hot dipped galvanized steel per ASTM A 653 and finished with baked on polyester paint in color indicated.
 - 1. Style: MW Linear Main Beam Carrier 2 (MBC2) as manufactured by Armstrong World Industries, Inc.
 - 2. Color: Black
- E. Carrier Splices: Same metal, profile, and finish as for carriers.
- F. Edge Moldings and Trim: Of types and profiles indicated or, if not indicated, manufacturer's box moldings for edges and penetrations, including light fixtures, that fit type of edge detail and suspension system indicated. Provide moldings with exposed flange of the same width as exposed runner. Finish to match exposed tees.
 - 1. Provide Armstrong 14" Axiom Classic Trim at elevations changes with spring border clip as detailed.
- G. Wire for Hangers and Ties: ASTM A 641, Class I zinc coating, soft temper, pre-stretched, with a yield stress load of at least three times the design load, but not less than 12 gauge.
- H. Seismic Struts: Manufacturer's standard compression struts designed to accommodate lateral forces.

2.04 ACCESSORIES

- A. Touch-up Paint: Type and color to match metal panel and grid unit finishes.

2.05 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.06 ALUMINUM FINISHES

- A. Color-Coated Wood Grain Pattern Finish: Manufacturer's post-production sublimation process for applying powder-coat baked paint finish with wood grain transfer film complying with coating manufacturer's written instructions for surface preparation, pretreatment, application, baking, and minimum dry film thickness.
 - 1. Color: Armstrong World Industries; Effects Cherry (FXCH)
 - 2. Finish: Unperforated M1

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing and substrates to which metal soffit panels attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect soffit installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of metal soffit panels.

3.02 PREPARATION

- A. Measure each soffit area and establish layout of metal panels to balance border widths at opposite edges of each soffit. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans and on approved Shop Drawings.
- B. Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other sections.
 - 1. Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordination of other work.

3.03 INSTALLATION - GRID SUSPENSION SYSTEM

- A. Install suspension system in accordance with ASTM C 636, manufacturer's written instructions and as supplemented in this section. Install seismic restraints per seismic requirements indicated.
- B. Suspend ceiling hangers from building's structural members and as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within soffit plenum that are not part of supporting structure or of ceiling suspension system.
 - 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 - 4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate to which hangers are attached and for type of hanger involved.
 - 5. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.

6. Install suspension system carriers so they are aligned and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
 7. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, post-installed mechanical fasteners that extend through forms into concrete.
 8. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
 9. Space hangers not more than 48-inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8-inches from ends of each member.
 10. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
 11. Attach main beam carrier to the main beams.
- C. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability. Support fixture loads by supplementary hangers located within 6 inches of each corner; or support components independently.
- D. Do not eccentrically load system, or produce rotation of runners.
- E. Install edge molding at intersection of soffit and vertical surfaces, using longest practical lengths. Miter corners where wall moldings intersect or install corner caps. Provide edge moldings at junctions with other interruptions.
1. Screw attach moldings to substrate at intervals not more than 16-inches o.c. and not more than 3-inches from ends, leveling with ceiling suspension system to a tolerance of 1/8-inch in 12-feet. Miter corners accurately and connect securely.
 2. Do not use exposed fasteners, including pop rivets, on moldings and trim.

3.04 INSTALLATION – METAL SOFFIT PANELS

- A. Install metal soffit panels in accordance with ASTM C 636 and the manufacturer's instructions.
- B. Cut metal soffit panels for accurate fit at borders and at interruptions and penetrations by other work through soffit. Stiffen edges of cut units as required to eliminate evidence of buckling or variations in flatness exceeding referenced standards for stretcher-leveled metal sheet. Cut edge to be supported off the edge molding.
- C. Install metal soffit panels in coordination with suspension system and exposed moldings and trim.
1. Perimeter Plank: Measure the starting width and cut one edge of the plank to width. Slide the cut edge of the plank into the perimeter carrier molding. The

opposite factory hook edge of the plank will fit into the hook slot feature of the hook tab.

2. Install the second row of planks by inserting the closer flange in the top hook on the carrier and swing the further flange up while pushing it into the top hook until it snaps in the carrier. Repeat these steps to continue installing rows of planks across the space.
 3. To splice planks use a splice plate to join and align adjacent planks. Install planks so the factory ends are at the splice location and assure the joint is tight. Install the splice by sliding it into the end of the first installed plank. Once the adjacent plank is installed, slide the splice so it is split evenly between the two planks.
- D. Place wood grain patterned units in one direction with grain pattern parallel to longest soffit axis. Fit border trim neatly against abutting surfaces.
 - E. Install units after above ceiling work is complete.
 - F. Install units level, in uniform plane, and free from twist, warp and dents.
 - G. Where round obstructions occur, provide preformed closers to match edge molding.

3.05 ERECTION TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

3.06 ADJUSTING AND CLEANING

- A. Replace damaged and broken panels.
- B. Clean exposed surfaces of soffit panels, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage

END OF SECTION

SECTION 09575 – SECURITY CEILING ASSEMBLIES

PART 1 - GENERAL

1.01 SUMMARY

- A. Work includes security acoustical pan metal ceilings including installation as scheduled in the contract drawings and as specified herein.
- B. Related Work specified elsewhere:
 - 1. Section 09900 - PAINTING
 - 2. Section 15500 – FIRE PROTECTION SYSTEMS
 - 3. Section 15600 – AIR CONDITIONING AND VENTILATION
 - 4. Section 16500 - LIGHTING

1.02 REFERENCES

- A. Referenced documents include:
 - 1. ASTM – ASTM International
 - a. ASTM A 1008 / A 1008M-03, Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
 - b. ASTM A 1011 / A 1011M-03, Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
 - c. ASTM A 653/A 653M-02, Specification for Steel Sheet, Zinc-coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot Dipped Process, (Commercial Steel)
 - d. ASTM A 666-00, Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate and Flat Bar
 - e. ASTM B 117-97, Standard Practice for Operating Salt Spray (Fog) Apparatus.
 - f. ASTM C 635-00, Standard Specification for the Manufacture, Performance and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
 - g. ASTM C 636-03, Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels
 - h. ASTM C 423, Standard Test Method for Sound Absorption and Sound Absorption Coefficient by the Reverberation Room Method.
 - i. ASTM D 610-95, Standard Test Method for Evaluating Degree of Rusting on Painted Steel Surfaces
 - j. ASTM D 714-87 (1994), Standard Test Method for Evaluating Degree of Blistering of Paints
 - k. ASTM D 1735-97, Standard Practice for Testing Water Resistance of

February 27, 2026

Coatings Using Water Fog Apparatus

- I. ASTM E-84-04, Standard Test Method for Surface Burning Characteristics of Building Materials
2. CISCA: Ceilings and Interior Systems Construction Association
 - a. CISCA Ceiling Systems Installation Handbook.
3. New York State Office of Mental Health (NYSOMH) Patient Safety Standards, Materials and Systems Guidelines.

1.03 PERFORMANCE REQUIREMENTS

- A. Security grades for each security ceiling type shall be indicated on the reflected ceiling plan.
- B. Acoustical Performance
 1. Perforated skin panel ceiling system shall provide an NRC of not less than 0.80 when tested in accordance with ASTM C 423, in an E-400 mounting as defined in ASTM E795.
 2. Acoustical fill flame spread index shall not exceed 15 with smoke developed value not exceeding 5 when tested in accordance with ASTM C 84.
- C. Security Performance
 1. Ceiling system shall be designed and installed to resist access to the plenum area. System access panels are to be provided in locations indicated on drawings. Access panels are to be sized so as to fit into the ceiling grid system and are locked in place with tamper resistant Torx security screws.

1.04 QUALITY ASSURANCE

- A. Manufacturer's Qualification
 1. Manufacturers shall have a minimum of five (5) years' experience successfully producing security ceiling systems of the types and sizes required in the contract documents. Upon request the manufacturer shall provide a list of successfully completed projects and the dates they were completed.
- B. Installer's Qualifications: Firm with not less than three (3) years of successful experience in the installation of security ceiling systems similar to those required by this project and acceptable to the Manufacturer of the System
- C. Quality Criteria
 1. Fabrication methods and product quality shall meet standards specified herein.

1.05 SUBMITTALS

- A. Submit in accordance with Section 01330 – SUBMITTAL PROCEDURES
- B. Shop Drawings
 1. Provide detailed drawings including: layout of ceiling systems, details of construction, gauges of metal, anchoring details, conditions at openings,

February 27, 2026

installation details and methods, and other data pertinent to the installation, including illustration of sequence of installation to accomplish interlocking panels.

2. Do not begin fabrication of material until shop drawings have been reviewed by the architect.

C. Samples

1. Supply a 1'-0" x 1'-0" section of each ceiling system being supplied showing wall mounting members and panel sections.
2. All samples submitted shall be of the production type and shall represent in all respects the minimum quality of work to be furnished by the manufacturer. No work represented by the samples shall be fabricated until the samples are approved, and any downgrading of quality demonstrated by the samples can be cause for rejection of the work.

- D. Certification: Submit certification from Manufacturer of ceiling panels attesting that product complies with specified requirements including finish as specified.

E. Qualifications

1. Manufacturer's Qualifications
2. Installers Qualifications.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver panels and all system hardware to the job site in Manufacturer's original packaging, unopened and undamaged, just prior to installation.
- B. Avoid warpage and damage by storing panels and all system hardware above floor, flat and in a dry, humidity and temperature controlled interior location.
- C. Follow Manufacturer's instructions and exercise care during off loading, handling and installation to avoid damage and marring of finishes.
- D. Inspect panels upon delivery for damage. Minor damage may be repaired provided finish items are equal in respect to new work and acceptable to Architect/Engineer. Otherwise, remove and replace with new material.

1.07 WARRANTY

- A. All ceiling systems work shall be warranted from defects in workmanship and quality for a period of one (1) year from shipment.

PART 2 - PRODUCTS

2.01 SECURITY CEILING SYSTEMS

- A. Basis-of-Design Product: Suspended metal acoustical security panel ceiling system is based on Lockdown® MH Metal Security Panel Ceiling shall be manufactured by Gordon, Inc.
 1. Subject to compliance with requirements provide equivalent products by one of the following:

February 27, 2026

- a. SecureDek as manufactured by Trussbilt.
2. Products other than those specified or approved will be considered if the following items are submitted to the Architect in accordance with the requirements of Section 01630 – PRODUCT OPTION AND SUBSTITUTIONS.

2.02 MATERIAL/CONSTRUCTION

- A. Suspended Metal Panel Ceilings: Ceiling Panels shall be nominally 24-inches x 24-inches and 24-inches x 48-inches x 1-inch deep with sloping vertical legs on all four sides.
 1. All ceiling panels shall be factory-formed from perforated 18 Gauge minimum A60 galvanized steel.
 2. All panels shall have a perforation pattern R564-732DG10, 0.078-inch diameter holes on 0.220-inch staggered 45-degree centers, 10% open area.
 3. When installed, the face of the panels shall rest on the inside surface of the exposed horizontal flanges of the main runners and cross tees.
 4. The sloping vertical legs of the panels shall lock-down positively and continuously under the bottom surface of the bulb of the tee sections, providing a visual concealment barrier without the use of concealed clips or fastener.
- B. Suspension System: The ceiling panel support system shall consist of main runners, cross tees, hanger wires, perimeter channel with hold down, and compression struts.
 1. Main Runners and Cross Tees: Shall conform to the requirements of a heavy-duty classification in accordance with ASTM C635. They shall be rolled with a double web and a rectangular bulb from hot-dipped galvanized steel, minimum 0.020-inch-thick, to an overall height of 1-1/2-inch with a flange width of 15/16-inch. The cross tees shall provide a positive mechanical lock into the main runners.
 2. Hangers: Supporting the main runners shall be 12-gauge galvanized steel wire hung on minimum 48-inches centers from the structure above the ceiling.
 3. Compression Struts: Shall be composed of telescoping 1/2-inch diameter and 3/4-inch diameter steel galvanized tubing. The 1/2-inch diameter tube shall be notched on one end to fit over the bulb of the main runner. At the other end, a length of 3/4-inch diameter tube is to be telescoped over the top portion of the 1/2-inch diameter tube and screw fastened to it with two TEK screws (3/8" long) so that the top of the 3/4-inch diameter tube bears on the structure above and the bottom of the 1/2-inch diameter tube fits snugly over the bulb of the main runner. A compression strut is required at each hanger wire and shall be tied to the hanger wire at the top and bottom.
 4. Wall Moldings: Exposed wall moldings shall be channel-shaped and be of the same material and have the same finish as the suspension system runners and shall include closure channels to hold perimeter panels in place.
 5. Acoustical material: The inside surface of all perforated ceiling pans shall be

covered with a Class "A" poly-encapsulated fiberglass insulation of sufficient thickness and density to provide the acoustical requirements as outlined in Section 1.05 of this specification.

6. Lights, HVAC: All light and air units are to be sized to fit into and trim off to full panel width openings and shall be independently supported from above by the trade requiring the opening.
7. Fasteners: All exposed Fasteners shall be tamper-proof and shall be a minimum No. 12 size. Fasteners for securing the Wall Molding to the wall are to be selected and furnished by the Contractor and approved by the Architect/Engineer.

2.03 FINISHES

- A. Comply with the National Association of Architectural Metal Manufacturers (NAAMM) "Metal Finishes Manual for Architectural and Metal Products" for recommendations.
- B. Ceiling Panels:
 1. The ceiling panels shall have a factory-applied white super-durable DuPont TGIC Polyester powder coating finish. Finish to be applied after perforation to ensure coating of perforated holes. Panels shall be coated to a minimum thickness of 2.0 mils on the finish side.
 2. Prior to painting, galvanized steel surfaces shall be cleaned, rinsed, and properly treated to receive the powder coating finish.
 3. Finish to achieve the following performance characteristics:
 - a. Salt Spray per ASTM B-117 – 1,000 hours PASS at less than 1/8" from score.
 - b. Humidity Resistance per ASTM D-2247 – 1,000 hours PASS at less than 1/8" from score.
- C. Suspension Systems:
 1. The main runners, cross tees, and wall moldings shall have a factory applied finish coat to match the color of the ceiling panels.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examination of Surfaces: Installer must examine conditions under which work is to be performed and must notify Contractor in writing of unsatisfactory conditions.
- B. Verify that field measurements and block-out dimensions are as shown on Shop Drawings.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the Manufacturer to achieve the best result for the project conditions.

3.03 INSTALLATION

- A. General: Comply with Manufacturer's printed instructions, governing regulations for Seismic Codes, and the Ceiling & Interior Systems Construction Association Standards applicable to work.
- B. Space Enclosure: Do not install any work until space is enclosed and weatherproofed, wet-work in space is completed and nominally dry, work above ceilings is complete, and temperature and humidity shall be continuously maintained at values near those of final occupancy.
- C. The ceiling system shall be installed in accordance with ASTM C636 and Cisca guidelines, in layouts as reflected on the approved shop drawings, all in compliance with the Manufacturer's Installation Instructions
 - 1. The suspension system and wall moldings shall be installed plumb and level.
- D. Except for the openings for light, air, fire protection, or access shown on the reflected ceiling plans, all openings or cut-outs required in the Ceiling Panels shall be field cut by the trades requiring the openings.
- E. Fastenings
 - 1. Fasten supporting members to each other and to building construction as detailed or as otherwise required to provide a secure, permanent installation.
 - 2. Where fastening spacings and sizes are not shown, use spacings and sizes of fasteners which will develop the full strength of the members before failure occurs in the fastenings.

3.04 FIELD QUALITY CONTROL

- A. Hold a meeting with other trades to review installation procedures and workmanship with a special emphasis on unusual conditions to ensure correct installation procedures.

3.05 PROTECTION, CLEANING AND TOUCH-UP

- A. Material Protection: Material shall not be delivered to the job site, nor installed, until all exterior openings have been closed in and all concrete and other wet work is completed and dry.
- B. Procedures: Care should be taken during the remainder of construction to protect the ceiling system from damage.
- C. Damage to Finished Work: Finished units of the ceiling system shall be without damage. Damage shall be repaired by the Contractor at the expense of the party damaging the material, as in accordance with the contract requirements.
- D. Touch-up Painting: Immediately after installation, areas where prime or finish coat has been damaged and where welding has occurred shall be sanded smooth and touched up with same primer or finish touch up paint as applied by the manufacturer.
 - 1. Remove rust before touch up primer is applied.
 - 2. Follow Manufacturer's cleaning instructions for specified finish.

END OF SECTION

SECTION 09622 – VINYL SPORTS FLOORING

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes the following:
 - 1. Foam backed vinyl sports floor, installed complete.
 - 2. Substrate preparation to receive flooring system.
- B. Related Sections include the following:
 - 1. Section 09652 – RESILIENT TILE FLOORING for wall base.

1.02 SUBMITTALS

- A. Product Data: Submit manufacturers data, installation instructions, and maintenance manuals for rubber sports floor tiles.
- B. Shop Drawings: Show installation details and locations of the following:
 - 1. Seam locations for resilient athletic sheet flooring
- C. Samples: For each exposed product and for each type, color, and pattern specified, 6-inch-square in size and of the same thickness indicated for the Work.
 - 1. Seam Samples: For each type of resilient athletic sheet flooring color and pattern required; with seam running lengthwise and in center of 6-by-9-inch Sample applied to a rigid backing and prepared by Installer for this Project.
- D. Product Certificates: Signed by manufacturers of resilient products certifying that each product furnished complies with requirements.
- E. Product Test Reports: For resilient athletic flooring, for tests performed by a qualified testing agency.
- F. Qualification Statements: For Installer.
- G. Maintenance Data: For resilient athletic flooring.
 - 1. Methods for maintaining resilient athletic flooring, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
 - 2. Precautions for cleaning materials and methods that could be detrimental to resilient athletic flooring.

1.03 QUALITY ASSURANCE

- A. Manufacturer: Provide vinyl sports flooring by a firm with a minimum of 10 years experience in the production of vinyl sports flooring of the type equivalent to that specified.
- B. Installer Qualifications: Engage an installer with a minimum of 2 years experience to perform work of this Section who has completed resilient athletic sheet flooring installations using seaming methods indicated for this Project and similar in material, design, and extent to that indicated for this Project; who is acceptable to

manufacturer; and whose work has resulted in installations with a record of successful in-service performance.

- C. Source Limitations: Obtain each type, color, and pattern of product specified from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.
- D. Fire-Test-Response Characteristics: Provide products with the following fire-test response characteristics as determined by testing identical products per test method indicated below by a testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Critical Radiant Flux: 0.45 W/sq. cm or greater when tested per ASTM E 648.
- E. Performance requirements: ASTM F 2772 – Indoor Sports Floor Standard.
 - 1. Provide certification of compliance for the four ASTM F2772 Indoor Sport Floor Standard performance categories:
 - a. Shock Absorption/Force Reduction: Class C2 - Pass
 - b. Ball Bounce: Minimum 90% - Pass
 - c. Surface Effect/Coefficient of Friction: Between 80-110, Pass
 - d. Vertical Deformation: Maximum 3.5mm: Pass
 - e. Chemical Resistance: ASTM D 543; OK
 - f. Impact Resistance: EN 1517; Pass
 - g. Abrasion Resistance: EN ISO 5470; Pass

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to Project site in manufacturer's original, unopened cartons and containers, each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.
- B. Store products in dry spaces protected from the weather, with ambient temperatures maintained between 50 and 90 deg F.
- C. Store rolls upright.
- D. Move products into spaces where they will be installed at least 48 hours before installation, unless longer conditioning period is recommended in writing by manufacturer.

1.05 PROJECT CONDITIONS

- A. Maintain a temperature of 70 deg F plus or minus 5 deg F in spaces to receive products for at least 48 hours before installation, during installation, and for at least 48 hours after installation, unless manufacturer's written recommendations specify longer time periods. After post installation period, maintain a temperature of not less than 55 deg F or more than 95 deg F.
- B. Do not install products until they are at the same temperature as the space where they are to be installed.

February 27, 2026

- C. Close spaces to traffic during flooring installation and for time period after installation recommended in writing by manufacturer.
- D. Install flooring and accessories after other finishing operations, including painting, have been completed.
- E. Do not install flooring over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive, as determined by flooring manufacturer's recommended bond and moisture test.

1.06 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.
 - 1. Furnish not less than 2% of total installed, sports flooring system installed.
 - 2. Furnish not less than 10 linear feet for each 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient accessory installed.
 - 3. Deliver extra materials to Owner.

1.07 WARRANTY

- A. Provide manufacturer's warranty against defects in manufacturing of rubber sports flooring for a period of fifteen (15) years from the Date of Substantial Completion.
- B. Special Limited Warranty: Installer's standard form in which installer agrees to repair or replace sports flooring that fails due to poor workmanship or faulty installation within the specified warranty period.
 - 1. Warranty Period: 1 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS AND PRODUCTS

- A. Basis-of-Design Product: Products indicated on the drawings (**RF-4**) and described in this section are Taraflex Multi-Use 6.2 Sports Floor manufactured by Gerflor. Subject to compliance with requirements of this section and acceptable to the Architect provide an equivalent product by one of the other manufactures specified.
 - 1. Encore International
 - 2. Mondo USA
 - 3. Moose Sports Surfaces
 - 4. Or approved equal
- B. Sheet Sports Flooring: Foam-backed sheet vinyl flooring designed for fully adhered athletic flooring applications.
 - 1. Roll Dimension: 59-inch wide.
 - 2. Overall Thickness: Mot less than 0.24-inch

February 27, 2026

3. Wear Layer Thickness: Not less than 0.08-inch.
4. Foam Backing:
 - a. Very high density, two layer, dual-durometer, closed cell foam
 - b. Two (2) layers of fiberglass reinforcement for dimensional stability and indentation resistance. One layer of woven grid fiberglass and an additional layer of non-woven fiberglass.
5. Traffic-Surface Texture: Wood visual shall have wood grain embossed texture for a genuine wood appearance.
6. Applied Finish: Manufacturer's, factory-applied, permanent and UV-cured.
7. Seaming Methods: Heat welded
8. Adhesive Method:
 - a. Full-spread adhesive coverage to completely adhere flooring to substrate.
 - b. Complete adhesive coverage to eliminate the possibility of gaps or space between the slab and flooring material where moisture could accumulate and create an environment conducive to mold growth.
 - c. Flooring to be fully adhered to the concrete slab in all locations eliminating the possibility of waves or wrinkles forming caused by the floor shifting, moving or by rolling loads displacing it.
9. Color: As Scheduled.

2.02 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, Portland cement based or blended hydraulic cement based formulation provided or approved by floor covering manufacturer for applications indicated.
- B. Floor Covering Adhesive: Flooring manufacturer's own or recommended Two-component, trowelable moisture-cured urethane adhesive for rubber flooring.
- C. Edge Strips: Where required for these applications, manufacturer's standard for the flooring system selected.
- D. Heat Welding Rod: As supplied by indoor resilient athletic flooring manufacturer. Color shall blend with resilient athletic flooring color.
- E. Vapor Retarder (Where Required): Two-part, fluid- applied, epoxy based membrane compatible with flooring adhesive.
 1. Durabond D-261 Extreme Moisture Vapor Barrier Coating as manufactured by Bostik, Inc., or approved equal
 2. Drytek Moisture Vapor Barrier as manufactured by Laticrete
 3. Vapor Seal – HM as manufactured by Dependable Floor Products
 4. Or approved equal.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions where installation of resilient products will occur, with Installer present, for compliance with manufacturer's requirements. Verify that substrates and conditions are satisfactory for resilient product installation and comply with requirements specified.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
 - 1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may act as a bond breaker. Substrate surface shall be smooth and flat to within 1/8 inch per 10 feet
 - 2. Slab shall be tested for relative humidity in accordance with ASTM F 2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes based of the flooring and adhesive manufacturer's recommendations or requirements.
 - a. ASTM F 2170 Testing: Preform three (3) tests for the first 1000 square feet and at least one additional test for each additional 1000 square feet of flooring and the results shall not to exceed the 95%.
 - 3. Perform alkalinity and adhesion tests recommended in writing by rubber flooring manufacturer. Proceed with installation only after substrates pass testing.
 - 4. Subfloor finishes comply with requirements for the installation of the specified rubber flooring and installation methods.
 - 5. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.
- C. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. General: Comply with rubber flooring manufacturer's written installation instructions for preparing substrates indicated to receive rubber flooring.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, and depressions in substrates. Substrate tolerance: level to within 1/8" in 10' at all locations.
- C. Remove coatings, including curing compounds, and other substances that act as bond breakers and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
- D. If the vapor emission rate at the time of installation is found to exceed to required rate for floor covering installation, and it is determined and agreed upon by the Contractor and Architect that the vapor emission rate will not improve, apply the specified vapor retarder in strict accordance to the manufacturer's written instructions.

February 27, 2026

- E. Broom and vacuum clean substrates to be covered immediately before product installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust.
- F. Adhesive Bond Test: An adhesive bond test must be performed using the actual flooring materials and adhesive to be installed. The test areas must be a minimum of 36" x 36" and remain in place for at least 72 hours and then evaluated for bond strength to the concrete. Results of adhesive bond test must be sent to and approved by the flooring manufacturer prior to the installation of the rubber tile flooring.

3.03 FLOOR INSTALLATION

- A. General: Comply with tile manufacturer's written installation instructions.
- B. Scribe, cut, and fit flooring to butt neatly and tightly to vertical surfaces and permanent fixtures, including built-in furniture, cabinets, pipes, outlets, edgings, door frames, thresholds, and nosings.
- C. Extend floor covering into toe spaces, door reveals, closets, and similar openings.
- D. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use chalk or other nonpermanent, nonstaining marking device.
- E. Lay out floor to minimize number of seams and place them inconspicuous areas. Locate seams as shown on approved Shop Drawings.
- F. Adhered Flooring: Adhere products to substrates using a full spread of adhesive applied to substrate to comply with adhesive and flooring manufacturers' written instructions, including those for trowel notching, adhesive mixing, and adhesive open and working times.
 - 1. Provide completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.
- G. Vinyl Sheet Flooring Seams: Finish seams to produce surfaces flush with adjoining flooring surfaces. Comply with ASTM F 1516. Rout joints and use heat welding rod to permanently and seamlessly fuse sections together.
- H. Roll floor in both directions with a 100 pound three-section roller. Use a small hand roller in areas that cannot be reached with a large roller.
- I. Keep all foot traffic of the finish floor for a minimum of 24 hours. All heavy traffic, rolling loads, pallet jacks, and furniture or appliance placement must be restricted for a minimum of 72 hours after installation.

3.04 CLEANING AND PROTECTING

- A. Perform the following operations immediately after installing resilient products:
 - 1. Remove surface blemishes using cleaner recommended by resilient product manufacturers.
 - 2. Sweep or vacuum floor thoroughly.
 - 3. Do not wash floor until after time period recommended by flooring manufacturer.

February 27, 2026

- B. Protect flooring against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by flooring manufacturer.
 - 1. Cover products installed on floor surfaces with undyed, untreated building paper until inspection for Substantial Completion.
 - 2. Do not move heavy and sharp objects directly over floor surfaces. Place plywood or hardboard panels over flooring and under objects while they are being moved. Slide or roll objects over panels without moving panels.
 - 3. Clean floor surfaces not more than 4 days before dates scheduled for inspections intended to establish date of Substantial Completion in each area of Project. Clean products according to manufacturer's written recommendations.

END SECTION

SECTION 09651 – RESILIENT TILE FLOORING

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes the following:
 - 1. Rubber Tile Flooring
 - 2. Electrostatic Dissipative Tile (ESD)
 - 3. Resilient Wall Base

1.02 SUBMITTALS

- A. Product Data: Submit manufacturers data, installation instructions, and maintenance manuals for each type of resilient flooring and wall base.
- B. Samples for Verification: Physical samples of each different color and pattern of flooring system and wall base specified, showing the full range of variations expected in these characteristics.
- C. Product Certificates: Signed by manufacturers of resilient products certifying that each product furnished complies with requirements.

1.03 QUALITY ASSURANCE

- A. Manufacturer: Provide flooring by a firm with a minimum of 10 years experience in the production of resilient flooring of the type equivalent to that specified.
- B. Installer Qualifications: Engage an experienced installer with a minimum of 2 years experience to perform work of this Section who has specialized in installing resilient flooring products similar to those required for this Project and with a record of successful in-service performance.
- C. Source Limitations: Obtain each type, color, and pattern of product specified from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.
- D. Slip Resistance: Flooring products shall have a Dynamic Coefficient of Friction (DCOF) AcuTest value shall not be less than 0.42 in accordance to ANSI A 137.1.
- E. Fire-Test-Response Characteristics: Provide products with the following fire-test response characteristics as determined by testing identical products per test method indicated below by a testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Critical Radiant Flux: 0.45 W/sq. cm or greater when tested per ASTM E 648.
- F. Electrostatic Dissipative Tile: Provide flooring material to meet the following electrical properties when installed according to manufacturer's instructions with the required adhesive, copper strips and SDT floor finish.
 - 1. ANSI/ESD S7.1 Floor Materials—Resistive Characterization of Materials results between 106 and 109 ohms, point-to-point and point-to-ground.

February 27, 2026

2. ASTM F 150 Electrical Resistance of Flooring between 106 and 109 ohms, point-to-point and point-to-ground.
3. ANSI/ESD STM 97.1: Floor Materials and Footwear—Resistance in Combination with a Person results between 106 and 109 ohms.
4. ANSI/ESD STM 97.2: Floor Materials and Footwear Voltage Measurement in Combination with a Person - less than 10 volts with dissipative footwear at 20% relative humidity.
5. Static Dissipation @ 12% RH: Flooring in combination with a person wearing dissipative footwear – 1000 to 100 volts: 0.2 seconds average.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to Project site in manufacturer's original, unopened cartons and containers, each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.
- B. Store products in dry spaces protected from the weather, with ambient temperatures maintained between 50 and 90 deg F.
- C. Store rolls upright.
- D. Move products into spaces where they will be installed at least 48 hours before installation, unless longer conditioning period is recommended in writing by manufacturer.

1.05 PROJECT CONDITIONS

- A. Maintain a temperature of 70 deg F plus or minus 5 deg F in spaces to receive products for at least 48 hours before installation, during installation, and for at least 48 hours after installation, unless manufacturer's written recommendations specify longer time periods. After post-installation period, maintain a temperature of not less than 55 deg F or more than 95 deg F.
- B. Do not install products until they are at the same temperature as the space where they are to be installed.
- C. Close spaces to traffic during flooring installation and for time period after installation recommended in writing by manufacturer.
- D. Install flooring and accessories after other finishing operations, including painting, have been completed.
- E. Do not install flooring over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive, as determined by flooring manufacturer's recommended bond and moisture test.

1.06 WARRANTY

- A. Provide manufacturer's warranty against defects in manufacturing and wear of resilient flooring for periods listed below:
 1. Rubber Tile: Ten (10) years from the Date of Substantial Completion.
 2. Electrostatic Dissipative Tile: Five (5) years from the Date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS AND PRODUCTS

A. Rubber Tile Flooring (**RF-01**):

1. Rubber Tile: ASTM F 1344, Type 1 (B), Grade 1, Homogeneous, thermoset rubber tile flooring.
 - a. Type: 1-B (Homogeneous Rubber Tile, through mottled)
 - b. Grade 1: Minimum hardness of 85, when measured using Shore, Type A durometer in accordance with ASTM D2240.
2. Thickness: 0.125-inch.
3. Wear Surface: Smooth
4. Size: As scheduled.
5. Color and Pattern: As scheduled.
6. Performance Criteria:
 - a. Static Load Limit/ Maximum Static Load:
 - i. ASTM F 970: Passes, ≤ 0.005 -inch
 - ii. Modified ASTM F 970 for maximum static load, 1500 psi

B. Electrostatic Dissipative Tile Flooring (**SDT-1**): ASTM F 1066

1. Static dissipative flooring tile composed of multiple layers of polyvinyl chloride resin, plasticizers, fillers, pigments and antistatic additives.
 - a. Class 2 (Through-pattern Tile)
 - b. Thickness: 0.125-inch
 - c. Size: As scheduled.

C. Resilient Wall Base (**RB-02**): ASTM F 1861

1. Resilient base shall be thermoplastic, solid homogeneous polyvinyl chloride (PVC), Type TV (ASTM F-1861 Type TV, Group 1); manufactured by Johnsonite, Burke-Mercer, Roppe or approved equal.
 - a. Color and Size as indicated on the Drawings. Provide in manufacturer's standard coiled lengths.
 - b. Provide coved toe base and pre-molded outside and inside corners.

2.02 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, Portland cement based or blended hydraulic cement based formulation provided or approved by floor covering manufacturer for applications indicated.
- B. Adhesives: Brush-on , roll-on, or trowel on water-resistant type recommended by the manufacturer to suit resilient products and substrate conditions indicated.

February 27, 2026

1. For electrostatic dissipative tiles provide tile manufacturers Static Dissipative Tile Adhesive with 2 in. wide x 24 in. long copper ground-connection strips for under the tile.
2. Slab Moisture Design Tolerance:
 - a. Maximum relative humidity of 90 percent when tested according to ASTM F 2170.
 - b. Maximum moisture vapor emission rate of 3 pounds of water per 1000 sq. ft. in 24 hours when tested according to ASTM F1869
- C. Sealers and Wax: Types recommended by flooring manufacturer.
- D. Polish for Static Dissipative Flooring: Provide protective, static control liquid floor polish products recommended by tile manufacturer.
- E. Edge Strips: Where required for these applications, manufacturer's standard for the flooring system selected.
- F. Vapor Retarder (Where Required): Two-part, fluid- applied, epoxy based membrane compatible with flooring adhesive.
 1. Slab-Cote Extreme Moisture Vapor Barrier Coating as manufactured by Bostik, Inc.
 2. Drytek Moisture Vapor Barrier as manufactured by Laticrete
 3. Vapor Seal – HM as manufactured by Dependable Floor Products
 4. Or approved equal.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions where installation of vinyl products will occur, with Installer present, for compliance with manufacturer's requirements. Verify that substrates and conditions are satisfactory for sheet vinyl product installation and comply with requirements specified.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
 1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may act as a bond breaker. Substrate surface shall be smooth and flat to within 1/8 inch per 10 feet
 2. Slab shall be tested for moisture vapor emissions in accordance with ASTM F 1869 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Sub-floor Using Anhydrous Calcium Chloride or relative humidity in accordance with ASTM F 2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes based of the flooring and adhesive manufacturer's recommendations or requirements.
 - a. ASTM F 1869 Testing: One test shall be conducted for every 1000 square feet of flooring and the results not to exceed the value required by the floor

or adhesive manufacturer per 100 square feet per 24 hours whichever is more stringent.

- b. ASTM F 2170 Testing: Preform three (3) tests for the first 1000 square feet and at least one additional test for each additional 1000 square feet of flooring and the results shall not to exceed the value required by the floor or adhesive manufacturer whichever is more stringent.
- 3. Perform alkalinity and adhesion tests recommended in writing by manufacturer.
- 4. Subfloor finishes comply with requirements specified in Section 03300 - CAST-IN-PLACE CONCRETE for slabs receiving resilient flooring.
- 5. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.
- C. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. General: Comply with resilient product manufacturer's written installation instructions for preparing substrates indicated to receive resilient products.
- B. If the vapor emission rate at the time of installation is found to exceed to required rate for floor covering installation, and it is determined and agreed upon by the Contractor and Architect that the vapor emission rate will not improve apply the specified vapor retarder in strict accordance to the manufacturer's written instructions.
- C. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, and depressions in substrates. Substrate tolerance: level to within 1/8" in 10' at all locations.
- D. Remove coatings, including curing compounds, and other substances that act as bond breakers and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
- E. Broom and vacuum clean substrates to be covered immediately before product installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust.

3.03 FLOOR INSTALLATION, GENERAL

- A. General: Comply with tile manufacturer's written installation instructions..
- B. For static control flooring extend grounding strip beyond perimeter of static control resilient flooring surfaces to ground connections
 - 1. Embed grounding strip in static control adhesive.
- C. Scribe, cut, and fit floor covering to butt neatly and tightly to vertical surfaces and permanent fixtures, including built-in furniture, cabinets, pipes, outlets, edgings, door frames, thresholds, and nosings.
- D. Extend floor covering into toe spaces, door reveals, closets, and similar openings.

February 27, 2026

- E. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use chalk or other nonpermanent, nonstaining marking device.
- F. Adhere floor coverings to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.04 FLOOR TILE INSTALLATION

- A. Lay out tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter. Lay tiles in the pattern indicated on the Drawings.
- B. Match tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

3.05 RESILIENT WALL BASE INSTALLATION

- A. Apply wall base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- B. Install wall base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- C. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- D. Do not stretch wall base during installation.
- E. On masonry surfaces or other similar irregular substrates, fill voids along top edge of wall base with manufacturer's recommended adhesive filler material.
- F. Premolded Corners: Install premolded corners before installing straight pieces.

3.06 CLEANING AND PROTECTING

- A. Perform the following operations immediately after installing resilient products:
 - 1. Remove adhesive and surface blemishes using cleaner recommended by resilient product manufacturers.
 - 2. Sweep or vacuum floor thoroughly.
 - 3. Do not wash floor until after time period recommended by flooring manufacturer.
- B. Protect flooring against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by flooring manufacturer.
 - 1. Cover products installed on floor surfaces with undyed, untreated building paper until inspection for Substantial Completion.

February 27, 2026

2. Do not move heavy and sharp objects directly over floor surfaces. Place plywood or hardboard panels over flooring and under objects while they are being moved. Slide or roll objects over panels without moving panels.
- C. Clean floor surfaces not more than 4 days before dates scheduled for inspections intended to establish date of Substantial Completion in each area of Project. Clean products according to manufacturer's written recommendations.

END OF SECTION

SECTION 09652 – RESILIENT SHEET FLOORING

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes the following:
 - 1. Sheet Vinyl Flooring
 - 2. Transition Strips
- B. Related Sections include the following:
 - 1. Section 09651 – RESILIENT TILE FLOORING for resilient base.

1.02 SUBMITTALS

- A. Product Data: Submit manufacturers data, installation instructions, and maintenance manuals for resilient flooring
- B. Samples for Verification: Physical samples of each different color and pattern of flooring system specified, showing the full range of variations expected in these characteristics.
- C. Heat-Welded Seam Samples: For each flooring product and welding bead color and pattern combination required; with seam running lengthwise and in center of 6-by-9-inch Sample applied to a rigid backing and prepared by Installer for this Project.
- D. Product Certificates: Signed by manufacturers of resilient products certifying that each product furnished complies with requirements.

1.03 QUALITY ASSURANCE

- A. Manufacturer: Provide flooring by a firm with a minimum of 10 years experience in the production of resilient flooring of the type equivalent to that specified.
- B. Installer Qualifications: Engage an experienced installer with a minimum of 5 years experience to perform work of this Section who has specialized in installing resilient flooring products similar to those required for this Project and with a record of successful in-service performance.
- C. Source Limitations: Obtain each type, color, and pattern of product specified from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.
- D. Slip Resistance: Flooring products shall have a Dynamic Coefficient of Friction (DCOF) AcuTest value shall not be less than 0.42 in accordance to ANSI A 137.1.
- E. Fire-Test-Response Characteristics: Provide products with the following fire-test response characteristics as determined by testing identical products per test method indicated below by a testing and inspecting agency acceptable to authorities having jurisdiction.

1. Critical Radiant Flux: 0.45 W/sq. cm or greater when tested per ASTM E 648.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to Project site in manufacturer's original, unopened cartons and containers, each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.
- B. Store products in dry spaces protected from the weather, with ambient temperatures maintained between 55 and 85 deg F.
- C. Store the indoor resilient surfacing rolls in an upright position on a smooth flat surface immediately upon delivery to Project.
- D. Move products into spaces where they will be installed at least 48 hours before installation, unless longer conditioning period is recommended in writing by manufacturer.

1.05 PROJECT CONDITIONS

- A. Maintain a temperature of 70 deg F plus or minus 5 deg F in spaces to receive products for at least 48 hours before installation, during installation, and for at least 48 hours after installation, unless manufacturer's written recommendations specify longer time periods. After post-installation period, maintain a temperature of not less than 55 deg F or more than 85 deg F.
- B. Do not install products until they are at the same temperature as the space where they are to be installed.
- C. Close spaces to traffic during flooring installation and for time period after installation recommended in writing by manufacturer.
- D. Install flooring and accessories after other finishing operations, including painting, have been completed.
- E. Do not install flooring over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive, as determined by flooring manufacturer's recommended bond and moisture test.

1.06 WARRANTY

- A. Special Limited Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace flooring that fails within specified warranty period.
 1. Material warranty must be direct from the product manufacturer.
 2. Failures include, but are not limited to, the following:
 - a. Material manufacturing defects.
 - b. Surface wear and deterioration to the point of wear-through.
 - c. Failure due to substrate moisture exposure not exceeding the manufacturer's required value for relative humidity when tested according to ASTM F2170 or for moisture vapor emission rate when tested according to ASTM F1869.
 3. Warranty Period: Fifteen (15) years from the date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS AND PRODUCTS

A. Sheet Vinyl Flooring (RF-02 & RF-03**)**

1. Sheet Vinyl: ASTM F1303, Type 1, Grade 1, Class B backed heterogeneous sheet vinyl flooring with UV cured factory finish.
 - a. Wear-Layer Thickness: 0.020-inch
 - b. Overall Thickness: 0.080-inch
2. Seaming Method: Heat Welded.
3. Adhesive Method:
 - a. Full-spread adhesive to completely adhere flooring to substrate.
4. Roll Size:
 - a. Roll Width: 12-feet.
5. Color and Pattern: As schedule.
6. Performance Criteria:
 - a. Static Load Limit/ Maximum Static Load:
 - i. ASTM F 970: Passes, ≤ 0.005 -inch
 - ii. Modified ASTM F 970 for maximum static load, 2000 psi
 - b. Residual Indentation: ASTM F1914; Passes ≤ 0.012 -inch

B. Accessories Integral Flash Cove Base:

1. Reducers: Butt-to transition, polyvinyl chloride (PVC), high quality additives, and colorants, ASTM E 648 Class 1.

2.02 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, Portland cement based or blended hydraulic cement based formulation provided or approved by floor covering manufacturer for applications indicated.
- B. Adhesives: Flooring manufacturer's trowel on solvent-free, two part epoxy adhesive recommended by manufacturer to install heterogeneous vinyl backed resilient products and substrate conditions indicated.
 1. Adhesive shall be solvent free with zero VOC content, low odor, no ammonia and non-flammable in wet state.
 2. Slab Moisture Design Tolerance:
 - a. Maximum relative humidity of 85 percent when tested according to ASTM F 2170.
 - b. Maximum moisture vapor emission rate of 5 pounds of water per 1000 sq. ft. in 24 hours when tested according to ASTM F1869.
- C. Heat Welding Bead: Solid-strand product of floor covering manufacturer. Color to match flooring.

- D. Vapor Retarder (Where Required): Two-part, fluid- applied, epoxy based membrane compatible with flooring adhesive. For field applications that are inside the weatherproofing system, vapor retarder products shall have the a VOC content of not more than 100 g/L.
 - 1. Slab-Cote Extreme Moisture Vapor Barrier Coating as manufactured by Bostik, Inc.
 - 2. Drytek Moisture Vapor Barrier as manufactured by Laticrete.
 - 3. Vapor Seal – HM as manufactured by Dependable Floor Products.
 - 4. Or approved equal.
- E. Integral Flash Cove Base Accessories:
 - 1. Top Edge Cap Trim: Fabricated to act as edge cap for resilient sheet flooring. Round Cap No. 040, Mercer or pre-approved equal.
 - a. Top Shape: Curved.
 - b. Colors: Ash 603.
 - 2. Cove Fillet Support Strip: Curved cove providing transition from floor to wall. Cove Stick No. 725 Merstick, Mercer or pre-approved equal.
 - a. Curve Radius: 1- inch.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions where installation of vinyl products will occur, with Installer present, for compliance with manufacturer's requirements. Verify that substrates and conditions are satisfactory for resilient product installation and comply with requirements specified.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
 - 1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may act as a bond breaker. Substrate surface shall be smooth and flat to within 1/8 inch per 10 feet.
 - 2. Slab shall be tested for moisture vapor emissions in accordance with ASTM F 1869 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Sub-floor Using Anhydrous Calcium Chloride or relative humidity in accordance with ASTM F 2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes based of the flooring and adhesive manufacturer's recommendations or requirements.
 - a. ASTM F 1869 Testing: One test shall be conducted for every 1000 square feet of flooring and the results not to exceed the value required by the floor or adhesive manufacturer per 100 square feet per 24 hours whichever is more stringent.
 - b. ASTM F 2170 Testing: Preform three (3) tests for the first 1000 square feet and at least one additional test for each additional 1000 square feet

of flooring and the results shall not to exceed the value required by the floor or adhesive manufacturer whichever is more stringent.

3. Perform alkalinity and adhesion tests recommended in writing by manufacturer.
 4. Subfloor finishes comply with requirements specified in Section 03300 - CAST-IN-PLACE CONCRETE for slabs receiving resilient flooring.
 5. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.
- C. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. General: Comply with resilient product manufacturer's written installation instructions for preparing substrates indicated to receive resilient products.
- B. Apply the specified vapor retarder or approved equal in strict accordance to the manufacturer's written instructions.
- C. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, and depressions in substrates. Substrate tolerance: level to within 1/8" in 10' at all locations.
- D. Remove coatings, including curing compounds, and other substances that act as bond breakers and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
- E. Broom and vacuum clean substrates to be covered immediately before product installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust.

3.03 FLOOR INSTALLATION, GENERAL

- A. General: Comply with tile manufacturer's written installation instructions.
- B. Scribe, cut, and fit floor covering to butt neatly and tightly to vertical surfaces and permanent fixtures, including built-in furniture, cabinets, pipes, outlets, edgings, door frames, thresholds, and nosings.
- C. Extend floor covering into toe spaces, door reveals, closets, and similar openings.
- D. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use chalk or other nonpermanent, nonstaining marking device.
- E. Adhere floor coverings to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.
- F. Flooring to be adhered to the concrete slab in all locations eliminating the possibility of waves or wrinkles forming caused by the floor shifting, moving or by rolling loads displacing it

3.04 SHEET VINYL INSTALLATION

- A. Unroll sheet vinyl floor coverings and allow them to stabilize before cutting and fitting. Lay out sheet vinyl flooring maintaining uniformity of floor covering direction. Minimize the number of seams keeping seams a minimum 6-inches away from parallel joints in the floor covering. Match edges of flooring for color shading at seams. Avoid cross seams.
- B. Heat-Welded Seams: Comply with ASTM F 1516. Rout joints and use welding bead to permanently fuse sections into a seamless floor covering. Prepare, weld, and finish seams to produce surfaces flush with adjoining floor covering surfaces.
- C. Integral-Flash-Cove Base: Cove floor coverings 4 inches up vertical surfaces. Support floor coverings at horizontal and vertical junction by cove strip. Butt at top against cap strip.

3.05 CLEANING AND PROTECTING

- A. Perform the following operations immediately after installing resilient products:
 - 1. Remove adhesive and surface blemishes using cleaner recommended by resilient product manufacturers.
 - 2. Sweep or vacuum floor thoroughly.
 - 3. Do not wash floor until after time period recommended by flooring manufacturer.
- B. Protect flooring against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by flooring manufacturer.
 - 1. Cover products installed on floor surfaces with undyed, untreated building paper until inspection for Substantial Completion.
 - 2. Do not move heavy and sharp objects directly over floor surfaces. Place plywood or hardboard panels over flooring and under objects while they are being moved. Slide or roll objects over panels without moving panels.
- C. Clean floor surfaces not more than 4 days before dates scheduled for inspections intended to establish the Substantial Completion date in each area of Project. Clean products according to manufacturer's written recommendations.

END OF SECTION

SECTION 09681 – CARPET TILE

PART 1 - GENERAL

1.01 SUMMARY

- A. Work Includes: Modular Multi-Leveled Pattern Cut/Loop carpet tile.

1.02 QUALITY ASSURANCE

- A. Installer Qualifications: Carpet Installation must be preformed by Installers with a minimum of 5 years experience in the installation of commercial carpeting.
- B. Fire Test Response Characteristics: Provide products with the critical radiant flux classification indicated in Part 2, as determined by testing identical products per ASTM E 648 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

1.03 SUBMITTALS

- A. Submit under the provisions of Section 01330 - SUBMITTAL PROCEDURES.
- B. Installation Drawings - Layout:
 - 1. Submit sets of 1/8-inch or 1/4-inch scale floor plans showing the proposed carpet tile layout of all areas to the Architect for approval. The drawings shall clearly indicate and accurately locate columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles as well as:
 - a. Existing flooring materials to be removed.
 - b. Existing flooring materials to remain.
 - c. Carpet tile type, color, and dye lot.
 - d. Type of subfloor.
 - e. Type of installation.
 - f. Pattern of installation.
 - g. Pattern type, location, and direction.
 - h. Pile direction.
 - i. Type, color, and location of insets and borders.
 - j. Type, color, and location of edge, transition, and other accessory strips.
 - k. Transition details to other flooring materials
- C. Material Safety Data Sheets (MSDS): Submit MSDS for each product.
- D. Samples: For each carpet tile, color and texture, submit the following samples for Architects approval.
 - 1. Carpet Tile: Full Size sample

February 27, 2026

2. Exposed Edge, Transition, and other Accessory Stripping: 12-inch long samples.
- E. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:
 1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
 2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.
- F. Sustainable Design Submittal:
 1. LEED v4 BD+C Healthcare
 - a. LEED IEQc2: Low Emitting Materials – Flooring
 - 1) Provide manufacturers General Emissions Evaluation verification in accordance with California Department of Public Health (CDPH) Standard Method v1.2 or equivalent verification method. Acceptable third party verified labels confirming CDPH compliance include but are not limited to CRI Green Label Plus.
 - b. LEED Credit IEQ2 – Low Emitting Materials – Paints and Coatings.
 - 1) Provide product data, MSDS or other documentation indicating VOC content and emissions testing documents showing compliance with requirements for low-emitting materials.
 - c. LEED Credit IEQ2 – Low Emitting Materials – Adhesives and Sealants.
 - 1) Provide product data, MSDS or other documentation indicating VOC content and emissions testing documents showing compliance with requirements for low-emitting materials.

1.04 PROJECT CONDITIONS

- A. All measurements and job conditions will be the responsibility of the floor covering installation contractor.
- B. Carpet tile installation shall be done after painting and finishing work is completed. Ceilings and overhead work shall be completed, tested and approved before carpet tile is installed. Close spaces to traffic during installation of the flooring.
- C. Fresh-air ventilate for 48 to 72 hours at normal room temperatures, using ventilation fans and opening windows and doors, where possible, after installation.
- D. Maintain temperature in spaces to receive flooring and accessories between 65 degrees F and 85 degrees F for at least 48 hours prior to installation, during installation, and for not less than 48 hours after installation. Install flooring after building air conditioning, dehumidifiers, etc. have operated to reduce moisture or provide approved sealer.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. General: Conform to CRI 104, "Standard for Installation of Commercial Carpet".
- B. Carpeting tile shall be delivered to site in manufacturer's original unopened packaging with register number tags attached or registered identification stenciled on packaging and intact.
- C. Materials to be stored in well ventilated spaces protected from damage, weather, dirt, stains, moisture, extreme temperatures and humidity, and other adverse conditions. Lay flat, blocked off the floor.

1.06 WARRANTY

- A. Upon completion, the carpet tile manufacturer shall submit a lifetime warranty covering carpet tile against manufacturing defects, abrasive wear, static protection, delamination, dimensional stability, edge ravel and tuftbind/zippering.
- B. Upon completion, the carpet contractor shall submit a certificate warranting the installation to be free of defects in workmanship for a period of one year to include the statement: "The carpet contractor shall, at his own expense and upon written notice from the Owner or Architect, promptly correct/replace any and all improper work and material that may become apparent within twelve months after the date of final completion".

1.07 EXTRA MATERIAL

- A. Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. General: Provide resilient flooring and wall base products that are CRI Green Label Plus certified and low VOC emitting materials.
- B. Carpet Tile (**CPT**-): As scheduled
 - 1. Performance Characteristics:
 - a. Critical Radiant Flux Classification: Class 1; Not less than 0.45 W/sq. cm.
 - 2. Properties:
 - a. Fiber Content: 93% Solution dye 7% yarn dyed nylon
 - b. Primary Backing: Manufacturer's non-woven synthetic backing.
 - c. Tile Size: As scheduled.
 - d. Pile Height: Pile height shall be as scheduled, and no more than 1/2-inch as required by ADAAG Section 302.2

February 27, 2026

- C. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- D. Adhesives:
 - 1. Carpet Tile Adhesive: Water-resistant, mildew-resistant, non-staining, pressure-sensitive type to suit products and sub-floor conditions indicated, that complies with flammability requirements for installed carpet and is recommended or provided by carpet manufacturer.
 - a. For field applications that are inside the weatherproofing system, carpet tile adhesive product shall have the following VOC content limits:
 - 1) Carpet Adhesives: 50 g/L.
- E. Vapor Retarder (Where Required): Two-part, fluid- applied, epoxy-based membrane compatible with flooring adhesive. For field applications that are inside the weatherproofing system, vapor retarder products shall have the a VOC content of not more than 100 g/L.
 - 1. Slab-Cote Extreme Moisture Vapor Barrier Coating as manufactured by Bostik, Inc.
 - 2. Drytek Moisture Vapor Barrier as manufactured by Laticrete
 - 3. Planiseal VS as manufacturers by Mapei.
 - 4. Vapor Seal – HM Plus as manufactured by Dependable Floor Products
 - 5. Or approved equal

PART 3 - EXECUTION

3.01 INSPECTION OF SURFACES

- A. Before work under this section is started, the Carpet Contractor, together with the Contractor and the Inspector, shall examine all surfaces that are to receive carpet tile to ensure that they are in the proper condition for same. The Carpet Contractor shall notify the Contractor of unacceptable areas and/or conditions (in terms of potential damage to the carpet) in writing. A copy of such notification shall be sent to the Architect. All such areas and/or conditions shall be corrected by the Contractor under this project prior to start of the work.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
 - 1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may act as a bond breaker. Substrate surface shall be smooth and flat to within 1/8 inch per 10 feet
 - 2. Slab shall be tested for moisture vapor emissions in accordance with ASTM F 1869 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Sub-floor Using Anhydrous Calcium Chloride. Results not to exceed 3 pounds per 1000 square feet per 24 hours.
 - a. Calculated results of test to be submitted to Owner and Architect prior to floor covering installation.

February 27, 2026

3. Perform alkalinity and adhesion tests recommended in writing by manufacturer.
4. Subfloor finishes comply with requirements specified in Section 03300 - CAST-IN-PLACE CONCRETE for slabs receiving carpet flooring.
5. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.

3.02 PREPARATION

- A. General: Comply with CRI 104, Section 8, "Substrate Preparation," and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.
- B. Surface to receive carpet tile must be free of dirt, moisture and irregularities in order to present a clean, smooth surface for installation.
- C. Apply the specified vapor retarder or approved equal in strict accordance to the manufacturer's written instructions.
- D. Underlayment surface is free of irregularities and substances that may interfere with adhesive bond or show through surface.
- E. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8-inch-wide or wider and protrusions more than 1/32 inch, unless more stringent requirements are required by manufacturer's written instructions.
- F. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.03 INSTALLATION, GENERAL

- A. General: Comply with CRI 104 Section 10 "Carpet Tile Installation" and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: Glue down; install every tile with full-spread, releasable, pressure-sensitive adhesive.
- C. All materials shall be installed by a licensed carpet installer.
- D. Maintain dye lot integrity. Do not mix dye lots in same area.
- E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacture.
- F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.

February 27, 2026

3.04 CLEANUP

- A. Upon completion of the installation, remove all waste and excess materials, all tools and equipment, and shall carefully and thoroughly vacuum the entire floor surface.
- B. All dirt and debris shall be cleaned off, all spots shall be removed from the carpet tile with a proper type of spot remover, and all loose threads shall be snipped from the carpet tile with a sharp pair of scissors. The entire installation shall be left clean and, in a condition, acceptable to the Architect.

3.05 PROTECTION

Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer, to ensure carpet tile is not damaged or deteriorated at time of Substantial Completion.

END OF SECTION

SECTION 09720 - WALL COVERING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Wall coverings and surface preparation.
- B. Related Work Described Elsewhere:
 - 1. Section 09250 – GYPSUM BOARD ASSEMBLIES for surface tolerances and finish level
 - 2. Section 09900 – PAINTING for Wall Covering primer.

1.02 SUBMITTALS

- A. Submit under the provisions of Section 01330 - SUBMITTAL PROCEDURES.
- B. Material Safety Data Sheet (MSDS): Submit MSDS for adhesives.
- C. Product Data: For each type of product indicated. Include data on physical characteristics, durability, fade resistance, and flame-resistance characteristics.
- D. Shop Drawings: Show location and extent of each wall-covering type. Indicate seams and termination points.
- E. Samples: Submit three samples, full width by 36-inches long, of each type, pattern and color showing complete pattern repeat. Mark top and face of material.
- F. Schedule: For wall coverings. Use same designations indicated on Drawings.
- G. Manufacturer's Installation and Maintenance Instructions: Indicate special procedures and perimeter conditions requiring special attention. Include maintenance data in maintenance manual for wall coverings.

1.03 QUALITY ASSURANCE

- A. Installer: Use adequate numbers of skilled installers who are thoroughly trained and have at least 3 years experience installing wall covering similar to those specified herein. No allowance will be made for the lack of skill on part of the installers in the acceptance and or rejection of installed wall covering.
- B. Manufacturer's Recommendations: The installation recommendations of the manufacturer of the wall covering used, when approved by the Architect shall be the basis for acceptance or rejection of actual installation methods used in this work.
- C. Fire-Test-Response Characteristics: Provide wall coverings and adhesives with the following fire-test-response characteristics as determined by testing identical products applied with identical adhesives to substrates per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Surface-Burning Characteristics: As follows, per ASTM E 84:
 - a. Flame-Spread Index: 25 or less.

- b. Smoke-Developed Index: 450 or less.
- D. Field Samples: Provide field sample of wall covering on scheduled substrate, minimum width of 8-feet, full height, demonstrating wall covering appearance, joint seaming and edging techniques.
 - 1. Accepted sample may remain as part of the completed Work.

1.04 DELIVERY AND STORAGE

- A. General: Comply with instructions and recommendations of manufacturer and as herein specified.
- B. Deliver materials to project site in original packages or containers clearly labeled to identify manufacturer, brand name, quality or grade, and fire hazard classification.
- C. Store materials in original undamaged packages or containers with labels and seals intact. Store materials flat in clean, dry storage area. Do not store rolled goods in upright position.

1.05 JOB CONDITIONS

- A. Install wall coverings only when normal temperature and humidity conditions approximate the same conditions that will exist when building is occupied. Maintain areas to receive wall coverings at a minimum temperature for 72 hours before , during and 48 hours after application of wall coverings.
- B. Illuminate areas of installation using building's permanent lighting system; temporary lighting alone will not be acceptable. Provide a lighting level of 80-foot candles minimum, measured mid-height, on surfaces to receive wall coverings.
- C. Ventilation: Provide continuous ventilation during installation and for not less than the time recommended by wall-covering manufacturer for full drying or curing.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. General: Provide rolls of each type of wall covering from the same run number and dye lot.
- B. Vinyl Wall Covering (**WC-02 & WC-03**) As scheduled.
 - 1. Provide mildew-resistant, strippable, perforated (micro-vented) vinyl wall covering complying with FS CCC-W-408D for Type II, Medium Duty products, in widths as scheduled.
 - 2. Backing: Osnaburg or Nonwoven fabric backing.
- C. Wood Veneer Wall Covering (**WC-04**): As Scheduled
 - 1. Fire Characteristics: ASTM E 84 Class A
 - a. Flamespread: 10
 - b. Smoke Developed: 25

February 27, 2026

2. Finish: Manufacturer's standard
3. Matching: Random
- D. Adhesive:
 1. Wall Covering Adhesive: Provide permeable, mildew-resistant, non-staining, water based adhesive, for use with specific wall covering and substrate application as recommended in writing by wall covering manufacturer.
 - a. ECO-888 Clear Permeable Adhesive; Roman Decorating Products.
 - b. Zinsser Vapor-Permeable Commercial Wallcovering System; Rustoleum
 - c. Dynamite 780 Heavy Duty Strippable Wallcovering Adhesive; Sherwin Williams
 - d. Or approved equal.
 2. Wood Veneer Wallcovering Adhesive: High solids, commercial grade clay-based adhesive.
 - a. PRO-732 Extra-Strength Clay Wallcovering Adhesive; Roman Decorating Products.
 - b. Or approved Equal'
- E. Primer: Mildew-resistant primer as specified in Section 09900 – PAINTING

PART 3 - EXECUTION

3.01 INSPECTION

- A. Examine substrates and conditions under which wall covering is to be installed and notify Contractor in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.
 1. Gypsum Board Substrates: Ensure that gypsum board substrate are finished with the proper level of finish specified in Section 09250 – GYPSUM BOARD ASSEMBLIES.
- B. Complete painting and all work that penetrate the substrate, before beginning wall covering installation. Test walls for moisture content with an electric moisture meter and take corrective measures if reading is more than 5 percent.

3.02 PREPARATION

- A. Acclimatize wall covering materials by removing from packaging in area of installation not less than 24 hours before application.
- B. Remove hardware, and hardware accessories, switch plates, wall plates, and surface-mounted fixtures in areas where wall covering is to be applied.
- C. Fill cracks, crevices, and holes with compound recommended by the wall covering manufacturer. Sand rough spots smooth and remove residual powder using a damp cloth. Surfaces to be covered shall be thoroughly dry.

February 27, 2026

1. Moisture Content: Maximum of 5 percent on concrete when tested with an electronic moisture meter.
- D. Prime and seal substrates with wall covering primer in accordance with wall covering manufacturer's recommendations for type of substrate.

3.03 INSTALLATION OF WALL COVERING

- A. Apply adhesives and wall coverings in accordance with the manufacturer's printed instructions.
- B. Place wall covering panels consecutively in order cut from rolls, including filling of spaces above or below openings. Hang by reversing alternate strips except on match patterns. After hanging the first three panels, obtain approval of color uniformity and pattern match.
- C. Apply adhesive to back of wall covering and place in accordance with manufacturer's instructions. Install seams plumb, and at least 6-inches away from corners. Horizontal seams are not permitted. Overlap seams and double-cut to assure tight closure. Roll, brush, or use broad knife to remove air bubbles, wrinkles, blisters, and other defects. Cut wall covering evenly to edges of outlet boxes or support.
- D. Trim salvages as required to assure color uniformity and pattern match.
- E. Edges shall extend not less than 1/2-inch behind applied base and trim.
- F. Seams and corners shall be securely pasted so that no moisture or water vapor can get behind the wall covering.
- G. Wall coverings shall extend behind edges of switch and receptacle cover plates.
- H. Remove excess adhesive along finished seams using warm water and clean sponge, and wipe dry and clean.

3.04 ADJUST AND CLEAN

- A. Clean all surfaces in accordance with the adhesive manufacturer's recommendations and wipe the wall covering clean. There shall be no residual film or stain after cleaning.
- B. Replace removed plates and fixtures; verify cut edges of wall coverings are completely concealed.
- C. Remove surplus materials, rubbish, and debris resulting from wall covering installation upon completion of work, and leave areas of installation in neat, clean condition.
- D. Replacement: In the event of damage, immediately make all repairs and replacement necessary to the approval of the Architect at no additional cost to the Owner.

END OF SECTION

SECTION 09779 – SAFETY PADDING

PART 1 - GENERAL

1.01 SUMMARY

- A. This section includes resilient cell padding with all accessories as specified and shown on Drawings.
 - 1. Provide resilient cell padding for Seclusion room as indicated.
- B. Related Sections include the following:
 - 1. Section 08113 – ANTI-BARRICADE DOORS AND FRAMES for doors and frames.
 - 2. Section 09250 – GYPSUM BOARD ASSEMBLIES

1.02 SUBMITTALS

- A. Product Data: Manufacturer's product data, literature and installation instructions.
- B. Shop Drawings showing fabrication and installation of resilient cell padding on walls. Include details of installation on door and frames, around glazed openings, and around other items located on wall.
- C. Samples: Colors available.
- D. Maintenance Information: Provide instructions for care and maintenance of surfaces.

1.03 QUALITY ASSURANCE

- A. Fire Performance Characteristics: Provide resilient cell padding with the following surface burning characteristics as determined by testing identical products per ASTM E 84 by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction.
 - 1. Flame Spread: 20 or less.
 - 2. Smoke Development: < 450.
 - 3. Class A fire rating.
- B. Padding to conform to the following:
 - 1. Tensile Strength Range: 300 PSI minimum in accordance with ASTM D412.
 - 2. Standard Test Method for Evaluating the Force Reduction Properties of Surfaces – ASTM F2569, Wall Pads 73%.
 - 3. Compression: 90% recovery after 72 hours.
 - 4. Compression Properties: 30 PSI to 70 PSI at 50% modulus.
 - 5. Moisture Absorption: Maximum 1.05% by weight.
 - 6. Fungus-Resistance (ASTM G 21-90): 0.
 - 7. Temperature Stability: Unaffected between 20 to 120 degrees F.

February 27, 2026

- C. Obtain approval from authority having jurisdiction to use resilient cell padding specified.
- D. Installer Qualifications: Engage an experienced installer with minimum five (5) years' experience and approved by the manufacturer as having the necessary experience, staff and training to install product.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Transport and handle resilient cell padding panels to prevent damage.
- B. Store materials in building on platform above floor and cover with tarps. Store joint filler liquid padding material in original containers in a well-ventilated area away from fire and flame.

1.05 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.
- B. Environmental Conditions: Maintain a minimum temperature of 65 degrees F, 36 hours before installation, during installation and until materials have fully cured as mandated by manufacturer.
- C. Ventilation: Provide adequate ventilation during installation and curing time.
- D. Flammability: No smoking, open flames or sparking from electrical equipment shall be permitted in the area during storage and application of material.

1.06 WARRANTY

- A. Contractor for work under this section shall agree to repair or replace and defective materials or work for a period of one (1) year from the date of Substantial completion. This warranty shall also include any loss of adhesion, resiliency or delamination. This warranty does not cover the damage caused by sharp or burning objects. This product is not intended to replace established management practices, but to supplement them in order to provide a safe environment for the end user, owner and client.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design Product: Subject to compliance with requirements, provide Gold Medal Safety Padding, manufactured by Marathon Engineering Corporation.

2.02 MATERIALS

- A. Padding: Resilient polymeric composition containing fire-retardant additives intended for use as door and wall padding and designed as a surfacing material which has no extraneous plasticizers or softening agents which are not integrally

February 27, 2026

bonded in the internal chemical structure. Materials to self-adhere to sub-surfaces when installed and cured on site.

1. Weight: Approximately 5 pounds per square foot at 1-inch thickness.
2. Finish: Smooth texture, scuff resistant.
3. Color: As selected.

B. Accessory Materials:

1. Minimum 7/16-inch fire retardant oriented strand board (OSB) or plywood panels.
2. Bond Coats and Adhesives: As recommended by manufacturer of padding to insure compatibility and bond with substrates.
3. Top Coating: Manufacturer's standard scuff-resistant coating.
4. Repair Kit: Provide manufacturer's standard repair kit for minor damage work.
5. Reinforcing Mesh: Manufacturer's standard product.

2.03 FABRICATION

- A. Padding applied to walls and doors shall be prefabricated panels 1-inch nominal thickness padded material bonded on oriented strand board 7/16-inch thick, making the wall panels a total nominal thickness of 1-1/2-inches.
- B. Door jamb and molding padding shall be a minimum of 1/2" solid padding material.
- C. Fasteners for use in securing panels shall be as recommended by protective padding manufacturer.
- D. All material must be able to be repaired in the field by the facility's maintenance staff in order to maximize cost effectiveness during the product's life cycle.

PART 3 - EXECUTION

3.01 EXAMINATION:

- A. Before installation of padding, examine all sub-surfaces to assure surfaces are true, even, dry, clean and in proper condition to start installation. Notify Architect in writing of any condition which will prevent satisfactory installation. Do not proceed with work until such defects are corrected. Application of padding constitutes acceptance of surfaces and responsibility thereof.

3.02 PREPARATION

- A. Provide adequate ventilation
- B. Maintain minimum temperature of 65 degrees F for duration of installation and curing time.
- C. Prepare substrates for padding by filling and leveling all grooves, cracks and other imperfections prior to installation of padding.

February 27, 2026

3.03 INSTALLATION

- A. Install resilient wall padding in accordance with approved Shop Drawings and manufacturer's written installation instructions.
- B. Remove doors to install pre-molded panel padding on them. Seal around glazing area as specified by the manufacturer. Re-install and test to verify that door operates properly after application of padding without bonding or scraping of padding, padding backer material.
- C. Apply bond coat to clean walls and adhere prefabricated wall panels from floor to ceiling with minimum 1/8-inch gap between panels. Fill all gaps with padding material in liquid form and sand prior to application of top coating.
- D. Apply finish coating in accordance with manufacturer's instructions.

3.04 CLEANING AND PROTECTION

- A. Touch-up damaged surfaces per manufacturer's instruction.
- B. Clean work area of debris associated with installation.
- C. Clean Surfaces per manufacturer's instructions
- D. Allow minimum 30-day cure time before use.

END OF SECTION

SECTION 09841 – ACOUSTICAL WALL PANELS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes sound absorptive wall treatment.

1.02 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.03 REFERENCES

- A. American Society of Testing and Materials (ASTM):
 1. ASTM C423 – Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
 2. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
 3. ASTM E795 – Standard Practices for Mounting Test Specimens During Sound Absorption Tests.

1.04 SUBMITTALS

- A. Product Data: Submit product data sheets for each product to be used, including:
 1. Preparation instructions and recommendations.
 2. Storage and handling requirements and recommendations.
 3. Installation mounting methods.
- B. Shop Drawings: Manufacturer's specifications, catalog cuts, and other items needed to demonstrate compliance with the specified requirements. Identify panel sizes, configurations, profiles, fabric selections by elevation, and corner details.
- C. Samples: Submit two (2) samples 12" x 12" (300 mm x 300 mm) size, including frame, substrate, and fabric. Sample will be reviewed for color, texture, fabric tautness, alignment and pattern of weave, fabric translucency, and appearance at corners.

1.05 QUALITY ASSURANCE

- A. Fabricators / Installers: Trained and certified by manufacturer.
- B. Manufacturer's Technical Representative: Qualified representative, trained by the manufacturer and knowledgeable of the products and the manufacturer's installation methods. Representative has the manufacturer's authority to approve and reject materials and installation of workmanship.

- C. The manufacturer's representative will be present to monitor the start of acoustical panel installation, establishing the standard of quality for the remainder of the installation.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until installation.
- B. Follow manufacturer's instructions for acclimatizing fabrics, panels, or other associated components.
- C. Protect fabric surfaces from damage.

1.07 WARRANTY

- A. Submit manufacturer's written warranty covering the products supplied and installed against defects in materials and workmanship under normal operating conditions for a period of two years from the date of project acceptance.
- B. Written warranty shall be executed by the manufacturer, showing warranty period by dates and agreeing to repair or replace acoustical panels that fail within the warranty period.

1.08 PROJECT CONDITIONS

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

PART 2 - PRODUCTS

2.01 TYPE AP-01 & AP-02: 1-INCH FABRIC WRAPPED PANELS

- A. Description: Fabric-faced panel with a 1-inch-thick medium density fiberglass core.
- B. Product must conform to the following:
 - 1. Noise Reduction Coefficient: Min. 0.80 when tested with Type A mounting (ASTM E795)
- C. Basis of Design: Lamvin Sonic High Impact Wall Panel or approved equal.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Site Verification of Conditions: Verify substrate conditions, which have been previously installed under other sections, are acceptable for product installation with manufacturer's instructions.
- B. Measure each ceiling area for conformance with the approved shop drawings. Notify the General Contractor and the Manufacturer's Technical Representative of discrepancies and conditions.

- C. Notify the Contracting Officer should the solutions require changes to the Construction Documents' details and/or the Shop Drawings.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Ensure substrate surface is clean and dry. Maintain temperature and humidity at conditions approximately those of occupancy prior to, during, and after installation.
- D. Ensure substrate surface is smooth, flat, and taped and sealed (if drywall) prior to installation. Directly adjoining work must be complete and dry.
- E. Field measure areas to receive sound absorbing wall units; establish exact layout of units.

3.03 INSTALLATION

- A. Install products in accordance with manufacturer's written instructions and in proper relationship with adjacent construction.

3.04 PROTECTION

- A. Protect installed products until completion of the project.
- B. Touch-up, repair or replace damaged products before substantial completion.
- C. The following defects shall also be cause for rejection or replacement at the Contractor's expense:
 - 1. Uneven joints or unaligned surfaces
 - 2. Soiled surfaces not cleaned to original condition
 - 3. Color variation
 - 4. Unsound mounting system
 - 5. Warping, buckling, or sagging of panels

END OF SECTION

SECTION 09842 - ACOUSTICAL CEILING TREATMENT

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following acoustical ceiling treatment as scheduled:

1. Spray-Applied Acoustical Insulation

B. Related Work Described Elsewhere:

1. Section 09250 – GYPSUM BOARD ASSEMBLIES

2. Section 09900 - PAINTING

1.02 SUBMITTALS

A. Product Data: For each type of panel edge, core material, and mounting indicated.

B. Samples: For the following products. Prepare Samples from same material to be used for the Work.

1. Spray-applied Acoustical Insulation: Submit 12-inch square sample of sprayed-on acoustical material showing texture variations for approval. All samples must be certified by manufacturer that they are representative of the texture which was acoustically tested in supporting acoustical test reports.

a. Submit test reports from all suppliers showing material to be 100% free of asbestos, mineral fibers, polystyrene and cellulose.

b. Submit certification of applicator licensing

C. Product Certificates: For each type of acoustical ceiling treatment, signed by product manufacturer.

D. Qualification Data: For testing agency.

E. Acoustical Test Data Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each type of acoustical treatment.

F. Maintenance Data: For acoustical ceiling treatment to include maintenance manuals.

1.03 QUALITY ASSURANCE

A. Applicator Qualifications: Applicator to be licensed by the spray-applied acoustical insulation manufacturer.

B. Provide testing results and procedures which have been certified by an accredited independent testing laboratory. Thickness of test samples must be determined and reported by acoustical laboratory:

1. NRC not less than 0.65 at 1-inch thickness and coefficient not less than 0.97, + or -, 0.03 at 1,000 Hz. Conduct testing on solid backing with no air gap.

C. Fire-Test-Response Characteristics:

1. Provide acoustical treatment with the following surface-burning characteristics as determined by testing identical products per ASTM E 84
 - a. Flame-Spread Index: 0.
 - b. Smoke-Developed Index: 0
 - D. Field Mock-up Control Sample: Prior to installation of final coats of acoustical treatment, apply an area of 50 sq. ft. in presence of the Contracting Officer and Architect, for approval of finish texture, as selected from samples.
- 1.04 DELIVERY, STORAGE, AND HANDLING
- A. Comply with manufacturers' written instructions for minimum and maximum temperature and humidity requirements for shipment, storage, and handling.
 - B. Deliver materials and panels in unopened containers and store in a temperature-controlled dry place with adequate air circulation.
- 1.05 COORDINATION
- A. Coordinate work with other trades when work may be affected or have an impact on the installation.
- 1.06 WARRANTY
- A. Manufacturer shall warrant the material to be supplied, agreeing to repair/replace that which has cracked, flaked, dusted excessively, peeled or fallen from substrate, or otherwise deteriorated to a condition where it would not perform effectively as intended for a sound absorbent purpose; due to defective materials and not due to abuse, improper maintenance, unforeseeable ambient exposures, or other causes beyond anticipated conditions by manufacturer.
 1. Warranty Period: The warranty period will be Ten (10) years from date of Project Acceptance.
 - B. The Surety and the Contractor shall not be held liable beyond two years from the Project Acceptance date.

PART 2 - PRODUCTS

2.01 SPRAY-APPLIED ACOUSTICAL INSULATION

- A. Gypsum plaster / exfoliated vermiculite spray applied acoustical surfacing with a nominal air-dried density of 40 lbs./cu.ft. when tested in accordance to ASTM E 605. Acoustement Plaster 40 as manufactured by Pyrok Inc.
 1. Compressive Strength: ASTM E 761, 64 psi
 2. Bond Strength: 2400 lbs/sq ft.
 3. Sound Absorption: ASTM C 423; 0.50 NRC at 1/2-inch thickness, 0.65 NRC at 1-inch thickness.

- 4. Thicknesses: As indicated on the Drawings
- 5. Color: As selected by Contracting Officer from manufacturer's standard colors.
- B. Bonding Agent: Water resistant, polyvinyl acetate homopolymer bonding agent; Plaster-Weld or Weld-Crete and manufactured by Larsen Products, Corp.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, and conditions, with Installer present, for compliance with requirements, installation tolerances, and other conditions affecting performance of acoustical treatment. Verify mechanical and electrical services have been installed, tested and inspected.
- B. Assure substrate is free of oil, grease, dirt, paint, or other matter which would impair bond or install metal lath or fiberglass mesh as recommended by the manufacturer.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Prepare substrate by filling voids and cracks and offsets, remove projections that result in telegraphing presence of imperfections.
- B. Brush or roll-apply a liberal coat of the bonding agent immediately prior to application of acoustical insulation in accordance with bonding agent manufacturer's written instructions.
- C. Do not apply insulation material when temperature is below 44 degrees F (ambient), or substrate is below 40 degrees F.
- D. Mask all adjoining surfaces in order to minimize damage from overspray.
- E. Provide ventilation if required and avoid excess drying rates.
- F. Provide tarps or temporary enclosures as necessary to confine operations.
- G. Perform all patching and repairing of insulation required to be done due to cutting, etc., by other trades.

3.03 INSTALLATION, SPRAY-APPLIED ACOUSTICAL INSULATION

- A. Apply in accordance with manufacturer's instructions using any rotary-stator plastering pump or other spray equipment approved by the manufacturer.
- B. Apply splatter coat covering 60-80 percent of the substrate surface. Allow splatter coat to cure overnight.
- C. Apply in successive passes to build to the thickness indicated on the Drawings but no less than the thickness required to achieve the NRC rating specified. Each pass shall be no more than 1/4-inch thick in accordance to the manufacturer's instructions. Allow 2-3 days of drying time will be required after 5/8-inch thickness has been applied and additional thickness is required.

- D. Ensure that texture and color are all as per control sample.
- E. Provide ventilation if required and avoid excess drying rates.
 - 1. During application and drying of the acoustical treatment, temperatures should be maintained between 50 - 95 degrees Fahrenheit. The humidity should be maintained between 45% - 75% for proper application and drying.

3.04 CLEANING AND PATCHING

- A. Remove overspray and fall out material immediately upon completion of the work in each area. Clean surfaces to remove evidence of soiling. Repair or replace damaged work surfaces to acceptable conditions.
- B. Coordinate work with other work, to minimize possibility of damage to system resulting from performance of subsequent work. As other units of work are completed in each area, patch damaged areas or surfaces of insulation by patching procedures as required to provide acceptable results.
- C. Provide natural or mechanical ventilation as required to properly cure the acoustical finish installation.
- D. Dispose of all waste materials in a proper and legal manner.

3.05 PROTECTION

- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, to ensure that acoustical ceiling treatments are without damage or deterioration at time of Project Acceptance.

END OF SECTION

SECTION 09900 - PAINTING

PART 1 - GENERAL

1.01 SUMMARY

- A. Work Includes: The work includes painting and finishing of interior and exterior items and surfaces throughout the project, whether scheduled or not, except as otherwise indicated. Painting shall include new work and surfaces made bare or damaged during construction. Surface preparation, priming and coats of paint specified are in addition to shop-priming and surface treatment specified under other sections of the work and are included in this Section.
- B. The work includes field painting of exposed bare and covered pipes and conduits, and of hangers, exposed steel and iron work, and primed metal surfaces of equipment installed under the electrical work, such as junction boxes, raceways and cabinets, except as otherwise indicated.
- C. "Paint" as used herein means all coating systems materials, including primers, enamels, sealers, stain, varnish, and fillers, and other applied materials whether used as prime, intermediate or finish coats, except as specifically noted herein.
- D. Paint all exposed surfaces whether or not colors are designated in "schedules." Where items or surfaces are not specifically mentioned, paint these the same as adjacent similar materials or areas. If color or finish is not designated, the Architect will select these from standard colors available for the materials systems specified.

1.02 PAINTING NOT INCLUDED

The following categories of work are not included as part of the field-applied finish work, or are included in other sections of these specifications.

- 1. Shop Priming: Unless otherwise specified, shop priming of ferrous metal items is included under the various sections for miscellaneous metal, hollow metal work, and similar items.

Also, for fabricated components such as shop-fabricated or factory-built mechanical and electrical equipment or accessories.
- 2. Mechanical and Electrical Work: The prime coat for mechanical and electrical work is specified in Divisions 15 and 16, respectively. Finish coats are as specified herein.
- 3. Pre-Finished Items: Unless otherwise indicated, do not include painting when factory-finishing or installer finishing is specified for such items as (but not limited to) solid phenolic, plastic laminate, high performance organic coated metal, exterior finish system, finished mechanical and electrical equipment including light fixtures, switchgear and distribution cabinets.
- 4. Concealed Surfaces (Present and Future): Unless otherwise indicated painting is not required on surfaces such as walls or ceilings in conceal areas and generally inaccessible areas, furred areas, and pipe spaces.

February 27, 2026

5. Finished Metal Surfaces: Metal surfaces of anodized aluminum, stainless steel, chromium plate, and similar finished materials will not require finish painting, unless otherwise indicated.
6. Labels: Do not paint over any code-required labels, such as Underwriters' Laboratories, or any equipment identification, performance rating, name, or nomenclature plates.

1.03 SUBMITTALS

- A. Submit under the provisions of Section 01330 - SUBMITTAL PROCEDURES.
- B. Schedule of Finishes: Submit sets of the proposed painting finish schedule to the Architect for approval. The schedule shall indicate the wet film thickness (mils) which the proposed paints/coatings will be applied that are necessary to achieve the final dry film thickness indicated on the Schedule of Finishes under paragraph entitled "Schedule of Finishes".
- C. Color Samples: Submit the following to the Architect for approval.
 1. Sets of each color finish sample.
- D. Schedule of Operations: Before work on the project is commenced, complete sets of a work schedule showing Contractor's sequence of operations and dates shall be submitted to the Architect.
- E. Warranty: Copies of a written warranty shall be submitted to the Architect.
- F. Certifications: Copies of asbestos-free, lead-free, zinc-chromate-free, strontium chromate-free, cadmium-free, and mercury free paint certificates shall be submitted to the Architect.
- G. Manufacturer's Product Data Sheets: Copies of the Manufacturer's Product Data Sheets for the primers, paints, coatings, solvents, sealing and patching materials, sealants and caulking, and other materials being used shall be submitted to the Architect. Data sheets shall indicate thinning and mixing instructions, required film thickness (mil) and application instructions.
- H. Manufacturer's Material Safety Data Sheets: Copies of the Manufacturer's Material Safety Data Sheets for coatings, solvents, and other hazardous materials shall be submitted to the Architect.
- I. Comprehensive Spray Plan: Where the Contractor proposes to employ airless spraying, a Comprehensive Spray Plan including the following information shall be submitted to the Architect for approval:
 1. Documentation that the individual spray applicator(s) on the project have completed an approved "Spray Applicator Certification Program".
 2. The overspray protection methods proposed.
 3. The spray application instructions and recommendations of the paint manufacturer he proposes to use.
- J. Certificate of Public Liability and Property Damage Insurance.
- K. Sustainable Design Submittal:
 1. LEED IEQc2: Low Emitting Materials

February 27, 2026

- a. Product Data: For paints, including printed statement of compliant VOC Content.

1.04 ANALYZING AND TESTING

- A. All paints and their applied thickness shall be subject to testing whenever the Architect deems necessary to determine conformation to the requirements of these specifications. Should testing by a laboratory be required, the laboratory shall be selected by the Architect and the cost of testing shall be borne by the Contractor. However, should test results show that the paint is in compliance with these specifications, the cost will be borne by the Owner.
- B. All rejected material shall be removed from the job site immediately. Surfaces painted with the rejected material shall be redone at no additional cost to the Owner.
- C. Where the required paint thickness is deficient, the affected surface(s) shall be recoated as necessary to provide the required paint thickness at no additional cost to the Owner.

1.05 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.

1.06 WARRANTY

- A. Warranty that the work performed under this section conforms to the contract requirements and is free of any defect in the materials used and workmanship performed by the Contractor. Such warranty shall continue for a period of two years from the project acceptance date and the Contractor shall remedy any such defect which is discovered during that period at no cost to the Owner.
- B. The Owner will notify the Contractor in writing within a reasonable time after discovery of any failure or defect.
- C. Should the Contractor fail to remedy any failure or defect described in Paragraph A above within 10 working days after receipt of notice thereof, Owner shall have the right to repair or otherwise remedy such failure or defect and charge the Contractor for the cost of same.

1.07 SPECIAL REQUIREMENTS

- A. Codes: Comply with State OSHL (Occupational Safety and Health Law) and all pollution control regulations of the State Department of Health.
- B. Safety methods used during coating application shall comply with SSPC-PA Guide 3.
- C. Protection:

1. Persons:
 - a. Take all necessary precautions to protect public pedestrians including tenants from injury.
 - b. Provide, erect, and maintain safety barricades around scaffolds, hoists, and wherever Contractor's operation creates hazardous conditions in order to properly protect the public and workmen.
 2. Completed Work: Provide all necessary protection for wet paint surfaces.
 3. Protective Covering: Provide and install protective covering over equipment, floor and other areas that are not scheduled for treatment. Protective covering shall be clean, sanitary drop cloth or plastic sheets. Paint applied to surfaces not scheduled for treatment shall be completely removed and surfaces shall be returned to original condition. Where paint application will be performed by use of airless spraying, ensure that protective enclosures are erected to prevent the escape of overspray from the work area.
 4. Safeguarding of Property: Take whatever steps necessary to safeguard the work and also the property of the Owner and other individuals in the vicinity of the work area during the execution of this Contract. Contractor shall be responsible for and make good on any and all damages and for losses to work or property caused by his or his employee's negligence. Where the damaged property cannot be cleaned and restored to its original condition (i.e. prior to being damaged) it shall be replaced with a new product of equal quality. No proration or use of "used" products will be permitted.
 - a. The Contractor shall be assessed \$300.00 for each incidence of property or personal damage caused by overspray until such time that a satisfactory settlement has been agreed upon by the damaged party and corrective action has been completed. All corrective action shall be settled within 24 hours from the time the damage is discovered.

Should the Contractor fail to take corrective action in a timely and expeditious manner, the Architect will contact the Contractor's Insurance company to seek resolution on the matter.
 - b. The Architect will withhold payment due the Contractor until damages have been corrected or damage claims resolved. The amount of payment withheld shall be equal to a minimum of \$2,000.00 plus the estimated cost of corrective action as determined by the Architect.
 5. Fire Safety: Direct employees not to smoke in the vicinity and exercise precautions against fire at all times. Waste rags, plastic (polyester sheets), empty cans, etc., shall be removed from the site at the end of each day.
- D. Right of Rejection: The Architect will have the right to reject all work which is not in compliance with the plans and specifications. Rejected work will be redone at no additional cost to the Owner.

February 27, 2026

In addition, the Architect will have the right to require the immediate removal of any paint applicator who demonstrates negligence, lack of competence or repeated non-compliance with the contract requirements.

- E. Sequence of Operations: The sequence of operations shall divide the surfaces into work areas and present a schedule for:
 - 1. Surface preparation and spot prime.
 - 2. Prime coat.
 - 3. First finish coat.
 - 4. Second finish coat.
- F. Inspection and Approvals: Prior to commencing with the work, prepare sample panel(s) of approximately 100 square feet indicative of each phase of the work for written approval from the Architect (phases of work are: surface preparation and spot prime; prime; first finish coat; second finish coat). Give the Architect one day (24 hours minimum) advance notice of completion of sample panel(s) and provide necessary access to areas to be inspected. The Contractor is to use the approved sample as a guide for the quality of work throughout the project.
- G. Ventilation of Interior Spaces Following Painting: Following the completion of interior painting and prior to final acceptance, the interior spaces shall be ventilated and allowed to "air-out" to remove paint odors such that no odors exist at Owner's occupancy date. Where necessary and as deemed by the Architect, the Contractor shall provide fans to mechanically ventilate the space(s).

1.08 DELIVERY, STORAGE AND HANDLING

- A. Deliver paint materials to the job site in original unopened containers with original labels intact.
- B. No paint material, empty cans and paint brushes and rollers, drop cloths and rags, may be stored in buildings, but shall be stored in separate storage facilities away from the buildings. Receiving, opening, and mixing of painting materials shall be done in this area.
- C. The Contractor may furnish a job site storage facility. Such facility shall comply with requirements of the local Fire Department. The storage area shall be kept clean and facility shall be locked when not in use or when no visual supervision is possible.
- D. Ensure the safe storage and use of paint materials and the safe storage or disposal of waste, at the end of each work day.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Hazardous Material Prohibition: All paint shall be free of asbestos, lead, mercury, zinc-chromate and/or strontium chromate, and cadmium.
- B. Material shall be equal in quality to that specified under the Schedule of Finishes and any given finish shall be as labeled by one manufacturer.

February 27, 2026

- C. All materials shall be delivered to the job site in undamaged original containers bearing the manufacturer's label and shall be stored in such a manner as to prevent damage. All rejected materials shall be removed from the job site immediately.
- D. Paints shall be as manufactured by Sherwin Williams.
Or Equal. Submitted products other than Sherwin Williams shall be equal to or better in quality than those listed 2.03
- E. Thinning of paint shall be done using material recommended by the manufacturer. Mix proprietary products according to manufacturer's printed specifications. Compound thinner, mineral oil, kerosene, refined linseed oil, or gasoline shall not be used for thinning.
- F. Mildew and Mold Resistance:
 - 1. Mildew Treatment: All paints specified in this section shall be factory formulated to be mold and mildew resistant.
 - a. The supplier shall submit a signed certificate indicating that the primers and paints supplied for this Project are manufactured and factory formulated to be mold and mildew resistant
 - 2. In the event a specified primer or finish paint is not formulated with mold and mildew resistant properties, provide each primer and finish paint with the maximum amount of mildewcide per gallon of paint permitted by the mildewcide manufacturer without adversely affecting the quality of the paint.
 - a. Mildewcide Additive: Zinser Add2 Prevent Mildew Mildewcide Additive, or approved equal.
 - b. The supplier shall submit a signed certificate indicating the amounts of mildewcide added by both the paint manufacturer and the paint supplier. Mercurial fungicide shall not be used.
- G. Preparation Materials
 - 1. Cleaner: Tri Sodium Phosphate, TSP, solution.
 - 2. Sealant (**JS-05**): As specified in Section 07920 – SEALANTS under "Interior Vertical and Overhead Non-Moving Joints"
 - 3. Concrete Patching material
 - a. For repair of areas 1/2 inch deep or greater: Sikaset Mortar, Sikatop No. 122 Co polymer repair mortar, or approved equal.
 - b. For repair of areas less than 1/2 inch deep: Sikatop No. 121 Co polymer repair mortar or approved equal.
 - 4. Primers, undercoats and finish coats: Employ products of the same manufacturer for all coats of a finish assembly wherever possible. Employ finish coats compatible with primers and undercoats.
 - 5. Provide ready mix coats and undercoats. Thin, reinforce or color only when necessary and in strict compliance with manufacturer's recommendations.

February 27, 2026

2.02 MANUFACTURERS

- A. Basis-of-Design Products: Products reference in the Contract Document are product of Sherwin Williams. Subject to compliance with the requirements comparable products from the following manufacturers may be incorporated into the Work:
1. Benjamin Moore
 2. Pratt & Lambert
 3. Benjamin Moore
 4. or approved equal

2.03 SCHEDULE OF FINISHES

- A. The Schedule of Finishes is made for the convenience of the Contractor and indicates the types and quality of finishes to be applied to the surfaces. Refer to Finish Schedule for symbols indicating location for various finishes. Provide additional systems for surfaces to be painted not listed hereinafter.
- B. All paints unless otherwise noted, are the products of Benjamin Moore and are so named to establish desired quality and standard of materials. Painting materials, equal to those mentioned by trade name under the various treatments may be used, provided they meet with the approval of the Architect.
- C. Treatments shall be applied on exposed surfaces of designated materials, in conformity with instructions of the paint product used.
- D. Exterior Painting:

1. Concrete and Concrete Masonry Units:

As Specified in Section 09905 – HIGH PERFORMANCE WALL COATINGS where scheduled or indicated on the Drawings.

2. Galvanized Metal (Steel Doors and Frames)

Cleaner***: Simple Green Surface Prep Cleaner

Two coats: SW Pro Industrial DTM Acrylic – Semi-Gloss

*** Not necessary if factory primed

3. Primed and Unprimed Ferrous and Galvanized Metal

Primer Coat: SW Zinc Clad III HS Organic Zinc-Rich Epoxy Primer

Intermediate (1) Coat: SW Macropoxy 646 Fast Cure Epoxy (Parts A&B)

Finish (1) Coat: SW Hi Solids Polyurethane B65 Series (Parts A&B)

Note: ** Only recommended for steel, not required for shop-primed or galvanized steel.

E. Interior Painting:

1. Concrete:

Prime Coat: SW Loxon Concrete & Masonry Primer LX02
2nd and SW Solo Interior/Exterior 100% Acrylic Semi-Gloss
3rd Coats A76 Series

2. Gypsum Board:

Wall:

Prime coat: SW ProMar 200 Zero Interior Latex Primer B28 Series
2nd and SW ProMar 200 Zero VOC Eggshell B20 Series
3rd coats: (Common Walls, Low Traffic/Abuse)
or
SW ProMar 200 Zero VOC Semi-Gloss B31 Series
(At Bathrooms)
or
SW Scuff Tuff Interior Waterbased Enamel Eggshell
S24 Series (At Corridors & Higher Abuse Areas)

Ceiling:

Prime coat: SW ProMar 200 Zero Interior Latex Primer B28 Series
2nd and SW B30W12651 ProMar® 200 Zero VOC Latex Flat
3rd coat:

3. Painted Wood Finish:

Prime coat: SW PrepRite ProBlock Int/Ext Primer/Sealer B51 Series
2nd and SW Solo Interior/Exterior 100% Acrylic Semi-Gloss
3rd coats: A76 Series

4. Ferrous and Galvanized Metal:

Cleaner**: Simple Green Surface Prep Cleaner
Two Coats: SW Pro Industrial DTM Acrylic Semi-Gloss B66 Series

** Only required for galvanized metal surfaces.

5. Wall Covering Primer:

1 coat: Roman Decorating Products ECO-988 Pigmented,
Permeable Primer

PART 3 - EXECUTION

3.01 SURFACE PREPARATION

A. General:

1. Surface preparation shall be in accordance with the Painting and Decorating Contractors of America, "Architectural Specification Manual," methods are applicable to all substrates.
2. Scrub surfaces with stiff nylon bristle brush and T.S.P. solution at rate of 3/4 cup T.S.P. per gallon of warm water to remove accumulated film of wax, oil, grease, smoke, dust, dirt, chalky, or other foreign matter which would impair bond or bleeding through new finish. Thoroughly sponge wipe surfaces with clean water. Allow surfaces to thoroughly dry before priming, painting, calking, or sealing.
 - a. Following sponge wiping, the surfaces shall be allowed to dry for a minimum of 24 hours.
 - b. Wood surfaces shall have a maximum moisture content of 12 percent when measured with an electronic moisture meter.
3. Cracks and openings found at joints and where different materials abut each other shall be sealed with a caulking compound compatible with the substrate and primer/paint. The caulking shall be applied and allowed to set in accordance with the manufacturer's recommendations and instructions.

B. The painting contractor shall be wholly responsible for the finish of his work and shall not commence any part of it until surfaces are in proper condition. If painting contractor considers any surfaces unsuitable for proper finish of his work, he shall notify the Architect of this fact in writing and he shall not apply any material until the unsuitable surfaces have been made satisfactory, or until the Architect has instructed him to proceed. Major defects shall be restored by the proper trades. In general, follow paint manufacturer's directions for surface preparation for the paint to be applied.

C. Remove all hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish-painted or provide surface-applied protection prior to surface preparation and painting operations. Remove, if necessary, for the complete painting of the items and adjacent surfaces. Following completion of painting of each space or area, reinstall the removed items by workmen skilled in the trades involved.

D. All necessary puttying of nail holes, cracks and blemishes shall be done after priming coat has become hard and dry and before second coat is applied.

E. All surfaces adjacent to areas being finished shall be protected and left clean of paints, stains, etc. Clean drop cloths shall be used until completion of job.

F. Unprimed galvanized metal shall be washed with a solution of chemical phosphoric metal etch and allowed to dry.

G. All metal surfaces shall be made clean and free of any defects or condition that may produce unsatisfactory finish. Touch-up any chipped or abraded places on surfaces that have been shop coated with the proper primer.

H. Gypsum Board Surfaces:

1. Surface Cleaning: Surfaces shall be dry. Remove loose dirt and dust by brushing with a soft brush or rubbing with a dry cloth prior to application of the first coat material.
2. Repair of Minor Defects: Prior to painting, repair joints, cracks, holes, surface irregularities, and other minor defects with patching plaster or spackling compound and sand smooth.

I. Plywood and Wood Surfaces:

1. Surface Cleaning: Surfaces shall be free from dust and other deleterious substances and in a condition approved by the Architect prior to receiving paint or other finish. Do not use water to clean uncoated wood.
2. Knots and Resinous Wood: Prior to application of paint, treat knots and resinous wood with an application of surface sealer.
3. Open Joints and Other Openings: Fill with whiting putty. Sand smooth after putty has dried.
4. Checking: Where checking of the wood is present, sand the surface, wipe, and apply a coat of pigmented orange shellac. Allow to dry before paint is applied.

J. PVC Trims and Accessories: Paint to match adjoining surfaces unless specifically indicated to remain unpainted.

3.02 PAINT APPLICATION

A. General:

1. Apply coating materials in accordance with SSPC-PA 1. SSPC-PA 1 methods are applicable to all substrates, except as modified herein. Thoroughly work coating materials into joints, crevices, and open spaces. Touch-up damaged coatings before applying subsequent coats.
2. All work shall be done in a workmanlike manner by skilled and experienced mechanics and shall conform to the best painting practices.
3. All materials shall be applied in accordance with the manufacturer's specifications and the finished surfaces shall be free from runs, sags, drips, ridges, waves, laps, streaks, brush marks and variations in color, texture, and finish (glossy or dull). The coverage shall be complete, and each coat shall be so applied as to produce a film of uniform thickness. No paint, varnish or enamel shall be applied until the preceding coat is thoroughly dry and approved.
4. Interior areas shall be broom clean and dust free before and during the application of coating material.
5. Any mixing shall be done outside the building.

B. Application:

1. Paint application shall be by brush, roller, airless spray painting or combination thereof or as required by manufacturer.

2. Where airless spraying is provided, a nozzle of the proper size in accordance with the paint manufacturer's recommendations to properly apply the paint shall be used.
 3. Spray painting method shall be used only under approved conditions. Spraying shall be done only when there is no wind, or under very low wind velocity. When wind velocity increases, all spraying operation shall be stopped. Before start of spraying, all surfaces that do not require painting shall be completely masked and protected. Adequate drop cloths shall be provided over floors, adjacent sidewalks, and over all cars parked nearby that may be stained or damaged from the spray work.
 4. Drying Time: Allow time between coats, as recommended by the coating manufacturer, to permit thorough drying. Provide each coat in specified condition to receive the next coat.
 5. Primers and Intermediate Coats: Do not allow primers or intermediate coats to dry more than 30 days, or longer than recommended by the manufacturer, before applying subsequent coats. Follow manufacturer's recommendations for surface preparation if primers or intermediate coats are allowed to dry longer than recommended by manufacturers of subsequent coatings. Each coat shall cover the surface of the preceding coat or surface completely and there shall be a visually perceptible difference in shades of successive coats.
 6. Finished Surfaces: Provide finished surfaces free from runs, drops, ridges, waves, laps, brush marks, and variations in selected colors.
- C. Colors: Tint pigmented undercoats to approximately same shade as final coat. Perceptibly increase the shade of each successive coat. Colors shall be in accordance with the color schedule on the drawings or as selected by the Architect.
- D. Finish Film Thickness: Apply primer, intermediate, and finish coats to not less than 1.5 mils dry film thickness, 4 mils wet unless recommended otherwise in writing by the manufacturer, for each coat and in accordance with the manufacturer's recommendations. Verify mil thickness by use of a suitable wet film gauge. Use a Tooke or other dry film gauge to test for total dry film thickness.

3.03 MECHANICAL AND ELECTRICAL WORK

- A. Paint visible surfaces of ductwork or plenum spaces, and interior surfaces visible through grilles.
- B. Paint shop primed metal surfaces of mechanical and electrical equipment with two finish coats of paint to match adjoining wall or ceiling surfaces. Prime unprimed bare metal surfaces with specified prime coat.

3.04 MISCELLANEOUS

- A. Installation of Removed Items: After completion of final paint coat, Reinstall removed items.
- B. At the completion of other trades, touch up damaged surfaces.

February 27, 2026

3.05 CLEAN UP

- A. During the progress of the work, remove all debris, empty crates, waste, drippings, etc., and leave the grounds about the areas to be painted clean and orderly at the end of each workday.
- B. Upon completion of the work, remove staging, scaffolding, containers, and all other debris from the site. Remove all paint, shellac, oil, or stains splashed or spilled upon adjacent surfaces not requiring treatment (hardware, fixture, floor) and leave the entire job clean and acceptable.

END OF SECTION

SECTION 09905 – HIGH-PERFORMANCE WALL COATINGS

PART 1 - GENERAL

1.01 SUMMARY

A. This section includes:

1. All materials, equipment, services, and labor necessary to apply water-based textured wall coating system where indicated or scheduled.
2. Masking and protection of adjacent surfaces not scheduled to receive coating specified in the section.

B. Related Sections:

1. Section 03330 – CAST-IN-PLACE CONCRETE
2. Section 07910 – EXTERIOR WALL SEALANTS
3. Section 09900 - PAINTING

1.02 SCOPE OF WORK

A. General description

1. This work includes proper preparation of and coating of exterior vertical concrete and concrete masonry substrates that is not scheduled or indicated to receive another waterproofing membrane or paint as scheduled on the Drawings and specified in Section 09900 – PAINTING.
2. Apply primer, textured undercoat and a minimum of two coats of elastomeric topcoat.

1.03 REFERENCES

A. In addition to referenced codes and standards within this specification, the work shall comply with the latest edition of the following standards. When conflicts arise between standards, the more stringent shall apply:

1. American Society for Testing and Materials (ASTM)
 - a. ASTM D 412 - Standard Test Method for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension.
 - b. ASTM D 522 - Standard Test Methods for Mandrel Bend Test of Attached Organic Coatings.
 - c. ASTM D 2247 - Standard Practice for Testing Water Resistance of Coatings in 100 % Relative Humidity.
 - d. ASTM D 3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
 - e. ASTM D 4541 - Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.
 - f. ASTM D 6904 - Standard Practice for Resistance to Wind-Driven Rain for Exterior Coatings Applied on Masonry.

- g. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials.

1.04 SUBMITTALS

- A. Provide complete product data including all test data. Submit manufacturer's technical information including basic materials analysis and installation instructions specified material.
- B. Elastomeric Coatings Contractor shall submit a detailed description of the work to be performed, materials to be used, sequencing of work, schedule of time required for each phase of work, and special protection required during the remaining construction.
- C. Elastomeric Coatings Contractor shall submit documentation of total square footage of area to receive elastomeric coatings and quantity of materials required prior to ordering material.
- D. Submit manufacturer's standard instructions for delivery, storage, surface preparation, installation, field quality control testing and adjusting.
- E. Submit sample of written warranty for Architects review prior to commencement of work.
- F. Samples: For each color and textured scheduled or specified submit coating finish samples, 8.5 inches x 11 inches in size illustrating specified colors and textures for each selection. Step each sample in horizontal strips showing primer and overlapping second and finish coats. Show coat tinting. Identify each sample.
- G. In each different area to receive coating at the project site, apply a representative sample (approximately 100 square feet to exhibit color, texture, joint treatment, and appearance. Architect and Owner shall approve these samples prior to proceeding with work. If samples are rejected, new samples shall be installed.
- H. Final acceptance of colors will be from samples applied to the job.
- I. Field quality control adhesion test reports.
- J. Submit Material Safety Data Sheets (MSDS) for all materials and products used in conjunction with this project.

1.05 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Materials shall be applied by a contractor previously certified or approved by the material manufacturer and listed as a pre-qualified contractor.
 - a. A letter from the manufacturer's representative shall be submitted prior to application of any materials stating that the firm designated to install the specified materials is approved for the level of warranty required by this Contract.
 - 2. Work must be performed by a firm having successful experience in comparable projects and employing personnel skilled in the processes and operations indicated.

February 27, 2026

3. Elastomeric Coatings Contractor's site foreman for this work shall have a minimum of three years successful experience in comparable projects and shall have been in the employment of this firm for a minimum of one year.
- B. Manufacturer's Technical Representative
1. Manufacturer's technical representative shall inspect site prior to installation and provide the Architect with notification of acceptance of the surfaces to receive the specified products.
 2. Manufacturer's technical representative shall outline, in writing, the cleaning method and primer requirements of each substrate to be coated prior to work beginning.
 3. Manufacturer's technical representative shall inspect installation during construction and at completion of the installation and verify to the Architect that installation has been completed in accordance with the specifications and manufacturer's requirements and that work complies with warranty requirements.
 - a. Provide site visits at intervals not exceeding fourteen (14) days by manufacturer's technical representative. Provide Architect with written report including job conditions, quality of work, conformance of work with specifications and warranty requirements.
 - b. Inspections shall include cutting samples to check millage thickness of coatings.
 4. Single Source Responsibility: Provide primers and other undercoat materials produced by same manufacturer as finish coats. All materials used within the coating system, including sealants, shall be approved by coating manufacturer prior to application and used within the recommended limits.
 - a. Manufacturer of wall coating system shall be the same as used for the cement plaster systems specified in Section 09220 – CEMENT PLASTER for aesthetic consistency and compatibility.
- C. Mock-ups: The contractor shall install a mock-up of the conditioner/primer, under coat and topcoat materials to a wall area of at least 100 sq. ft. for evaluation and approval by the Architect, Owner, or Owner's representative/quality assurance agent.
- D. Field Testing: Conduct tests in accordance with ASTM D 4541 on mock-up to verify adhesion of installed primer and topcoat to prepared substrate. Test at least 3 specimens and report results to the Architect, Owner, or Owner's representative/quality assurance agent.
1. Conduct tests during coating installation as directed by the Architect, Owner, or Owner's representative/quality assurance agent to verify adhesion throughout the course of the installation.

1.06 DELIVERY AND STORAGE

- A. Deliver materials in original, new and unopened packages and containers bearing manufacturer's name and label, and following information:
1. Name or title of material.
 2. Expiration date, if applicable.

February 27, 2026

3. Manufacturer's stock number and date of manufacture.
 4. Manufacturer's name.
 5. Contents by volume, for major pigment and vehicle constituents.
 6. Thinning and mixing instructions.
 7. Application instructions.
 8. Color name and number.
 9. Batch number.
- B. Take precautions to ensure that workmen and work areas are adequately protected from fire and health hazards resulting from handling, mixing and application of special coatings.
- C. Store materials not in actual use in tightly covered containers. Maintain containers used in storage of coatings in a clean condition, free of foreign materials and residue.
- D. Protect form over heating by storage in air-conditioned storage area. Keep storage area neat and orderly. Remove oily rags and waste daily. Take all precautions required to prevent fires.

1.07 JOB CONDITIONS

- A. Do not apply coatings when the temperature of surfaces to be coated and the surrounding air temperature exceed the limits established with the material manufacturer.
- B. Do not apply coating when the ambient temperature is above 100 degrees F unless written approval from the manufacturer can be obtained.
- C. Do not apply coatings in rain, fog, or mist; or when relative humidity exceeds 85%; or to damp or wet surfaces; unless otherwise permitted by coating manufacturer's printed instructions.
- D. Do not apply to surfaces with condensation, or surface moisture.
- E. Coating work may be continued during inclement weather only if areas and surfaces to be coated are enclosed and within temperature limits established by coating manufacturer during application and curing periods.
- F. Measurements
1. It shall be Elastomeric Coatings Contractor's responsibility to obtain and verify any necessary dimensions by visiting the job site, and the Contractor shall be responsible for the correctness of same.
 2. Elastomeric Coatings Contractors shall make a physical inspection of the facilities and include all work required for the elastomeric coatings in the bid costs.

1.08 SPECIAL WARRANTY

- A. Warranty: Submit a written warranty agreeing to repair or replace elastomeric coating compounds which have failed to provide watertight surfaces for any reason, or which appear to have failed in adhesion, cohesion, abrasion-resistance,

February 27, 2026

- migration-resistance, stain-resistance, general durability or any other form of apparent deterioration (excluding inherent qualities and limitations clearly specified in the manufacturer's data which was submitted).
- B. Warranty Period: Period of warranty shall be Ten (10) years, from date of Substantial Completion.
- C. Comply with these specifications for repair or replacement of work.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design Product: Textured Wall Coating System indicated in these specifications and drawings are based on StoColor Silcolastic as manufactured by Sto Corp.
- B. Subject to compliance with requirements, the following manufacturers offering equivalent products are:
 - 1. Dryvit
 - 2. Parex
 - 3. Senergy

2.02 MATERIALS

- A. Elastomeric Top Coat: Elastomeric, silicone enhanced acrylic-based, decorative and protective exterior wall coating. Weatherproof, dirt-resistant, mildew resistant, and bridges hairline cracks for use on vertical above grade concrete, stucco meeting or exceeding the following properties:
 - 1. Coating shall be vapor permeable when cured.
 - 2. Resistance to Wind Driven Rain: ASTM D 6904; Passed
 - 3. Tensile Strength: ASTM D 2370; 0.67
 - 4. Elongation: ASTM D 2370; not less than 200%
 - 5. Solids Content: Not less than 50 percent by volume.
 - 6. Mold Resistance: No Mold Growth at 90 days, ASTM D 3273
 - 7. Product: StoColor Silcolastic 80222.
- B. Accessory Materials
 - 1. Crack and Hole Fillers: Elastomeric coating manufacturer's recommended, factory-formulated crack fillers or sealants compatible with substrate and other materials.
 - 2. Primer: Elastomeric coating manufacturer's recommended, factory-formulated, alkali-resistant primer compatible with substrate and other materials indicated.
 - 3. Concrete Unit Masonry Block Filler: Factory-formulated, high-performance latex block filler compatible with substrate and other materials indicated.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates to determine if work is ready to receive elastomeric coatings. Verify that surfaces are clean, dry, and free of dust, dirt, grease, oil, curing compounds, form release agents, laitance, efflorescence, mildew, excess alkalinity, and other conditions affecting performance of work.
 - 1. Verify that new concrete and mortar to receive coating application has cured adequately in accordance with substrate and coating manufacturer's instructions.
- B. Preinstallation Testing: Prior to application of elastomeric coatings, perform the following tests to verify condition of substrate in accordance with manufacturer's instructions:
 - 1. Adhesion: Perform substrate field adhesion tests on each substrate to determine if primer is required to satisfactorily adhere elastomeric coatings to substrates.
 - 2. Alkalinity: Verify substrate is within alkalinity range acceptable to manufacturer.
 - 3. Moisture Level: Verify substrate moisture content is acceptable to manufacturer

3.02 PREPARATION

- A. Protection
 - 1. The Elastomeric Coatings Contractor shall protect all new surfaces and be responsible for correction, or payment for correction, of any damage due to his operations.
 - 2. Provide and maintain at all times any OSHA required danger signs, guards, and obstructions necessary to protect the public and workmen from any dangers inherent with or created by the work. All federal, state, and city rules and requirements pertaining to safety and all EPA standards and OSHA standards pertaining to safety shall be fulfilled as part of this Contract.
- B. Surface Preparation
 - 1. Clean surfaces
 - a. Clean building by pressure washing to remove all dust, dirt, oil, grease, loose particles, and foreign materials. Adjust pressure of spray rinse as required to clean, but not damage substrate. Allow surface to dry.
 - i) The intensity of the pressure used in power washing shall be a minimum of 2100 psi.
 - 2. Cracks 1/16-inch or smaller do not require patching by the two listed manufacturers, the contractor shall verify this when submitting manufacturer's installation procedures.
 - 3. Chip or grind out cracks larger than 1/16" to 1/8" minimum width and depth and clean surface and inside of crack with IPA and install silicone sealant into cracks and tool smooth. Silicone sealant must be from the same manufac-

turer as the elastomeric coating and must be approved by the elastomeric coating manufacturer for this purpose.

3.03 APPLICATION OF ELASTOMERIC COATING SYSTEM

- A. General: Apply special coatings by brush, roller, or spray in accordance with manufacturer's directions. Use brushes best suited for type of material being applied. Use rollers, synthetic nap as recommended by manufacturer, for material and texture required.
 - 1. Brush: nylon or synthetic bristle brushes only.
 - 2. Roller: 3/4" to 1-1/2", medium synthetic nap roller for smooth surface.
- B. Use brush application only at small inaccessible areas and limited areas such as pre-stripping of cracks.
- C. Use roller for majority of application. Completely saturate roller and keep it loaded with coating to build the required coating millage thickness. Never dry roll except for touch up. Roll the coating in a fan like pattern to achieve uniform millage.
- D. Before using, stir coating materials in accordance with manufacturer recommendations to achieve a smooth, uniform consistency.
- E. Application of primer.
 - 1. Consult manufacture technical representative prior to the start of work to verify primer requirements. Manufacture's technical representative to submit written procedure for cleaning and priming each substrate that is to receive a new coating.
 - 2. Primer shall be applied at full strength without thinner unless otherwise recommended by manufacturer and approved by Architect. When use of thinner is recommended, thin with materials as recommended by manufacturer.
 - 3. Allow primer to dry in accordance with the manufacturer's instructions.
- F. Apply additional coats of primer as required to achieve minimum two(2) mils dry film thickness in all areas.
- G. Mixing:
 - 1. Mix in accordance with published literature for the product. Mix for approximately 3 minutes using a slow-speed drill and paddle to a uniform consistency. Avoid entrapping air in the liquid during mixing.
- H. Elastomeric Top Coat Application:
 - 1. Apply 12-14 uniform wet mil coat of finish topcoat to dry under coat with brush, roller or proper spray equipment and allow to dry.
 - 2. Apply a second 12-14 uniform wet mil coat of finish top coat after first coat is completely dry.
 - 3. Minimum final dry thickness shall be 14 mils dry film thickness

3.04 FIELD QUALITY CONTROL

February 27, 2026

- A. Manufacturer shall provide a field technical representative on the jobsite to inspect material quality and application procedures. Technical Representative shall at the minimum:
 - 1. Inspect site prior to application and provide Architect with notification of acceptance of surface to receive materials.
 - 2. Inspect installation at sufficient intervals during application, not exceeding fourteen days and at completion and verify to Architect that installation is in accordance with specifications, manufacturer requirements, and warranty requirements.
- B. Architect, Consultant and Manufacturing Field Representative shall require contractor to cite sample areas on coating system to verify millage thickness and number of coats. Contractor shall repair sample cut areas.
 - 1. If millage is found to be inadequate, contractor shall be required to achieve specified millage. When additional coating is required, it shall be applied to entire wall in question, to expansion or control joints surrounding the recoated area.

3.05 ADJUSTING

- A. A final inspection shall be conducted by the Elastomeric Coatings Contractor, Manufacturer, Consultant, General Contractor and Architect.
- B. The Elastomeric Coatings Contractor shall promptly remove any work which is found unacceptable and correct any items of work listed during the final inspection.

3.06 CLEAN-UP AND PROTECTION

- A. Clean-up: During progress of work, remove from project site discarded materials, rubbish, and rags resulting from work.
- B. Upon completion of work, clean all coating-spattered surfaces. Remove spattered materials by proper methods of washing and scraping, using care not to damage finished surfaces.
- C. Protection: Protect all work against damage. Correct damage by cleaning, repairing, or replacing, and recoating as directed by Architect. Leave work in undamaged condition.
- D. Provide "Wet Paint" Signs as required to protect finished. After coating application, remove temporary protective materials installed for protection of other work during coatings operation.

END OF SECTION

SECTION 10200 - METAL LOUVERS AND VENTS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Fixed Aluminum Storm-Resistant Louvers

1.02 SUBMITTALS

- A. General: Submit under provisions of Section 01330 - SUBMITTAL PROCEDURES.
- B. Manufacturer's Data: Submit copies of manufacturer's product specifications and installation instructions along with shop drawings. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.
- C. Shop Drawings: Submit shop drawings for fabrication and erection. Include plans, elevations, sections, large scale details, materials and thicknesses, and anchorages.
- D. Samples: Submit 4 samples of high performance organic coated aluminum color and finish for factory finished louvers.
- E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for each type of louver.

1.03 PERFORMANCE REQUIREMENTS

- A. Air performance, water penetration, air leakage ratings and wind-driven rain ratings: Provide louvers complying with performance requirements indicated as demonstrated by testing manufacturers stock units, of height and width indicated, according to Air Movement and Control Association (AMCA) Standard 500.
- B. Structural Performance: Louvers shall be factory engineered and furnished by louver manufacturer to withstand loads created by the following criteria:
 1. Wind Loads: Design louvers to withstand wind load design pressures, as determined by IBC 2018 and ASCE 7.
 - a. Wind Design Criteria: As indicated on the Structural Drawings.
 2. Seismic Criteria: As indicated on the Structural Drawings and determined by 2018 IBC.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. The manufacturer shall have demonstrated not less than 10 years consecutive successful experience in fabrication of metal louvers similar to those specified for this Project.

February 27, 2026

- B. Louvers licensed to bear AMCA Certified Ratings Seal. Ratings based on tests and procedures performed in accordance with AMCA 511 and comply with AMCA Certified Ratings Program. AMCA Certified Ratings Seal applies to air performance and water penetration ratings.
- C. Louver sizes scheduled on the Drawings are based on the free area percentage of the Basis-of-Design product and the required free areas indicated on the Mechanical Drawings. As free areas differ slightly from manufacturer to manufacturer, coordinate, compare and confirm that sizes of louver provided meet the scheduled sizes on the Drawings.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store materials in a dry area indoors, protected from damage and in accordance with manufacturer's instructions.
- C. Handling: Protect materials and finishes during handling and installation to prevent damage.
- D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.06 COORDINATION

- A. Dimensions of the louvers in the louver scheduled indicated on the Drawings are based on the Basis-of-Design louver manufacturer and model. Due to varying louver sizes and free area percentages between different louver manufacturers, coordinate louver and wall rough opening sizes with the provided louver manufacturer's requirements.

1.07 WARRANTY

- A. Manufacturer shall provide standard limited warranty for louver systems for a period of five (5) from the date of Substantial Completion. When notified in writing from the Owner of a manufacturing defect, manufacturer shall promptly correct deficiencies without cost to the Owner.
- B. Manufacturer shall provide a 20-year limited warranty for 70% PVDF Fluoropolymer Metal Finishes on extruded aluminum and formed steel substrates.
 - 1. Manufacturer warrants the Finish under normal atmospheric conditions.
 - a. Will not crack, craze, flake or blister.
 - b. Will not change or fade more than (5) Delta-E Hunter units as determined by ASTM method D-2244.
 - c. Will not chalk in excess of ASTM D 4214 number (8) rating, determined by the procedure outlined in ASTM D 4214 specification test.
 - 2. Any forming or welding must be done prior to finishing. Post forming or welding will void the warranty.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Asbestos Prohibition: No asbestos containing materials or equipment shall be used in this section. The Contractor shall ensure that all materials and equipment incorporated in the project are asbestos-free.
- B. Extruded Aluminum: ASTM B 211, aluminum extrusions shall be of 6063-T5 alloy and temper. Fasteners, where exposed, shall be aluminum or stainless steel in accordance with ASTM A 164.
- C. Aluminum Sheet: ASTM B 3209, Alloy 1100, 3003 or 5005.
- D. Fasteners: Of same basic metal and alloy as fastened metal, unless otherwise indicated. Do not use metals which are corrosive or incompatible with materials joined.
 - 1. Use types, gages, and lengths to suit unit installation conditions.
 - 2. Use Phillips flat-head machine screws for exposed fasteners, unless otherwise indicated.
- E. Anchors and Inserts: Of type, size, and material required for type of loading and installation indicated. Use hardened aluminum or stainless-steel anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or expansion bolt devices for drilled-in-place anchors.
- F. Bituminous Paint: SSPC-Paint 12 (cold-applied asphalt mastic).

2.02 FABRICATION, GENERAL

- A. General: Fabricate louvers to comply with requirements indicated for design, dimensions, materials, joinery, and performance.
- B. Preassemble louvers in shop to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- C. Maintain equal louver blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.
- D. Fabricate frames, including integral sills, to fit in openings of size indicated with allowances made for fabrication and installation tolerances of louvers, adjoining construction, and perimeter sealant joints.
- E. Include supports, anchorages, and accessories required for complete assembly.
- F. Provide concealed vertical brace/mullion of type and at spacing indicated.
- G. Join frame members to one another and to fixed louver blades as follows, unless otherwise indicated, or size of louver assembly makes bolted connections between frame members necessary: With fillet welds, concealed from view; or mechanical fasteners; or a combination of these methods; as standard with louver manufacturer.

2.03 FIXED STORM-RESISTANT LOUVERS

- A. Manufacturers: Subject to compliance with requirements manufacturers offering product that may be incorporated into the Work include, but not limited to, the following:
 - 1. Airolite Company, LLC
 - 2. Construction Specialties, Inc.
 - 3. Industrial Louvers, Inc.
 - 4. Ruskin Company (Basis-of-Design)
 - 5. or approved equal
- B. Storm Resistant Horizontal Louver (5-inch Deep): Head to be one piece 0.094-inch-thick, sill, jambs and mullion to be 0.81-inch-thick structural aluminum members with integral caulking slot and retaining beads. Mullions shall be sliding interlock with integral drains. Blades to be one piece 0.081-inch-thick aluminum extrusions with front lip gutter and secondary gutters designed to catch and direct water to jamb and mullion downspouts. Equal to Ruskin. Model EME520DD (Basis-of-Design) or approved equal.
 - 1. Air Performance: Louver shall pass a maximum free area velocity of 1,361 fpm with less than 0.20-inch wg pressure drop.
 - a. Test criteria shall be based on a 48-inch square sample with a minimum free area of 6.99 square feet or 47%.
 - 2. Wind-Driven Rain Performance: Test criteria shall be based on a 39-inch square sample.
 - a. Not less than 99.7 percent effectiveness when subjected to a rainfall of 3 inches/hr. and a wind speed of 29 mph.
 - b. Not less than 99.0 percent effectiveness when subjected to a rainfall of 8 inches/hr. and a wind speed of 50 mph.
 - 3. Louver shall carry the AMCA Certified Ratings Seal for both water penetration and air performance.
 - 4. Wind-driven rain performance: Class A.

2.04 BIRD, INSECT SCREENS AND ACCESSORIES

- A. General: Provide each exterior wall louver with louver screens complying with the following requirements.
 - 1. Screen Location for Fixed Louvers: Interior face, unless otherwise indicated.
 - 2. Bird Screening: 0.063-inch aluminum wire, 1/2-inch mesh.
 - 3. Insect Screen: Aluminum, 18-16 mesh, mill finish, 0.011-inch wire
- B. Secure screens to louver frames with stainless steel machine screws, spaced at each corner and at 12 inches on center between.
- C. Louver Screen Frames: Fabricate screen frames with mitered corners to louver sizes indicated and to comply with the following requirements:

February 27, 2026

1. Metal: Same kind and form of metal as indicated for louver frames to which screens are attached.
 2. Finish: Same finish as louver frames to which louver screens are attached.
 3. Type: Rewireable frames with a driven spline or insert for securing screen mesh.
- D. Blank-Off Panels: 0.040-inch aluminum sheet aluminum skin, insulated core], factory installed with removable screws and neoprene gaskets

2.05 FINISH

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Surface to be finished shall be free from mechanical imperfections such as scratches, scrapes, dents and die marks. Pretreatment of the aluminum surface shall be completed in accordance with the procedures recommended by the manufacturer.
- C. Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.
- D. Repair to finished surface by mechanical means (other than those specified) or by painting is strictly forbidden unless the procedure is submitted and approved by Architect (including a sample area repair).
 1. Material may be finished more than once provided that all specified requirements are satisfied. However, if still not acceptable, it shall be rejected.
- E. Fluoropolymer Two-Coat Coating System: Manufacturer's standard two-coat, thermo-cured system composed of specially formulated inhibitive primer and Fluoropolymer color topcoat. Both color and clear topcoats containing not less than 70% polyvinylidene fluoride resin by weight; comply with AAMA 2605.
 1. Color: To be selected by Architect.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Coordinate setting drawings, diagrams, templates, instructions and directions for installation of anchorages which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

3.02 INSTALLATION

- A. Locate and place louver units plumb, level, and in proper 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.

February 27, 2026

- C. Form closely fitted joints with exposed connections accurately located and secured.
- D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated. Provide closed cell PVC compression gaskets between jambs and sill frame and surrounding construction.
- E. Repair finishes damaged by cutting, welding, soldering, and grinding operations required for fitting and jointing. Restore finishes so there is no evidence of corrective work. Return items which cannot be refinished in field to shop, make required alterations and refinish entire unit, or provide new units.
- F. Protect galvanized and nonferrous metal surfaces from corrosion or galvanic action by application of a heavy coating of bituminous paint on surfaces which will be in contact with concrete, masonry, or dissimilar metals.

3.03 ADJUSTING AND PROTECTION

- A. Protect louvers from damage of any kind during construction period including use of temporary protective coverings where needed and approved by louver manufacturer. Remove protective covering at time of Substantial Completion.
- B. Restore louvers damaged during installation and construction period, so that no evidence remains of correction work. If results of restoration are unsuccessful, as judged by the Architect, remove damaged units and replace with new units.

3.04 CLEANING

- A. Periodically clean exposed surfaces of louvers which 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 with a mild soap or detergent not harmful to finishes.

END OF SECTION

February 27, 2026

SECTION 10240 – ALUMINUM VISION BARRIER WALLS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Design, engineer, manufacture and installation of:
 - a. Fixed aluminum vision barrier wall fabricated from formed sheet metal blades attached to structural horizontal runners supported by structural steel posts specified in Section 5120 – STRUCTURAL STEEL.
 - b. Miscellaneous attachments, anchors, and fasteners as indicated on the drawings and required by system performance.
 - c. Applied finish of aluminum extrusions and sheet.

B. Related Sections include the following:

1. Section 05120 – STRUCTURAL STEEL
2. Section 05500 – METAL FABRICATIONS

1.02 REFERENCE STANDARDS

- A. In addition to referenced codes and standards within this specification, the work shall comply with the latest edition of the following standards. When conflicts arise between standards, the more stringent shall apply.
- B. AA – The Aluminum Association Incorporated
 1. Aluminum Standards and Data
 2. Specifications and Guidelines for Aluminum Structures
- C. AAMA – Architectural Aluminum Manufacturers Association
 1. AAMA 2605 – High Performance Organic Coatings on Architectural Extrusions and Panels.
- D. ASCE – American Society of Civil Engineers
 1. ASCE 7 – Minimum Design Loads for Buildings and Other Structures
- E. ASTM – American Society for Testing and Materials
 1. ASTM B209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 2. ASTM B211 - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire.
 3. ASTM B221 – Standard Specifications for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 4. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.

February 27, 2026

1.03 SUBMITTALS

- A. General: Submit under provisions of Section 01330 - SUBMITTAL PROCEDURES.
- B. Manufacturer's Data: Submit copies of manufacturer's product specifications and installation instructions along with shop drawings.
- C. Shop Drawings: Submit complete shop drawings of all aluminum vision barrier work to the Architect for review and approval before fabrication. Detail all members, connections, and anchorage not specifically shown but which are required to complete the work. Shop Drawings shall be stamped by the same engineer responsible for preparing the structural analysis. Include plans, elevations, sections, large scale details, materials and thicknesses, and anchorages. Show interface with adjacent construction and installation details.
- D. Structural Analysis: Submit structural calculations showing that the aluminum vision barrier meets the performance requirements set forth in this section. Calculation shall be stamped and signed by a practicing structural engineer licensed in the State of Hawaii.
- E. Samples: Submit 4 samples of high performance organic coated aluminum color and finish for factory finished screens.

1.04 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design aluminum vision barrier wall components, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. General: In engineering the aluminum vision barrier to withstand structural loads indicated, determine allowable design working stresses of screen materials based on the following:
 - 1. Aluminum: The lesser of minimum yield strength divided by 1.65 or minimum ultimate tensile strength divided by 1.95
- C. Structural Performance: Structural supports, frames, blades and anchorages shall be designed and furnished by screen manufacturer to withstand loads created by the following criteria:
 - 1. Wind Design Criteria: As indicated on the Structural Drawings.
 - 2. Seismic Design Criteria: As Indicated on the Structural Drawings.
 - 3. Maximum allowable deflection for the barrier structural members to be $L/180$ or 0.75 inch, whichever is less. Maximum allowable deflection for the louver blades to be $L/120$ or 0.50 inch across the weak axis, whichever is less.
- D. Thermal Movements: Provide aluminum vision barrier wall that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing 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): 50 degrees F, ambient; 120 degrees F, material surfaces.

February 27, 2026

1.05 QUALITY ASSURANCE

- A. Product Options: Information on Drawings and in Specifications establishes requirements for system's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including structural analysis, preconstruction testing, field testing, and in-service performance.
- B. Manufacturer Qualifications: A single company to assume undivided responsibility for engineering, fabrication, installation and total coordination of all components for each type of system. Provision of products from numerous sources for site assembly without complete single source design and supply responsibility is not acceptable. All systems may be the work of one firm subject to the compliance with the specified requirements.
 - 1. Company must demonstrate at least 10 years of successful experience in the fabrication and installation of the respective systems, of the types required for this project.
- C. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- D. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.
- E. Shop Assembly: Coordinate field measurements and shop drawings with fabrication and shop assembly to minimize field adjustments, mechanical attachment and field assembly of units. Pre-assemble units in ship to greatest extent possible and disassemble as necessary for shipping and handling limitations. Clearly mark units for reassemble and coordinated installation.

1.06 COORDINATION

- A. Coordinate design loads determined by the delegated design structural analysis with the design of the structural steel columns and concrete footings indicated on the structural drawings and specified in Section 05120 – STRUCTURAL STEEL and Section 03300 – CAST-IN-PLACE CONCRETE respectively.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly indicating manufacturer and material.
- B. Storage: Store materials in a dry area indoors, protected from damage and in accordance with manufacturer's instructions.
- C. Handling: Protect materials and finishes during handling and installation to prevent damage.

February 27, 2026

1.08 WARRANTY

- A. Materials Warranty: Provide the Manufacturers standard one (1) year warranty covering aluminum vision barrier materials from defects in workmanship and materials commencing from the date of Substantial Completion.
- B. Finish Warranty: Submit a written warranty, signed by manufacturer, covering failure of the factory-applied exterior finish within the specified warranty period and agreeing to repair finish or replace work that shows evidence of finish deterioration. Deterioration of finish includes, but shall not be limited to, color fade, chalking, cracking, peeling, and loss of film integrity.
 - 1. Warranty Period: Warranty period shall be 5 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Basis-of-Design Manufacturer
 - 1. Drawings and specification are based on Econoscreen RF-20 as manufactured by Construction Specialties, Inc.. Subject to compliance with the requirements and approval by the Architect; manufacturer's offering equivalent products that may be incorporated into the Work.

2.02 MATERIALS

- A. Aluminum, General: Provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with strength and durability properties for each aluminum form required not less than that of alloy and temper designated below.
- B. Extruded Aluminum: ASTM B 221, aluminum extrusions shall be of 6063-T5/T6 alloy and temper. Fasteners, where exposed, shall be aluminum or stainless steel in accordance with ASTM F593.
- C. Structural Aluminum: ASTM C 221, Alloy 6061, Temper T6.
- D. Aluminum Sheet: ASTM B 3209, Alloy 1100, 3003 or 5005.
- E. Blade Locks: Manufacturer's engineered plastic blade locks; V1 Grip Plastic Blade Locks
- F. Fasteners: Type 316 stainless steel in accordance with ASTM F593, unless otherwise indicated. Do not use metals which are corrosive or incompatible with materials joined.
 - 1. Use types, gages, and lengths to suit unit installation conditions.
 - 2. Use Phillips flat-head machine screws for exposed fasteners, unless otherwise indicated.
- G. Anchors and Inserts: Of type, size, and material required for type of loading and installation indicated. Use hardened stainless-steel anchors and inserts for

February 27, 2026

- exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or expansion bolt devices for drilled-in-place anchors.
- H. Bituminous Paint: SSPC-Paint 12 (cold-applied asphalt mastic).

2.03 FABRICATION, GENERAL

- A. General: Fabricate vision barriers to comply with requirements indicated for design, dimensions, materials, joinery, and performance.
- B. Maintain equal blade spacing, including separation between blades and frames at ends, to produce uniform appearance.
- C. Include supports, anchorages, and accessories required for complete assembly.
- D. Use materials of size and thickness shown but not less than what is required by the delegated structural analysis. Work to dimensions shown or accepted on shop drawings, using proven details of fabrication and support. Use type of materials shown or specified for various components of work.

2.04 ALUMINUM VISION BARRIER WALL

- A. Aluminum Vision Barrier Wall: Formed aluminum blades positioned vertically held in place and braced at each support post with screw fasteners.
 - 1. Blades: Formed blades from 5056-H19 alloy aluminum sheet minim 0.020-inch thick, position vertically and spaced 4-inches center to center.
 - 2. Blades to be secured to continuous extruded aluminum horizontal hat-runners with the use of engineered blade locks. One blade lock to be installed at the intersection of each blade with a hat runner. Hat-runners fixed directly to vertical steel posts as specified in Section 05120 – STRUCTURAL STEEL and detailed on the Drawings.
 - 3. All fasteners to be stainless steel. Material shipped KD (knocked down) for field assembly by the installer. Hat-runners to be mill finish. Blades to be finished on both sides.

2.05 FINISH

- A. All exposed aluminum surfaces shall be free of scratches and other blemishes. Pre-clean surfaces and provide a conversion coating and provide exposed surfaces of aluminum with a three coat fluoropolymer coating system containing at least 70 percent by weight polyvinylidene fluoride, PVF2 resin, factory-applied, oven baked conforming to AAMA 2605, "High Performance Organic Coatings on Architectural Aluminum Extrusions and Panels," with total dry film thickness of not less than 1.2 mils. Color as selected by the Architect.

February 27, 2026

PART 3 - EXECUTION

3.01 PREPARATION

- A. Coordinate setting drawings, diagrams, templates, instructions and directions for installation of anchorages which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.
- B. 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.
- C. The Contractors shall make all required measurements in the field to ensure proper and adequate fit of metal vision barrier wall blades.
- D. Examine the areas and conditions under which aluminum vision barrier walls will be installed and correct conditions detrimental to the proper and timely completion of the work. Examine steel columns to ensure their locations and that they are plumb. Do not proceed until unsatisfactory conditions have been corrected and approved by the Architect

3.02 INSTALLATION

- A. Locate and place vision barrier walls plumb, level, and in proper alignment with adjacent work.
- B. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing screens to in-place construction, which will develop anchorage meeting or exceeding all system performance requirements.
- C. Form closely fitted joints with exposed connections accurately located and secured.
- D. Cut and trim component parts during erection only with the approval of the manufacturer or fabricator, and in accordance with his recommendations. Restore finish completely. Remove and replace members where cutting and trimming has impaired the strength or appearance of the assembly.
- E. Do not erect warped, bowed, deformed, or otherwise damaged or defaced members. Remove and replace any members damaged in the erection process as directed.
- F. Repair finishes damaged by cutting, welding, soldering, and grinding operations required for fitting and jointing. Restore finishes so there is no evidence of corrective work. Return items which cannot be refinished in field to shop, make required alterations and refinish entire unit, or provide new units.
- G. Protect galvanized and nonferrous metal surfaces from corrosion or galvanic action by application of a heavy coating of bituminous paint on surfaces which will be in contact with concrete, masonry, or dissimilar metals.

3.03 ADJUSTING AND PROTECTION

- A. Protect screens from damage of any kind during construction period including use of temporary protective coverings where needed and approved by screen manufacturer. Remove protective covering at time of Project Acceptance.

February 27, 2026

- B. Restore screens damaged during installation and construction period, so that no evidence remains of correction work. If results of restoration are unsuccessful, as judged by the Architect, remove damaged units and replace with new units.

3.04 TOLERANCES

A. Erection Tolerances:

1. Maximum variation from plane or location shown on the approved shop drawings: 1/8" per 12 feet of length but not exceeding 1/2" in any total building length or portion thereof (non-cumulative).
2. Maximum offset from true alignment between two members abutting end to end, edge-to-edge in line or separated by less than 3": 1/16" (shop or field joints). This limiting condition shall prevail under both load and no-load condition.

3.05 Protection

- A. Protect the finishes of the aluminum construction from damage during construction period by use of temporary protective coverings approved by aluminum screen manufacturer. Remove protective covering at time of Substantial Completion.
- B. Restore finishes damaged during installation and construction period so that no evidence remains of correction work. Return items which cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units as required.

3.06 CLEANING

- A. Periodically clean exposed surfaces of screens which 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 with a mild soap or detergent not harmful to finishes.

END OF SECTION

SECTION 10265 – IMPACT-RESISTANT WALL PROTECTION

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes the following:
 - 1. Impact-resistant wall coverings.
 - 2. Corner Guards

1.02 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
- B. Testing Agency Qualifications: An independent agency qualified according to ASTM E 329 for testing indicated, as documented according to ASTM E 548.
- C. Source Limitations: Obtain impact-resistant wall-protection units through one source from a single manufacturer.
- D. Product Options: Drawings indicate size, profiles, and dimensional requirements of impact-resistant wallcovering and are based on the specific system indicated.
 - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- E. Fire-Test-Response Characteristics: Provide impact-resistant wallcovering with surface-burning characteristics as determined by testing identical products per ASTM E 84, NFPA 255, or UL 723 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

1.03 SUBMITTALS

- A. Submit under provisions of Section 01330 – SUBMITTAL PROCEDURES.
- B. Product Data: Include construction details, material descriptions, impact strength, fire-test-response characteristics, dimensions of individual components and profiles, and finishes for each type of impact-resistant wallcovering.
- C. Shop Drawings: For each impact-resistant wallcovering showing locations and extent. Include sections, details, and attachments to other work.
- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below. Include Samples of accent strips to verify color selected.
 - 1. Crash and Corner Guards: 12 inches long. Include examples of joinery, corners, end caps, top caps, and field splices.
 - 2. Impact-Resistant Wall Covering: 6 by 6 inches square

February 27, 2026

- E. Material Certificates: For each impact-resistant wallcovering, signed by manufacturer.
- F. Maintenance Data: For each impact-resistant wallcovering to include in maintenance manuals.
 - 1. Include recommended methods and frequency of maintenance for maintaining optimum condition of plastic covers under anticipated traffic and use conditions. Include precautions against using cleaning materials and methods that may be detrimental to plastic finishes and performance.
- G. Warranty: Special warranty specified in this Section.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Store impact-resistant wall-protection units in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.
 - 1. Maintain room temperature within storage area at not less than 50 deg F during the period plastic materials are stored.
 - 2. Keep plastic sheet material out of direct sunlight.
 - 3. Store plastic wall protection components for a minimum of 72 hours, or until plastic material attains a minimum room temperature of 70 deg F.
 - a. Store impact resistant wall covering flat. Do not stand rolls or sheet on end.

1.05 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install impact-resistant wallcovering until building is enclosed and weatherproof, wet work is complete and dry, and HVAC system is operating and maintaining temperature at 70 deg F (21 deg C) for not less than 72 hours before beginning installation and for the remainder of the construction period.
- B. Field Measurements: Verify actual locations of walls, columns, and other construction contiguous with impact-resistant wallcovering by field measurements before fabrication and indicate measurements on Shop Drawings.

1.06 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of impact-resistant wallcovering that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures.
 - b. Deterioration of plastic and other materials beyond normal use.
 - 2. Warranty Period: Five years from date of Substantial Completion.

February 27, 2026

1.07 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Corner-Guard Covers: Full-size plastic covers of maximum length equal to two of each type, color, and texture of units installed.
- B. Include mounting and accessory components. Replacement materials shall be from same production run as installed units

PART 2 - PRODUCTS

2.01 IMPACT-RESISTANT WALL COVERINGS

- A. Impact-Resistant Wall Covering (**WPP**-): Fabricated from plastic sheet wall-covering material having the following characteristics:
 - 1. Impact Strength: Minimum 18 ft-lbf/in. of notch when tested according to ASTM D 256, Test Method A.
 - 2. Impact Resistance: Minimum 6.5 in-lbs/mil when tested according to ASTM D 5420.
 - 3. Fire Resistance Classification: Class A when tested in accordance with ASTM E 84:
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less
- B. Basis-of-Design Products:
 - 1. **WPP-01 & WPP-02**: Subject to compliance with requirements, provide P3Tec Advanced Wall Protection or approved equal.
 - a. Size: 48 inches wide.
 - b. Sheet Thickness: 0.030-inch
 - c. Color and Texture: As Scheduled
 - d. Height: Wainscot as indicated on the Drawings.
 - e. Mounting: Adhesive.
 - 2. **WPP-03**: Subject to compliance with requirements, provide Koroseal Korogard, 500-series Impact Resistant Wall Coverings or approved equal.
 - a. Size: 48 inches wide.
 - b. Sheet Thickness: 0.040-inch
 - c. Color and Texture: As Scheduled
 - d. Height: As indicated on the Drawings.
 - e. Mounting: Adhesive.
- C. Accessories

February 27, 2026

1. Adhesive: Adhesive shall be solvent free with zero VOC content, low odor, no ammonia and non-flammable in wet state.
 - a. Hi-Stik Advantage adhesive.
2. Trims and Moldings: Manufacturer's standard for specified sheet gauge. Color Matched Aluminum Trim.

2.02 CORNER GUARDS

- A. Basis-of-Design Product (**CG-01**): Subject to compliance with requirements, provide Inpro Architectural Products; "160BN BluNose Surface Mount Corner Guard" or approved equal.
- B. Materials:
 1. Vinyl Covers: Snap on cover of .080" (2mm) thickness shall be made from chemical and stain-resistant unplasticized polyvinyl chloride (uPVC) with the addition of impact modifiers. No plasticizers shall be added (plasticizers may aid in bacterial growth).
 - a. Impact Resistance: Minimum 25.4 ft-lbf/in. of notch when tested according to ASTM D 256, Test Method A.
 - b. Chemical and Stain Resistance: Tested according to ASTM D 543.
 - c. Self-extinguishing when tested according to ASTM D 635 CC1 classification.
 - d. Flame-Spread Index: 25 or less.
 - e. Smoke-Developed Index: 450 or less.
 2. Vinyl Retainers: Continuous vinyl retainers of .070" (1.8mm) thickness with a Biopolymer Flex PVC apex shall be fabricated from polyvinyl chloride with the addition of impact modifiers.
 3. Components:
 - a. Top caps and bottom caps shall be made of injection molded thermoplastics.
 - b. Fasteners: All mounting system accessories appropriate for substrates indicated on the drawings shall be provided.
 4. Finishes:
 - a. Vinyl Covers: Colors of the corner guard to be selected by the architect from the IPC finish selection. Surface shall have a pebblette texture.
 - b. Molded Components: Top caps and bottom caps shall be of a color matching the corner guards. Surface shall have a pebblette texture.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances, fire rating, and other conditions affecting performance of work.
 - 1. Ensure the wall surface is free from dirt, grease, loose paint, and scale.
 - 2. For impact-resistant wallcovering attached with adhesive, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - a. Measure moisture content of surfaces using an electronic moisture meter. Apply coatings only to surfaces with moisture content equal to or less than the following:
 - 1) Plaster and gypsum board: 4%
 - 2) Masonry, cement plaster, concrete and concrete block: 4%
 - 3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Remove rough spots by sanding smooth walls. On concrete substrates remove high spots using a mason's stone. Sand high-gloss surfaces to ensure proper adhesion.
- B. Fill low spots on concrete wall with a trowelable Portland cement based patching compound approved by wall protection system manufacturer for applications indicated.
- C. For surfaces receiving impact resistant wallcoverings apply an acrylic primer as specified in Section 09900 – PAINTING.
- D. Complete finishing operations, including painting, before installing impact-resistant wall-protection system components.
- E. Before installation, clean substrate to remove dust, debris, and loose particles.

3.03 INSTALLATION

- A. General: Install impact-resistant wall-protection units level, plumb, and true to line without distortions in accordance with manufacturer's written instructions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work,
 - 1. Install impact-resistant wall-protection units in locations and at mounting heights indicated on Drawings.
 - 2. Provide splices, mounting hardware, anchors, and other accessories required for a complete installation.
 - a. Provide anchoring devices to withstand imposed loads.

February 27, 2026

- b. Where splices occur in horizontal runs of more than 20 feet (6.1 m), splice aluminum retainers and plastic covers at different locations along the run, but no closer than 12 inches (305 mm).
 - c. Adjust end caps as required to ensure tight seams
 - B. Install impact-resistance wallcovering to walls in accordance with the manufacturer's written instructions.
 - 1. Install impact-resistant wallcovering in locations and at mounting heights indicated on Drawings.
 - 2. Prior to installation, wallcovering, adhesive and accessories must be preconditioned for a minimum of 24 hours at the temperature between 65 F and 85 F.
 - 3. Follow adhesive manufacturer's instruction for applying adhesive.
 - 4. Install sheets with texture running in the same direction for uniform appearance.
 - 5. Install top and edge moldings, corners, and divider bars as required for a complete installation.
 - C. Corner Guard:
 - 1. Retainer Installation
 - a. Position the vinyl retainer against the wall, allowing 5/16-inch from the bottom of the retainer to the top of the cove base or baseboard for the bottom cap.
 - b. Drywall: Secure the retainer to the wall using #8 x 1-1/4" Phillips round head, self-tapping screws. Stagger the fasteners on each wing of the retainer. Use 6 screws per 4' (1.22m) length, 10 screws per 8' (2.44m) length, or 12 screws per 9' (2.74m) length.
 - 2. Top and Bottom Cap Installation:
 - a. Drywall: Overlap the retainer with the mounting tabs of the top and bottom caps and attach them to the retainer using two, #8 x 1-1/4" Phillips flat head, self-tapping screws per cap. Stagger the fasteners on each wing of the cap.

3.04 CLEANING

- A. Immediately after completion of installation, clean wallcovering and accessories using warm soapy water.
- B. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

END OF SECTION

SECTION 10515 – PLASTIC LAMINATE LOCKERS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes

1. Work Includes: Furnish all labor, materials, tools and equipment necessary to install all plastic laminate lockers and miscellaneous related work as called for or required by the drawings and as specified herein.

B. Related sections

1. Section 01361 – SUSTAINABLE DESIGN REQUIREMENTS LEED
2. Section 06100 - ROUGH CARPENTRY: Wood sleepers and blocking.
3. Section 09250 - GYPSUM BOARD ASSEMBLIES.

1.02 SUBMITTALS

A. Product Submittals: Follow Section 01330 – SUBMITTAL PROCEDURES.

1. Shop Drawings: Verify dimensions affecting locker installations. Show details of fabrication, method of installation, fillers, trim, base and accessories. Include locker numbering sequence information.
2. Product data.
3. Finish samples: Submit three 6-inch square finish samples of plastic laminate specified for lockers.
4. Manufacturer's installation instructions.

B. Sustainable Design Submittals:

1. LEED Credit IEQc2 Low-Emitting Materials
 - a. Provide a list and product data sheets for the adhesives and sealants used products used on the project, to include the manufacturer's name specific VOC data for each product (in g/L), and the corresponding allowable VOC limit from the referenced standard.
 - b. Provide a list of and product data sheets for each composite wood and agrifiber products installed in the building interior, to include documentation that each product does not contain any urea-formaldehyde. This credit will apply to wood doors, interior plywood and casework.

1.03 PERFORMANCE REQUIREMENTS

- A. Flame Spread: When tested in accordance with ASTM E84-07, locker materials shall meet or exceed all requirements for Class B Flame Spread Rating and Smoke Developed and shall carry a Class B Fire Rating Certification in

February 27, 2026

accordance with the requirements of NFPA and ICC. Class B Fire Rating Certification shall be in the name of the Locker Manufacturer and shall be less than six (6) months old.

1. Flame Spread: Not more than 75
2. Smoked Developed: Not more than 450.

1.04 QUALITY ASSURANCE

- A. Perform work in accordance with AWI (Architectural Woodwork Institute) Architectural Woodwork Quality Standards Illustrated or Woodwork Institute (WIC) Manual of Millwork.
 1. Grade: Custom
- B. Uniformity: Provide each type of locker produced by a single manufacturer, including necessary mounting accessories, fittings and fastenings.
- C. Use only an installer approved by manufacturer.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Do not deliver wood lockers until building is enclosed and ready for locker installation.
- B. Store lockers in a dry well-ventilated area and protect all finishes from moisture, soiling and damage during handling.

1.06 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.
- B. During and after installation, maintain same temperature and humidity conditions in building spaces as will occur after occupancy.
- C. Protect locker finish and adjacent surfaces from damage.

1.07 ACCESSIBILITY

- A. Accessible lockers shall conform by design or custom modification to the requirements of the 2010 ADA Standards for Accessible Design Sections 308 and 803.

1.08 WARRANTY

- A. Locker manufacturer must warrant the new lockers for a period of 3 years from date of shipment for all defects in material and workmanship.
 1. The Surety shall not be liable beyond 2 years of Project Acceptance.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Basis-of-Design Product: Ideal Products, Inc.; Ideal 1000 Series Model B or a comparable product of one of the following:
 - 1. Hollman Inc.
 - 2. Salsbury Industries
 - 3. or Approved Equal
- B. Configuration: Lockers shall be two-tier in sizes and at locations as shown on the drawings. Contractor shall verify quantity, sizes, and location of lockers

2.02 MATERIALS

- A. Shell: Fabricate from 5/8-inch fire retardant, 48 lb. industrial grade particle board core ANSI A208.1, Grade M-2 with 6 mil low pressure laminated vinyl or thermally fused melamine on both sides. Laminate colors to be selected from manufacturer's complete list of standard colors by Architect.
- B. Exposed shell edges to be finished with self-edging 1 mm polyvinyl chloride match locker plastic laminate.
- C. Shelving: Fabricated from 3/4-inch fire retardant, 48 lb industrial grade particle board core; grade M-2 with thermally fused melamine finish.
- D. Back Panel: 1/4-inch 48 lb. medium density fiberboard with 6 mil low pressure laminated vinyl, ventilated.
- E. Doors to be fabricated from 3/4-inch fire retardant, 48 lb. industrial grade particle board core ANSI A208.1, Grade M-2 with high pressure plastic laminate, VGS-GP28, class II-B fire retardant.
 - 1. Color: Formica, Winter Sky 8792-58.
- F. End panels sloped top and filler panels to be fabricated from 3/4-inch fire retardant, 48 lb. industrial grade particle board core ANSI A208.1, Grade M-2 with high pressure plastic laminate, VGS-GP28, class II-B fire retardant.
 - 1. Color: Formica, Winter Sky 8792-58.
- G. Accessories
 - 1. Lock Systems: Recessed padlock hasp.
 - 2. Fittings: Furnish each locker with the following:
 - a. Two-tier units: 1 double-prong ceiling mounted and hat self.
 - 3. Number plates: Manufacturer's standard etched, embossed or stamped, non-ferrous metal number plates with numerals not less than 1/4" high. Number lockers in sequence as directed by Architect. Attach plates to each locker door, near top, routed flush with surface.
 - 4. Hinges: Manufacturer's standard exposed five knuckle hinges, 180-degree opening.

2.03 FABRICATION

- A. Fabricate lockers square, rigid, and without warp, with finished faces flat and free of scratches and chips, using manufacturer's standard method of fabrication.
- B. Machine attachment holes accurately and free of chips. Attach fasteners standard with manufacturer.
- C. Fabricate corners and fillers as required for installation.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine the surfaces and conditions under which work of this section will be performed. Do not proceed until unsatisfactory conditions detrimental to timely and proper completion of the work have been corrected.

3.02 PREPARATION

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, when possible, to ensure proper fitting. Allow for adjustment and fitting of trim and filler panels when field measurements before fabrication might delay work.

3.03 INSTALLATION

- A. General: Install lockers accurately at locations shown in accordance with manufacturer's instructions for plumb, level, rigid, and flush installation.
- B. Install manufactured supplied prefabricated base to floor at the locations indicated on the approved shop drawings taken care to ensure and stable and level base. Scribe exposed toe kicks to the floor for a clean, tight joint.
- C. Anchor lockers to prefabricated bases as supplied by the manufacturer allowing for a 2-inch toe kick. Join lockers together with T-nuts and hex head screws through factory drilled holes.
- D. Anchor lockers every 4 feet to furring or wall studs thru locker back using brass finished #8 fasteners and factory supplied straps.
- E. Install end and corner filler panels and caps, cut to size in the field at locations indicated on approved shop drawings. Install end panels, finished tops and number plates.

3.04 ADJUST AND CLEAN

- A. Adjust doors and latches to operate easily without binding. Verify that integral locking devices are operating properly.
- B. Touch-up marred finishes but replace units which cannot be restored to factory-finished appearance, before Project Acceptance. Use only materials and procedures recommended or furnished by locker manufacturer.

February 27, 2026

- C. Upon completion of the work, clean lockers, remove surplus materials rubbish and debris resulting from the operations of this section.

END OF SECTION

SECTION 10520 - FIRE EXTINGUISHERS AND CABINETS

PART 1 - GENERAL

1.01 SUMMARY

- A. Work Includes: Provide all fire extinguishers and fire extinguisher cabinets as shown on the drawings.
 - 1. Fire extinguishers.
 - 2. Ligature-Resistant Fire extinguisher cabinets.

1.02 QUALITY ASSURANCE

- A. Single-Source Responsibility: Obtain extinguishers and cabinets from one source from a single manufacturer.
- B. Coordination: Verify that cabinets are sized to accommodate type and capacity of extinguishers indicated.
- C. Fire-Rated, Fire Extinguisher Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.
- D. UL-Listed Products: Fire extinguishers shall be UL listed with UL listing mark for type, rating, and classification of extinguishers.
- E. Except as indicated otherwise, conform to NFPA 10 requirements for location and type portable fire extinguishers.

1.03 SUBMITTALS

- A. Submit in accordance with Section 01330 – SUBMITTAL PROCEDURES.
 - 1. Manufacturer's Data: Submit manufacturer's descriptive literature and specifications. For fire extinguisher cabinets include rough-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type and materials, trim style, door construction, panel style, and materials.
 - 2. Certificates of Compliances: Fire extinguishers shall bear the UL label. In lieu of such label, a written certificate from a Nationally recognized testing agency adequately equipped and competent to perform such services may be submitted stating that the items have been tested and that the units conform to the requirements specified herein, including methods of testing of the specified agencies.
 - 3. Samples: Submit samples of metal finishes for fire extinguisher cabinets.

1.04 DELIVERY AND STORAGE

- A. Materials delivered to the site shall be inspected for damage, unloaded and stored with a minimum of handling. The storage spaces shall be dry locations with adequate ventilation, free from dust or water, and shall permit easy access for inspection and handling.

February 27, 2026

1.05 COORDINATION

- A. Coordinate type and capacity of fire extinguishers with fire protection cabinets to ensure fit and function.

1.06 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Failure of hydrostatic test according to NFPA 10
 - b. Faulty operation of valves or release levers
 - 2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 FIRE EXTINGUISHER

- A. Manufacturers: Provide fire extinguishers as manufactured by one of the following manufacturers:
 - 1. Larsen's Manufacturing Co.
 - 2. Whitehall Manufacturing (Basis-of-Design)
 - 3. or Approved equal
- B. Multi-purpose, dry chemical type, UL rated, 2A:10B:C, nominal 5 lb capacity, in red polyester coated steel container; Larsen Manufacturing Co. Model MP5 or approved equal, for Class A, B, and C fires.
- C. Provide with standard wall bracket where indicated for surface mounting.

2.02 FIRE EXTINGUISHER CABINETS

- A. General: Provide fire extinguisher cabinets where indicated, of suitable size for housing fire extinguishers of types and capacities indicated.
- B. Construction: Manufacturer's standard powder-coated steel box, with trim, door and hardware to suit cabinet type, trim style, and door style indicated. Weld all joints and grind smooth. Miter and weld perimeter door frames.
- C. Manufacturers: Provide fire extinguisher cabinets and brackets as manufactured by the following
 - 1. Whitehall Manufacturing (Basis-of-Design)
 - 2. Larsen's Manufacturing Co.
 - 3. or approved equal.
- D. Cabinet Types: Suitable for mounting conditions indicated, of the following type:
 - 1. Non- Rated Extinguisher Cabinets: Recessed, Whitehall Manufacturing., Ligature-Resistant Fire Extinguisher Cabinet, Model WH1704-A

February 27, 2026

- a. 20 gauge cold-rolled steel sheet box.
 - b. Door: Steel, Solid.
 - i. Provide manufacturers locking/latching device that allows emergency access to the cabinet.
 - c. Entire Cabinet Finish: Electrostatically-applied, thermally-fused re-coatable polyester powder coating.
 - i. Color: White.
2. Fire- Rated Extinguisher Cabinets: Recessed Whitehall Manufacturing, Ligature-Resistant Fire Extinguisher Cabinet, Model – WH1704-FR
- a. Construct fire-rated cabinets with double walls fabricated from 20 gauge cold-rolled steel sheet fire box and 20 gauge cold-rolled steel sheet inner box with minimum 5/8-inch-thick, fire-barrier material sandwiched between with 20 gauge steel trim and door.
 - b. Door: Solid
 - i. Provide manufacturers locking/latching device that allows emergency access to the cabinet.
 - c. Entire Cabinet Finish: Electrostatically-applied, thermally-fused re-coatable polyester powder coating.
 - i. Color: White.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine rough-in cabinets to verify locations prior to cabinet installation.
- B. Examine walls and partitions for thickness and framing for cabinets to verify cabinet depth and mounting prior to cabinet installation.
- C. Do not proceed until satisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Install fire extinguisher in each location noted on drawings for fire extinguisher (FE) and fire extinguisher cabinet (FEC-R) for recessed and (FEC-S) for surface mounted.
- B. Install units securely in place in accordance with manufacturer's recommended installation procedures.
- C. Install in indicated locations and mounting heights unless otherwise required to comply with applicable regulations of governing authorities. Extinguishers and cabinets in walks, halls, corridors, passageways, or aisles shall not protrude more than 4-inches in conformance with ADA Standards Section 307.2.
- D. Wipe all surfaces clean and free of soil, fingerprints, etc. after installation.

February 27, 2026

3.03 SCHEDULE

- A. Extinguisher Cabinets: At all locations indicated on the Drawings.
- B. Bracket Mounted: At electric & mechanical rooms, and facility support rooms.

END OF SECTION

SECTION 10800 - TOILET ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

- A. Work Includes: The extent of each type of toilet accessory is shown on the drawings and herein specified.
- B. Related Work Described Elsewhere:
 - 1. Section 06100 - ROUGH CARPENTRY: Blocking.

1.02 QUALITY ASSURANCE

- A. Inserts and Anchorages: Furnish inserts and anchoring devices for toilet accessories. Provide setting drawings, templates, instructions and directions for installation of anchorage devices. Coordinate delivery with other work to avoid delay.
- B. The structural strength of all grab bars, shower seats and all fasteners and mounting devices shall meet or exceed the accessibility requirements of the 2010 ADA Standards for Accessible Design Section 609.8
- C. Products:
 - 1. Provide products of the same manufacturer for each type of accessory unit and for units exposed in the same areas, wherever possible.
 - 2. Coordinate with the Architect for acceptable designs and finishes.
 - 3. Stamped names of labels on exposed faces of units will not be permitted, except where otherwise specified.
 - 4. Provide locks where specified or standard with the manufacturer. One key shall fit all locks of one brand. Provide a minimum of 6 keys.
- D. Accessibility: Mount accessories for accessible toilets in accordance with the 2010 ADA Standards for Accessible Design Sections 308.2.1, 609, 604.9.6, 603.3, 604.5, 604.9.5 where either in an accessible stall or accessible by all.
- E. Drawings may be general in nature. Accessories shown for one stall or room shall be repeated in similar stalls or rooms unless noted otherwise.

1.03 SUBMITTALS

- A. Submit in accordance with Section 01330 - SUBMITTALS.
 - 1. Manufacturer's Data: For information only, submit copies of manufacturer's specifications and installation instructions for each toilet accessory.
 - 2. Schedule: Submit a schedule listing types, quantities, and installation locations by room for each toilet accessory to be provided.
 - 3. Samples: When requested, submit full-size samples of units to Architect for review of finishes. Acceptable samples will be returned and may be used in the work. Compliance with all other requirements is the exclusive responsibility of the Contractor.

February 27, 2026

1.04 DELIVERY, STORAGE AND HANDLING

- A. Toilet accessories shall be wrapped for shipment and storage, delivered to the jobsite in manufacturer's original packaging and stored in a clean, dry area protected from construction damage and vandalism.

1.05 WARRANTY

- A. Warranty: Submit a written warranty executed by mirror manufacturer, agreeing to replace any mirrors that develop visible silver spoilage defects within warranty period.
- B. Warranty Period: 15 years from date of Substantial Completion.
- C. The warranty shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Stainless Steel: ASTM A 666 AISI, Type 304. Provide satin finish, in 0.0312-inch minimum nominal thickness, unless otherwise specified.
- B. Galvanized Steel Sheet: ASTM A 653/A 653M, G60.
- C. Fasteners: Screws, bolts and other devices of same material as accessory unit, tamper and theft resistant when exposed, and of galvanized steel when concealed.
- D. Galvanized Steel Mounting Devices: Hot-dip galvanized after fabrication ASTM A A 153/A 153M.

2.02 MANUFACTURERS

- A. Product manufacturers as scheduled in the Drawings are basis-of-design manufacturers. Subject to compliance with the requirements manufacturers offering comparable products will be considered.

2.03 LIST OF TOILET ACCESSORIES

- A. As scheduled on the drawings.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Installer must examine the areas and conditions under which toilet accessories are to be installed. 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.

February 27, 2026

- B. Determine that all blocking and concealed backer plates have been installed to allow mounting of accessories.

3.02 INSTALLATION

- A. Use concealed fastenings wherever possible.
- B. Provide anchors, bolts, backer plates, and other necessary fasteners, and attach accessories securely to walls and partitions in locations as shown or directed.
- C. Install concealed mounting devices and fasteners fabricated of the same material as the accessories or of galvanized steel.
- D. Install exposed mounting devices and fasteners finished to match the accessories.
- E. Provide theft-resistant stainless steel fasteners for all accessory mountings.
- F. Secure toilet room accessories to adjacent walls and partitions complying with the manufacturer's instructions for each item and each type of substrate construction.
- G. Where accessories transition uneven substrates such as between ceramic tile wainscot and wall surface above, provide finish wood spacers to completely fill all voids. Finish to match wall surface or as directed.
- H. Provide solid backing for all accessories.

3.03 CLEAN UP

- A. Clean exposed surfaces as recommended by the manufacturer and restore damaged work to its original condition or replace with new.

END OF SECTION

February 27, 2026

SECTION 12485 – RECESSED WALK-OFF MAT

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes recessed walk-off mat and frames.
- B. Related Sections include the following:
 - 1. Section 03300 - CAST-IN-PLACE CONCRETE

1.02 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide walk-off mat and frames capable of withstanding the following loads and stresses:
 - 1. Uniform floor load of 300 lbf/sq. ft.
 - 2. Wheel load of 350 lb per wheel, ASTM F2753.
- B. Flammability in accordance with ASTM E648, Class 1, Critical Radiant Flux, minimum 0.45 watts/m2.
- C. Slip resistance in accordance with ASTM D-2047-96, Coefficient of Friction, minimum 0.60 for accessible routes.

1.03 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for walk-off mats and frames.
- B. Shop Drawings: In sufficient detail showing layout of mat and frame specified including details indicating construction relative to materials, direction of traffic, spline locations, profiles, anchors and accessories. Include the following:
 - 1. Divisions between rail sections.
 - 2. Perimeter floor moldings.
- C. Samples for Verification: For each type of product indicated.
 - 1. Walk-Off Mat: 12-inch square assembled sections.
 - 2. Frame Members: 12-inch-long Sample of each type and color.
- D. Maintenance Data: For walk-off mats and frames to include in maintenance manuals.

1.04 QUALITY ASSURANCE

- A. Source Limitations: Obtain walk-off mats and frames through one source from a single manufacturer.
- B. Accessibility Requirements: Provide installed walk-off mats that comply with Section 404.2.4.4 in the 2010 ADA Standards for Accessible Design.

1.05 PROJECT CONDITIONS

- A. Field Measurements: Check actual openings for mats by accurate field measurements before fabrication. Record actual measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay of work.
- B. Recessed Conditions: Coordination with Section 03300 – CAST-IN-PLACE CONCRETE is required. For proper installation, the concrete recess must be flat and smooth throughout. If the recess is formed by a concrete contractor, the pour dimensions may require leveling grout to achieve the proper depth and a smooth finish. The final recess depth will match the specified product and must be field verified. For proper frame installation, the side walls of the concrete recess must also be straight and smooth. Inconsistencies with the recess and side walls must be remediated prior to product installation.
 - 1. The depths and sizes specified are based on the Basis-of-Design product only. These dimensions can vary depending on the manufacturer and their comparable product. Coordinate size and location of recesses in concrete to receive entrance mat and frames with the actual product being provided.

1.06 WARRANTY

- A. Walk-off mats and frames shall be fabricated free of defects in materials and workmanship in accordance with the General Conditions, and the manufacturer shall offer a 10-year warranty against defects in materials and workmanship commencing from the date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide American Floor Mats, 7/16" Recessed Grille Mats QuietStep or a comparable product by one of the following:
 - 1. Babcock-Davis
 - 2. Balco, Inc.
 - 3. Construction Specialties
 - 4. J. L. Industries, Inc.
 - 5. Or approved equal.

2.02 MATERIALS

- A. Asbestos Prohibition: No asbestos containing materials or equipment shall be used in this section. The Contractor shall ensure that all materials and equipment incorporated in the project are asbestos-free.
- B. Extruded Aluminum: ASTM B 221, Alloy 6061-T6 or Alloy 6063-T5, T6, or T52 as standard with manufacturer.

2.03 WALK-OFF MATS

- A. Roll-up, Aluminum-Rail Hinged Mats: Extruded aluminum tread rails 2-inches wide by 7/16-inch-thick, with extruded soft-durometer vinyl hinges.
 - 1. Tread Rail Spacing: 2 inches o.c. with 3/16-inch-wide openings between treads.
 - 2. Aluminum Finish: Clear Anodized.
 - 3. Tread Insert: Carpet insert meeting CRI standard for good indoor air quality. Fibers shall include a minimum of 100, 10 mil monofilament fibers per square inch. Each carpet fiber and monofilament shall be fusion-bonded to a rigid two-ply backing to prevent fraying and supplied in continuous splice-free lengths. Anti-static carpet fibers shall contain antimicrobial additive and be treated with Scotchgard® to reduce soiling. Carpet weight shall be 33-oz./yd².
 - a. Colors: As selected by the Architect from the manufacture's full range.
- B. Mat Size: As indicated on the Drawings.

2.04 FRAMES

- A. Recessed Base Frame: Mechanically fastened, 3/4-inch-deep recessed frame fabricated from extruded 6063-T5 aluminum alloy with 1/4-inch-wide exposed surface. Black EPDM trim fillers shall be furnished as required when standard 2-inch tread spacing cannot be maintained.
 - 1. Color: Clear Anodized

2.05 CONCRETE FILL AND GROUT MATERIALS

- A. Provide concrete grout and fill equivalent in strength to cast-in-place concrete slabs for recessed mats and frames. Use aggregate no larger than one-third fill thickness.

2.06 FABRICATION

- A. Walk-off Mats: Shop fabricate units to greatest extent possible in sizes indicated. Unless otherwise indicated, provide single unit for each mat installation; do not exceed manufacturer's recommended maximum sizes for units that are removed for maintenance and cleaning. Where joints in mats are necessary, space symmetrically and away from normal traffic lanes. Miter corner joints in framing elements with hairline joints or provide prefabricated corner units without joints.
- B. Recessed Frames: As indicated, for permanent recessed installation, complete with corner pins or reinforcement and anchorage devices.
 - 1. Fabricate edge-frame members in single lengths or, where frame dimensions exceed maximum available lengths, provide minimum number of pieces possible, with hairline joints equally spaced and pieces spliced together by straight connecting pins.
- C. Coat surface of frame in contact with cementitious materials with manufacturer's standard protective coating.

February 27, 2026

2.07 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

2.08 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Products must be placed on a flat and level substrate. Substrate shall meet tolerance of 1/8-inch over 10-feet in accordance with ACI 302
- B. Examine substrates and floor conditions for compliance with requirements for location, size, minimum recess depth, and other conditions affecting installation of door mats and frames.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Install recessed mat frames to comply with manufacturer's written instructions. Set mat tops at height recommended by manufacturer for most effective cleaning action; coordinate top of mat surfaces with bottom of doors that swing across mats to provide clearance between door and mat.
 - 1. Install necessary shims, spacers, and anchorages for proper location and secure attachment of frames.
 - 2. Install grout and fill around frames and, if required to set mat tops at proper elevations, in recesses under mats. Finish grout and fill smooth and level.

3.03 PROTECTION

- A. After completing frame installations, provide temporary filler of plywood or fiberboard in foot-grille recesses and cover frames with plywood protective flooring. Maintain protection until construction traffic has ended and Project is near Substantial Completion.
- B. Install product when no further wheeled construction traffic will occur and wet type operations including painting and decorating are complete.

February 27, 2026

END OF SECTION

SECTION 12494 – ROLLER SHADES

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes manually operated roller shades with single roller.
- B. Related Sections include the following:
 - 1. Section 06100 – ROUGH CARPENTRY
 - 2. Section 08520 – GLAZED ALUMINUM SYSTEMS
 - 3. Section 09250 – GYPSUM BOARD ASSEMBLIES

1.02 SUBMITTALS

- A. Product Data: For each type of product indicated. Include styles, material descriptions, construction details, dimensions of individual components and profiles, features, finishes, and operating instructions.
- B. Shop Drawings: Show location and extent of roller shades. Include elevations, sections, details, and dimensions not shown in Product Data. Show installation details, mountings, attachments to other work, operational clearances, and relationship to adjoining work.
- C. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
 - 1. Ceiling suspension system members and attachment to building structure.
 - 2. Ceiling-mounted or penetrating items including light fixtures, air outlets and inlets, speakers, sprinklers, recessed shades, and special moldings at walls, column penetrations, and other junctures of acoustical ceilings with adjoining construction.
 - 3. Shade mounting assembly and attachment.
 - 4. Size and location of access to shade operator, motor, and adjustable components.
- D. Samples for Verification:
 - 1. Complete, full-size operating unit not less than 16 inches wide for each type of roller shade indicated.
 - 2. For the following products:
 - a. Shade Material: Not less than 3 inches square, with specified treatments applied. Mark face of material.
- E. Product Certificates: For each type of roller shade, signed by product manufacturer.
- F. Qualification Data: For Installer.
- G. Product Test Reports: For each type of roller shade.

February 27, 2026

- H. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for each type of roller shade.
- I. Maintenance Data: For roller shades to include in maintenance manuals. Include the following:
 - 1. Methods for maintaining roller shades and finishes.
 - 2. Precautions about cleaning materials and methods that could be detrimental to fabrics, finishes, and performance.
 - 3. Operating hardware.

1.03 QUALITY ASSURANCE

- A. Installer Qualifications: Installer shall be approved by manufacturer and shall have 5 years minimum experience of successful installations of specified products in projects of similar size and scope
- B. Source Limitations: Obtain roller shades through one source from a single manufacturer.
- C. Fire-Test-Response Characteristics: Provide roller shade band materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
 - 1. Flame-Resistance Ratings: Passes NFPA 701.
- D. Product Standard: Provide roller shades complying with WCMA A 100.1.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver shades in factory packages, marked with manufacturer and product name, fire-test-response characteristics, lead-free designation and location of installation using same designations indicated on Drawings.
- B. Store materials in a dry, secure place. Protect from weather, surface contaminants, corrosion, construction traffic and all other potential damage.

1.05 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install roller shades until construction and wet and dirty finish work in spaces, including painting, is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operable glazed units' operation hardware throughout the entire operating range. Notify Architect of discrepancies. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

February 27, 2026

1.06 EXTRA MATERIALS

- A. The manufacturer shall make available to the Owner a method of ordering new equipment for replacement or parts to be used as spares.
- B. The manufacturer shall make available new or remanufactured parts for a minimum period of ten years from the date of Substantial Completion.

PART 2 - PRODUCTS

2.01 ROLLER SHADES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide
 - 1. Manual Single Roll Shade System: Mecho/5 by MechoShade Systems, Inc; Wide Bracket with fascia.
- B. Sheer Shade (**WT-1**): EcoVeil1750
 - 1. Fabric Width: 126-inches.
 - 2. Fabric Thickness: 0.0358-inches
 - 3. Type and Color: 100% Thermoplastic Olefin shade cloth. Color as scheduled.
 - 4. Material Properties:
 - a. Openness Factor – 1%,
 - 5. Bottom Hem: Straight
 - 6. Anti-Microbial Characteristics: Shade cloth shall conform to requirements for 'No Growth' in accordance with ASTM G 21 results for fungi, using fungus samples ATCC 9642, 9644, and 9645.
- C. Rollers: Extruded-aluminum tube of diameter and wall thickness required to support and fit internal components of operating system and the weight and width of shade band material without sagging; designed to be easily removable from support brackets; with double-sided adhesive strip for attaching shade material. Provide a minimum one turn of fabric on roller before the working section of fabric starts.
- D. Direction of Roll: Regular from back of roller.
- E. Mounting Brackets: Single mounting brackets; galvanized or zinc-plated steel
- F. Removable Bottom Flap: Extruded aluminum 0.063-inch thick; long edges rolled; continuous panel concealing bottom of shade roller, brackets, and operating hardware and operators; length as indicated on Drawings; removable design for access.
- G. Bottom Bar: Steel or extruded aluminum, with plastic or metal capped ends. Provide exposed-to-view, external type bottom bar with concealed weight bar as required for smooth, properly balanced shade operation.
- H. Mounting: Single mount as indicated on the Drawings, mounting permitting easy removal and replacement without damaging roller shade or adjacent surfaces and finishes.

February 27, 2026

- I. Shade Operation: Manual as scheduled on the Drawings:
 - 1. Manual Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.
 - a. Bead Chains: Stainless steel.
 - 1) Loop Length: Full length of roller shade.
 - 2) Limit Stops: Provide upper and lower ball stops.

2.02 ROLLER SHADE FABRICATION

- A. Product Description: Single roller shade consisting of a one roller, a means of supporting the roller, a flexible sheet or band of material carried by the roller, a means of attaching the material to the roller, a bottom bar, and an operating mechanism that lifts and lowers the shade.
- B. Concealed Components: Non-corrodible or corrosion-resistant-coated materials.
 - 1. Lifting Mechanism: With permanently lubricated moving parts.
- C. Unit Sizes: Obtain units fabricated in sizes to fill window and other openings as follows, measured at 74 deg F:
 - 1. Shade Units Installed Outside Jambs: Width and length as indicated, with terminations between shades of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.
- D. Installation Brackets: Designed for easy removal and reinstallation of shade, for supporting roller, and operating hardware and for hardware position and shade mounting method indicated.
- E. Installation Fasteners: No fewer than two fasteners per bracket, fabricated from metal noncorrosive to shade hardware and adjoining construction; type designed for securing to supporting substrate; and supporting shades and accessories under conditions of normal use.
- F. Color-Coated Finish: For metal components exposed to view, apply manufacturer's standard baked finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness.
- G. Colors of Metal and Plastic Components Exposed to View: [As selected by Architect from manufacturer's full range, unless otherwise indicated.

PART 3 - EXECUTION

3.01 EXAMINATION

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

February 27, 2026

3.02 ROLLER SHADE INSTALLATION

- A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions and located so shade band is not closer than 2 inches to interior face of glass. Allow clearances for window operation hardware.

3.03 ADJUSTING

- A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.04 CLEANING AND PROTECTION

- A. Clean roller shade surfaces after installation, according to manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.
- C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

3.05 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain roller shades.

END OF SECTION

SECTION 15072 - VIBRATION ISOLATION AND SEISMIC CONTROL MEASURES

PART 1 - GENERAL

1.01 SUMMARY

- A. All mechanical equipment, piping, and ductwork as noted on equipment schedule or in the specifications shall be mounted on or suspended from vibration isolators to reduce the transmission of vibration and mechanically transmitted sound to the building structure.
- B. Section includes:
 - 1. Elastomeric isolation pads, hangers and mounts
 - 2. Spring isolation hangers and mounts
 - 3. Steel bases, concrete inertia bases and curb isolation systems
 - 4. Flexible connectors
 - 5. Miscellaneous support products

1.02 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.03 REFERENCES

- A. Air-Conditioning, Heating & Refrigeration Institute (AHRI):
 - 1. AHRI 575 – Method of Measuring Machinery Sound Within an Equipment Space
- B. American Institute of Steel Construction (AISC):
 - 1. Specification for the Design, Fabrication and Erection of Structural Steel Buildings (8th Edition)
- C. American National Standards Institute (ANSI):
 - 1. ANSI B027.2-965 – Plain Washers
 - 2. ANSI / ASA S1.13 – American National Standard Measurement of Sound Pressure Levels in Air
- D. American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
- E. American Society for Testing and Materials (ASTM):
 - 1. ASTM A6 – General Requirements for Delivery and Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use
 - 2. ASTM A36 – Structural Steel
 - 3. ASTM A53 – Welded and Seamless Steel Pipe
 - 4. ASTM A307 – Carbon Steel Externally and Internally Threaded Standard Fasteners

5. ASTM A500 – Cold-Formed Welded and Seamless Carbon Steel Structural Tubing
6. ASTM A1011 – Hot Rolled Carbon Steel Sheet and Strip
7. ASTM C94 – Standard Specification for Ready-Mixed Concrete
- F. American Welding Society (AWS):
 1. AWS D1.1 – Structural Welding Code
- G. National Electrical Manufacturer's Association (NEMA)
- H. International Building Code (IBC)
- I. International Code Council Evaluation Service (ICC-ES)
- J. Underwriters' Laboratories (UL):
 1. UL 778 – Motor Operated Water Pumps

1.04 SUBMITTALS

- A. Submit in accordance with Division 01 Specification Sections for Submittal Procedures.
- B. Product Data: For each product indicated. Include rated load, rated deflection, misalignment capability (for hanger-type isolators) and overload capacity for each vibration isolation device.
- C. Shop Drawings:
 1. Isolation Schedule: Submit schedule showing equipment tag, isolator manufacturer / model, deflection, and location for each product furnished, including associated piping/ductwork.
 2. Vibration Isolation Bases: Dimensional drawings including anchorage and attachments to structure and to supported equipment, if needed or required. Include auxiliary motor slides and rails, base weights, and equipment static loads.
 3. Vibration Restraint Details: Detailed submittal drawings of vibration restraints and snubbers. Show anchorage details and indicate quantity, diameter, and depth of penetration of anchors. Include ratings for loads.
 4. Dimensioned Outline Drawings of Equipment Unit(s): Identify center of gravity and locate and describe mounting and anchorage provisions for each isolated unit.
 5. Seismic Restraint Details: Detailed submittal drawings of seismic restraints and snubbers. Show anchorage details and indicate quantity, diameter, and depth of penetration of anchors.

1.05 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing the products specified herein with a minimum 5 years' experience.
- B. Except as otherwise indicated, obtain vibration isolator products from a single manufacturer.

- C. All vibration isolators shall have either known un-deflected heights or calibration marking so that, after adjustment, when carrying their load, the deflection under load can be verified and shown to be within the proper range of the device according to the design.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Kinetics Noise Control
- B. Mason Industries
- C. Approved Equal

2.02 VIBRATION ISOLATORS

- A. General:
 - 1. The ratio of spring diameters divided by the compressed spring height shall be no less than 0.8.
 - 2. Springs shall have a horizontal stiffness of at least 80% of the vertical stiffness to ensure stability.
 - 3. Spring shall have a minimum additional travel to solid equal to 50% of the rated deflection.
 - 4. Spring diameters and hanger box lower hole sizes shall be large enough to permit hanger rods to swing through a 30-degree arc before contacting the hole and short-circuiting the spring.
 - 5. All frame and base members shall have a height that is at least 10% of the spacing between adjacent isolators.
 - 6. Seismic/wind-loading restraint and cables shall not affect the isolation system effectiveness during normal operating conditions.
- B. Elastomeric Pads, Type N-1
 - 1. Description: Single or multiple layers of 3/4-inch thick ribbed or waffled neoprene pad bonded to a galvanized steel load distribution plate. Thickness of load distribution plate shall be sufficient to evenly distribute (+/- 10%) the load over the entire pad. Pad shall be furnished with sufficient area to achieve the static deflection shown in the schedule. If anchoring is mandatory, provide neoprene grommets and washers (WB-1) to prevent anchor bolt from short-circuiting isolation.
 - 2. Mason Industries Type Super W or approved equivalent
- C. Double Deflection Elastomeric Mounts, Type N-2
 - 1. Description: Molded neoprene mounting with a minimum static deflection of 0.35 inches. Isolators shall have a durometer between 30 and 70. All metal surfaces are neoprene-covered to prevent corrosion and have friction pads, both top and bottom. Provide bolt holes on the bottom and a tapped hole with cap screw and washer on top.
 - 2. Mason Industries Type ND or approved equivalent

- D. Neoprene and Cork Sandwich Pads, Type N-3
 - 1. Description: Pads, loaded at 50 psi, consisting of a cork layer sandwiched between two neoprene layers. Thickness of load distribution plate shall be sufficient to evenly distribute (+/- 10%) the load over the entire pad. Pad shall be furnished with sufficient area to achieve the static deflection shown in the schedule. If anchoring is mandatory, provide neoprene grommets and washers (WB-1) to prevent anchor bolt from short-circuiting isolation.
 - 2. Mason Industries Type NK or approved equivalent.
- E. Captive Elastomeric Mounts, Type N-4
 - 1. Description: Captive neoprene mounting with a minimum static deflection of 0.15 inches. Isolators shall have a durometer between 30 and 70. Captive mounting consists of a steel housing with a captive steel insert embedded in neoprene.
 - a. Mason Industries Type RAA/RBA/RCA
 - b. Or approved equivalent
- F. Open Spring Isolators, Type S-1
 - 1. Description: Freestanding and laterally stable spring isolator without any housing and includes a molded neoprene cup or 1/4-inch thick neoprene friction pad between the baseplate and the support. All mountings shall have leveling bolts that must be rigidly bolted to the equipment. Installed and operating heights shall be equal.
 - 2. Mason Industries Type SLF or approved equivalent
- G. Housed Spring Isolators, Type S-2
 - 1. Description: Freestanding and laterally stable open-spring isolators with two-part telescoping steel housing. Steel housing with factory-drilled baseplate with 1/4-inch thick neoprene isolator pad attached to the baseplate underside.
 - 2. Mason Industries Type C or approved equivalent
- H. Restrained Spring Isolators, Type S-3
 - 1. Description: Freestanding open-spring isolators with seismic or limit-stop restraint. Steel housing with resilient vertical-limit stops to prevent spring extension due to weight being removed; factory-drilled baseplate with 1/4-inch thick neoprene isolator pad attached to baseplate underside; and adjustable equipment mounting and leveling bolt that acts as blocking during installation. Mounts designed with fail-safe feature to protect against wind loads and overturning of mounts in earthquakes. Mounts capable of withstanding lateral accelerations of 1g. Allow 1/2-inch clearance around vertical restraining bolts, with neoprene grommets and washer (WB-1) to prevent restraining bolts from short-circuiting isolation. Limit stops must be out of contact during normal operation.
 - 2. Mason Industries Type SLR or approved equivalent
- I. Elastomeric Hangers, Type NH-1
 - 1. Description: Cone-shaped elastomeric mounting made from neoprene with a steel box frame, open on two sides, containing a double deflection neoprene element with a projecting bushing to prevent steel to steel contact.

2. Mason Industries Type HD or approved equivalent
- J. Spring Hangers, Type SH-1
 1. Description: Hangers containing a steel spring and 0.3-inch deflection neoprene element in series. Neoprene shall be molded with a rod isolation bushing that passes through the hanger box.
 2. Mason Industries Type 30N Series or approved equivalent
- K. Pre-Compressed Spring Hangers, Type SH-2
 1. Description: Hangers containing a steel spring and 0.3-inch deflection neoprene element in series. Neoprene shall be molded with a rod isolation bushing that passes through the hanger box. Isolator shall be pre-compressed to the rated deflection to allow installation at a fixed elevation. Isolator shall have a release mechanism to free the spring upon installation completion and subjection to its full load.
 2. Mason Industries Type PC30N or approved equivalent

2.03 EQUIPMENT BASES

- A. Structural Steel Frame Base, Type B-1
 1. Description: Structural steel rectangular base with cross members as required per engineered drawings. Structural members shall have a depth equal to one-tenth the longest span between isolators. Use height saving brackets for side mounting of isolators.
 2. Mason Industries Type WF or approved equivalent
- B. Concrete Inertia Base, Type B-2
 1. Description: Factory-fabricated, welded, structural steel bases and rails ready for placement of cast-in-place concrete. Concrete shall be supplied by General Contractor and shall conform to ASTM C94 standard. Bases shall have size and shape to accommodate supported equipment without overhanging structural members that form perimeter framing. Bases shall be large enough to support suction elbow of end suction pumps and suction and discharge elbow of horizontal split-case pumps, unless flexible neoprene elbows are used. Total mass shall not be less than 2 times the total weight of all equipment mounted on the base. Depth of base shall not exceed 10-inches unless specifically recommended by the base manufacturer for mass or rigidity. Furnish with preset embedded equipment anchor bolts and auxiliary motor slide bases or rails. Factory-welded steel brackets on frame for outrigger isolation mountings and to provide for anchor bolts and equipment support. Include supports for suction and discharge elbows for pumps. Forms shall be furnished with steel members to hold equipment anchor-bolts sleeves and anchors in place during placement of concrete. Use T-shape where necessary to conserve weight and size. The bottom inertia base shall be a minimum of 2" above the supporting structure or housekeeping pad.
 2. Mason Industries Type BMK or approved equivalent
- C. Vertical Steel Rods, Type B-3
 1. Description: Base to consist of four vertical steel hanger rods attached to structure above. Rods are to be capable of carrying an equivalent of 5 times overload without

failure or yielding. Use isolation hangers on all four rods in series with the supported load, as specified.

D. Curb Isolation System, Type B-4

1. Description: Base to consist of a factory-fabricated, welded, structural steel upper and lower frames separated with free-standing, unhoused, laterally-stable springs rested on top of a roof curb. Assembly shall be watertight with flexible elastomeric seals between the upper and lower frames and a continuous sponge gasket around the perimeter of the top frame.
2. Kinetics Type ESR or approved equivalent

2.04 FLEXIBLE CONNECTORS

A. Flexible Duct Connector, Type FC-1

1. Description: Flexible, glass fabric double-coated with neoprene. Air-tight, water-tight and fire-retardant.
2. Ventfabrics Type Ventglas, Duro-Dyne Type MFN or MF6N or approved equivalent

B. Elastomeric Pipe Connector, Type FC-2

1. Description: Spherical rubber expansion joint. Peroxide cured EPDM throughout with Kevlar tire cord reinforcement. The raised-face rubber flanges must encase solid steel rings to prevent pull out. The connector shall be terminated at both ends with either a flange or threaded fitting. Connectors shall have a minimum burst pressure of 500 psi and a recommended maximum operating pressure that is greater than the design operation pressure at the temperature of the fluid. Control rods or cables should not be used unless specifically required by the manufacturer in writing. Steel braided connectors are not acceptable.
2. Pipes less than 12 inches:
 - a. Axial Compression: 3-1/2 inches
 - b. Axial Extension: 1-3/4 inches
3. Pipes greater than 12 inches:
 - a. Axial Compression: 4-3/8 inches
 - b. Axial Extension: 2-1/8 inches
4. Mason Industries Type Safeflex SFDEJ or approved equivalent

2.05 PLUMBING PIPE ISOLATORS

A. Copper Supply Piping Isolators:

1. Pre-Engineered Isolators:
 - a. Holdrite Acoustical Series
 - b. Trisolator by Elmdor Stoneman
 - c. Holdrite Silencer #270/271 Self-Adhesive Acoustical Insulation Liner
 - d. Or approved equivalent

2. Elastomeric Closed Cell Foam Insulation:

- a. Foam Insulation shall be adhered to the inside of each hanger or clamp to eliminate direct contact between the pipe and the hanger or clamp. Alternatively, a 3" wide strip may be wrapped around the pipe at each support hanger or clamp.
- b. ½" thickness minimum. Oversize each pipe hanger or clamp to avoid crushing insulation.
- c. Armaflex AP
- d. Or approved equivalent

B. Waste, Drain, Storm Drain Piping Isolators:

1. Pre-Engineered Isolators:

- a. Holdrite Acoustical Series
- b. Holdrite Silencer Acoustic Loop Hanger
- c. Holdrite Silencer #270/271 Self-Adhesive Acoustical Insulation Liner
- d. Or approved equivalent

2. Elastomeric Closed Cell Foam Insulation:

- a. Foam Insulation shall be adhered to the inside of each hanger or clamp to eliminate direct contact between the pipe and the hanger or clamp. Alternatively, a 3" wide strip may be wrapped around the pipe at each support hanger or clamp.
- b. ½" thickness minimum. Multiple layers of insulation may be used to reach the required thickness (e.g., 2 layers of ¼" thick insulation). Oversize each pipe hanger to avoid crushing insulation.
- c. Armaflex AP
- d. Or approved equivalent

2.06 ACCESSORIES

A. Cushion Sleeve, Type CS-1

1. Description: Elastomeric pad 1/4-inch minimum thickness for use as a noise and vibration isolator between piping and its supporting or suspension system. Sleeve shall be split hinged and shall have an exterior metal shell to prevent crushing during installation.
2. Mason Industries Type SWS or approved equivalent

B. Elastomeric Washer Bushing, Type WB-1

1. Description: One-piece molded bridge-bearing neoprene washer bushing, used to surround the anchor bolt and have a flat washer facing to avoid metal-to-metal contact.
2. Mason Industries Type HG or approved equivalent

C. Hanging Elastomeric Vibration Isolation Kit, Type WB-2

1. Description: Vibration isolation kit with neoprene washer/bushing, used to surround the steel hangar rod to avoid metal-to-metal contact.

2. Greenheck Type 855837 / 855838, or approved equivalent

D. Thrust Restraint, Type TR-1

1. Description: Laterally-stable spring isolator element in series with an elastomeric molded cup with a threaded rod and bracket assembly. The spring element shall have a lateral spring stiffness greater than 1.0 times the rated vertical stiffness. Device shall be sized to limit maximum lateral movement to 0.25 in.

2. Mason Industries Type WBD or approved equivalent

E. Resilient Snubber, Type RS-1

1. Description: All-directional seismic snubbers with resilient neoprene elements, used to restrain vibration isolated equipment from excessive motion during a seismic event without making rigid contact with the equipment during normal operation.

2. Mason Industries Type Z-1125, Kinetics HS series, or approved equivalent

2.07 FACTORY FINISHES

A. Where exposed to the atmosphere, all steel shall be finished with dry powder coating for corrosion protection.

B. All hardware shall be zinc electroplated.

C. Springs and housings shall be powder coated.

2.08 VIBRATION ISOLATION SCHEDULES

A. All vibration isolators shall be selected in complete conformance with the schedule below.

<i>Equipment Tag</i>	<i>Isolator Type</i>	<i>Deflection (in.)</i>	<i>Base Type</i>	<i>Flex Connector Type</i>	<i>Notes</i>
<i>Air Conditioning Units</i>					
PACU-1	S-3	1"	---	FC-1	1,3,5
<i>Outdoor Air Units</i>					
DOAS-1	S-3	1"	---	FC-1	1,3,5
<i>Fans</i>					
EF-1	NH-1	0.25"	---	FC-1	1,3
EF-2	NH-1	0.25"	---	FC-1	1,3
EF-3	NH-1	0.25"	---	FC-1	1,3
EF-4	NH-1	0.25"	---	FC-1	1,3
EF-5	NH-1	0.25"	---	FC-1	1,3
EF-6	NH-1	0.25"	---	FC-1	1,3
EF-7	NH-1	0.25"	---	FC-1	1,3
EF-8	NH-1	0.25"	---	FC-1	1,3

<i>Terminal Units</i>					
TU-A	---	---	---	---	1
TU-B	---	---	---	---	1
TU-C	---	---	---	---	1
TU-D	---	---	---	---	1
TU-E	---	---	---	---	1
TU-F	---	---	---	---	1
TU-G	---	---	---	---	1
TU-H	---	---	---	---	1
TU-I	---	---	---	---	1
TU-J	---	---	---	---	1
TU-K	---	---	---	---	1
<i>Hot Water Heaters</i>					
WH-1	---	---	---	---	2
<i>Pumps</i>					
HWRP-1	---	---	---	FC-2	2,4

Notes:

1. See Mechanical and Structural Drawings.
2. See Plumbing and Structural Drawings.
3. Install flexible duct connectors at intake and discharge of all fans and air handling equipment.
4. All piping to unit shall utilize a flexible connector to limit vibration transfer.
5. For packaged units, internal fan isolators are acceptable in lieu of specified external isolators provided that specified isolator performance can be achieved. Where internal isolation is used, unit housing shall be mounted on elastomeric isolation pads (Type N-1) with a min. static deflection of 0.15 in.

PART 3 - EXECUTION**3.01 EXAMINATION**

- A. Examine areas and equipment to receive vibration isolation and seismic control devices for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine rough-in of reinforcement and cast-in-place anchors to verify actual locations before installation.
- C. Bring to the attention of the Project Manager any discrepancies between this Specification and the field conditions prior to installation.
- D. Bring to the attention of the Project Manager any conflicts due to specific equipment selection prior to installation.

HAWAII HEALTH SYSTEMS CORPORATION – KAUAI DIVISION

Samuel Mahelona Memorial Hospital
Behavioral Health New Patient Facility
Project No. 221093-01

Vibration Isolation and Seismic Control Measures
15072-9

- E. Bring to the attention of the Project Manager any conflict with other trades which will result in rigid contact with equipment, piping or ductwork due to inadequate space or other unforeseen conditions prior to installation.
- F. Proceed with installation only after all unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Install all vibration isolators in strict accordance with this Specification, the Manufacturer's instructions, and all certified submittal data.
- B. Isolate HVAC equipment from the building structure by means of vibration isolators as scheduled in this specification section or on the Drawings. For all other equipment with rotating parts or motors, isolation and minimum static deflections shall comply with the ASHRAE Handbook, HVAC Applications, Sound and Vibration Control.
- C. Make no rigid connections between piping /ductwork and building structure that degrades the noise and vibration systems specified herein.
- D. Install vibration isolators so as to not cause any change in position of equipment or piping which would result in stresses or misalignment.
- E. Install vibration isolators in locations for ease of inspection and adjustment as well as for proper operation.
- F. Position vibration isolation hangers as to provide 1" minimum to 3" maximum clearance between hanger housing and building structure above. Provide side clearance for hanger housings to allow for a full 360-degree rotation about the rod axis. Align hanger rods to clear the hanger box. Replace bent rods.
- G. If specific attachment to building structure is not indicated, anchor bracing to structure at flanges of beams, upper truss chords or bar joists, or at concrete members.
- H. Bring to the attention of the Project Manager any isolators that need to be upgraded from what is specified herein.
- I. Verify that all installed isolators and mounting systems permit equipment motion in all directions.
- J. Verify that the bolts securing equipment to metal support frame are not in rigid contact with the equipment and supporting frame, bolts attaching base shall include neoprene washer bushing (Type WB-1).

3.03 SEISMIC CONTROL

- A. Seismic cable restraints shall be installed hand tight with slack such that they do not short circuit vibration isolators during normal operation. Solid-mount seismic and wind restraint brackets or bracing should be avoided unless properly coordinated with vibration isolators to avoid short circuiting.

3.04 ISOLATION BASES

- A. Install all equipment bases with no less than 1" clearance between the bottom of the base and the floor or housekeeping pad.

3.05 FLEXIBLE CONNECTIONS

- A. Install flexible duct connectors at the intake and discharge of all fans and air-handling equipment, with a minimum of 2-inches of separation.
- B. Thrust restraints shall be utilized for fans and air-handling equipment operating at 2" or greater total static pressure to maintain a slack position of all flexible duct connections. Static deflection shall be equal to that of the isolator supporting the equipment.
- C. Elastomeric, double bellow flexible connections are required at all chillers, cooling towers, and other rotation equipment located in commonly accessible areas such as rooftops, mechanical rooms, etc.
- D. Metallic flexible connections are only allowed as follows, and after written approval by the acoustical consultant:
 - 1. When equipment is located in inaccessible areas, such as above ceilings.
 - 2. When pipe pressure or temperature exceeds manufacturer tolerances for rubber flexible connections.
- E. Flexible connections shall not be used to correct for misalignment and shall not be allowed to create a bulge when operated under pressure.

3.06 PIPE ISOLATORS

- A. Bring to the Architect's attention prior to installation any conflicts with other trades, which will result in unavoidable rigid contact with equipment or piping, as described herein, due to inadequate space or other unforeseen conditions. Corrective work necessitated by conflicts after installation will be at the Contractor's expense.
- B. All piping within 50 feet from connection to vibration isolated equipment shall use vibration isolators.
 - 1. When connected equipment is not spring isolated, neoprene pipe hangers / floor mounts are permitted in place of the isolator types specified below.
 - 2. Piping within 30 feet from connection to vibration isolated equipment shall use Type SH-2 / S-3 isolators, with static deflection at least equal to that of the isolator supporting the equipment.
 - 3. Piping beyond 30 feet from connection to vibration isolated equipment:
 - a. Pipes 2.5 inches and larger diameter: Isolators shall be spring and neoprene type, with a minimum static deflection of 0.75 inches.
 - b. Pipes 2 inches and smaller diameter: Isolate using one of the following acceptable methods:
 - 1) Closed cell foam insulation wrapped completely around the pipe at each pipe strap. Minimum 3 inches wide and 0.5 inches thick. All pipe straps to be sized at least ½" larger to avoid crushing insulation.
 - 2) Neoprene pad at pipe stand base. Bolts attaching base shall include neoprene washer-bushing (Type WB-1).
 - 3) Prefabricated acoustical pipe supports such as Holdrite Acoustical Supports.

- C. Pipe Trapezes:
 - 1. Multiple vibration isolated pipes may be mounted together on vibration-isolated trapezes if desired.
 - 2. Trapeze vibration isolators shall be sized to meet the largest minimum static deflection requirement of any single pipe supported on the trapeze.
 - 3. Non-vibration isolated piping or conduit shall never be mounted on vibration-isolated trapezes.
- D. Floor-mounted spring isolators for pipes shall be pre-compressed type.

3.07 PIPING / DUCTWORK PENETRATIONS

- A. No elements shall bridge or rigidly connect dual stud rows together. Bridging elements include, but are not limited to, piping, conduit, cross bracing, lateral bracing, and gussets. Install all elements to the stud on the side of the wall that they serve. Where rigid connections are required, the pipes should be isolated from the pipe supports with plumbing pipe isolators.
- B. No piping or ductwork shall contact any gypsum board faces or framing members. Oversize all piping and ductwork penetrations by minimum 0.5 inches to prevent rigid contact, fill gap around the penetrating element with batt insulation, and seal airtight with acoustical sealant.
- C. Vibration isolated piping and ductwork shall pass freely through walls and floors without rigid connections. Maintain 1" to 2" concentric clearance around outside surfaces of piping or ductwork at penetration points. Pack the clearance space tightly with fiberglass and caulk airtight with non-hardening acoustical sealant after installation of piping, or provide resilient firestopping as required. Provide supports 6" to 8" from walls or partitions on both sides of penetrations.

3.08 ADJUSTING

- A. Adjust isolators after system is at operating weight.
- B. Adjust limit stops on restrained isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so that they are out of contact during normal operation.
- C. Adjust restraints to permit free movement of equipment while within normal mode of operation.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15400 - PLUMBING

PART 1 - GENERAL

1.01 SUMMARY

- A. This section includes the provisions for a complete plumbing system.
- B. Related Sections
 - 1. Section 01330 - SUBMITTALS.
 - 2. Section 15011 - GENERAL MECHANICAL PROVISIONS.
 - 3. Section 15410 - PLUMBING FIXTURES.

1.02 MECHANICAL GENERAL PROVISIONS

As specified in Section 15011 - GENERAL MECHANICAL PROVISIONS shall apply to work specified in this Section.

1.03 DESCRIPTION OF WORK

This section covers the furnishing, fabrication, delivery and installation of the plumbing system complete, including but not limited to the following:

- 1. Study work (and related drawings) of all other crafts whose work abuts, adjoins or is in any manner affected by work under this heading.
- 2. Soil, waste and vent piping system.
- 3. All wetted surfaces of pipe, fittings, valves, and fixtures in potable water system shall have a weighted average lead content ≤ 0.25 percent per Safe Drinking Water Act as amended January 4th, 2011 Section 1417. Valve materials for potable water service shall comply with NSF/ANSI 61 and/or NSF/ANSI 372. Valves for domestic water must be 3rd party Certified.
- 4. Cold water systems consisting of piping and all accessories.
- 5. Hot water system, including building domestic hot water circulating system, piping, water heaters, heat exchanger connections, circulation pumps, pipe insulation, tank controls and connections to fixtures.
- 6. All connections to utility stubouts such as water, sewer, storm drainage, etc.
- 7. All plumbing fixtures and equipment, trim and accessories.
- 8. Soil, waste, vent, and water final connections to all plumbing fixtures and equipment.
- 9. Temporary piping and valves to supply water during construction for all Contractors, at all locations required by the State.

10. Firestopping.
11. Labeling and tagging all valves.
12. Operating and maintenance instructions and manuals.
13. Shop drawings and record drawings.
14. Inspection, testing and warranty

1.04 RELATED WORK

1.05 ELECTRICAL WORK

Electrical motor driven equipment specified herein shall be provided complete with motors, motor starters, and controls. Electric equipment and wiring shall be in accordance with DIVISION 16 - ELECTRICAL. Electrical characteristics shall be as indicated. Motor starters shall be provided complete with properly sized thermal overload protection and other appurtenances necessary for the motor control. Each motor shall be of sufficient capacity to drive the rating of the motor. Manual or automatic control and protective or signal devices required but not shown on the electrical plans, shall be provided under this section of the specifications.

1.06 CODES, ORDINANCES AND PERMITS

- A. Codes and Ordinances: The work shall be in accordance with the governing State and Local Ordinances, Codes and Regulations, including NFPA Regulations and Factory Mutual, all of which are hereby made a part of these requirements. However, when these requirements and/or drawings call for or describe materials, workmanship or construction of a better quality, higher standard, or larger size than is required by the above rules and regulations, the provisions of these requirements and/or drawings shall take precedence over the requirements of the said rules and regulations. The Contractor shall furnish, without any extra charge, any additional material or labor, or both, required for compliance with these rules and regulations, although not mentioned in these requirements nor indicated on the contract drawings.
- B. Permits: The Contractor shall secure and pay for all permits, inspections and certificates of any inspection of any governmental body having jurisdiction over all or any part of the work included under this section, and/or such inspections, etc., required by these requirements.

1.07 CONTRACT DRAWINGS

- A. Contract drawings are essentially diagrammatic, indicating general layout and approximate locations towards establishing the scope for uniform estimating basis for all bidders; they are not intended to be detailed construction working drawings. Reasonable modifications to indicated locations and arrangement to suit job conditions shall not be construed as basis for requesting of additional funds from the Owner.

- B. Where apparatus and equipment have been indicated on the drawings, dimensions have been taken from typical equipment of the class indicated. The shop drawings shall show the details of construction and installation of the particular equipment furnished; they shall be fully dimensioned to show that the equipment and connections thereto fit the space provided with adequate maintenance space. If equipment is disapproved, drawings shall be revised to show acceptable equipment and resubmitted.
- C. Capacities of all equipment and materials shall be not less than those indicated.

1.08 SHOP DRAWINGS

Shop drawings shall be submitted in accordance with Section 15011 - GENERAL MECHANICAL PROVISIONS.

1.09 MATERIAL AND EQUIPMENT SUBMITTALS

Material and equipment submittals shall be in accordance with Section 15011 - GENERAL MECHANICAL PROVISIONS. Material or equipment brochures shall be submitted for the following items at one time in order to demonstrate that these items of equipment have been properly coordinated and will function properly with each other:

Backflow Preventers	Cleanouts, Access Covers
Dielectric Connectors	Electronic Sensors
Equipment Insulation	Equipment Supports
Flexible Pipe Connectors	Gas Flue Pipe
Fuel Oil Tank & Accessories	Gauges
Heat Exchanger	Hi-Efficiency Motors
Hot Water Storage Tank	Pipe and Fittings
Pipe Insulation	Pipe Supports and Hangers
Plumbing Fixtures	Pumps
Sealants	Solder Flux and Solder
Temperature Controls	Thermometers
Valves and Accessories	Vibration Isolators
Water Hammer Arrestors	Water Heaters
Grease Interceptors	Grease Traps

If departures from the contract drawings are deemed necessary by the Contractor, details of such departures, including changes in related portions of the project and the reasons thereof, shall be submitted with the shop drawings. Approved departures shall be made at no additional cost to the Owner.

Submittals shall be complete. Piecemeal submittals will be returned without review. Each submittal shall clearly identify equipment to be provided. Information not pertaining to equipment to be provided shall be deleted or crossed out.

1.10 AS-BUILT DRAWINGS

As-built drawings shall be provided in accordance with Section 15011 - GENERAL MECHANICAL PROVISIONS.

1.11 CONFORMANCE TO AGENCY REQUIREMENTS

Where materials or equipment are specified to be approved by the Underwriters' Laboratories, Inc., the Contractor shall submit proof that the items furnished under this section of the specifications conform to such requirements. The label of or listing in the Underwriters' Laboratories, Inc., Building Materials List, or the Electrical Appliance and Utilization Equipment List will be acceptable as sufficient evidence that items conform to Underwriters' Laboratories, Inc., requirements.

1.12 NAMEPLATES

Each major component of equipment shall be provided with a nameplate engraved with the manufacturer's name, address, and catalog number, serial number and electrical data on a metal plate securely attached to the item of equipment.

1.13 VERIFICATION OF DIMENSIONS

The Contractor shall be responsible for the coordination and proper relation of his work to the building structure and to the work of all trades.

The Contractor shall visit the premises and thoroughly familiarize himself with all details of the work and working conditions, to verify all dimensions in the field, and to advise the Architect of any discrepancy before performing any work.

1.14 OMISSIONS

It is the intent of the plans and specifications to provide a complete installation. Should there be omissions, the Contractor shall call the attention of the Architect to such omissions in fifteen (15) days advance of the date of bid openings so that the necessary corrections can be made.

1.15 SUBSTITUTIONS OF EQUIPMENT

- A. Substitution shall be in accordance with Section 00700 - GENERAL CONDITIONS OF THE CONTRACT.
- B. The Contractor shall assume full responsibility for proper fit, performance and additional work relating to other sections of the specifications.

1.16 LEAD-FREE REQUIREMENT FOR POTABLE WATER SYSTEMS

All materials that come into contact with potable water, including but not limited to piping, solder, flux, and valves, shall be certified lead-free for potable water applications per NSF 61/372 or IAPMO.

1.17 WELDERS QUALIFICATIONS

Welders shall be qualified in accordance with Section 15011 - GENERAL MECHANICAL PROVISIONS.

1.18 CLEANING EQUIPMENT AND PREMISES

- A. During the process of the work, the premises shall be kept reasonably free of all debris and waste materials resulting from the work performed under the various sections of the General Contract. All such debris and rubbish shall be removed from the site.
- B. Upon completion and before final acceptance of the work, all debris, rubbish, left over materials, tools and equipment shall be removed from the site. Plumbing fixtures shall be cleaned with an approved cleansing compound.

1.19 GUARANTEE

The entire plumbing installation described herein shall be guaranteed in writing as a complete working unit for a period of one year from the date of acceptance in accordance with Section 15011 - GENERAL MECHANICAL PROVISIONS.

1.20 LEED

- A. Contractor shall coordinate with Section 01016 - OCCUPANCY, AIR QUALITY REQUIREMENTS and Section 15911 - DESIGN COMMISSIONING OF BUILDING SYSTEMS.
- B. LEED Certification Documentation: Demonstrate that LEED Requirements for water efficiency and VOC limits are met.
 - 1. Attach cover sheet or transmittal to LEED submittals with prominent identification as a LEED submittal, including Specification Section title and number.
 - 2. In addition to number of copies specified in Section 01330 - SUBMITTALS AND SUBSTITUTIONS, submit 1 additional copy for LEED review.
 - 3. Refer to Section 00010 - INSTRUCTIONS TO CONTRACTOR for further LEED requirements.

PART 2 - PRODUCTS

2.01 SOIL, WASTE AND VENT PIPE

- A. Soil, waste and vent service weight cast iron, hub and spigot soil pipe and fittings, double asphalt coated, NSF International Listed, ASTM A 74 and CISPI

HSN with ASTM C 564 rubber compression gasket.

- B. Above grade cast iron soil, waste and vent piping in enclosed pipe shafts, systems, Tyler No-Hub pipe and fittings or equal, NSF International Listed and conform to Cast Iron Soil Pipe Institute Standard 301-90 with Cast Iron Soil Pipe Institute Standard 310 coupling joint.
- [B. Below grade soil, waste and vent piping within the building in sizes 6 inches and smaller may be Schedule 40 Acrylonitrile Butadiene Styrene (ABS) with solvent-joined fittings, ASTM D2661. Note only one material shall be used throughout.]
- [C. Below grade piping within building in sizes 6 inches and smaller may be hubless cast iron sanitary system with MG mechanical cast iron couplings or approved equal, conforming to Cast Iron Soil Pipe Institute's Standard 301-72. Stainless steel couplings are unacceptable. Each assembled coupling shall bear the following clearly identifiable markings: The manufacturer, the size, and the letters UPC, indicating conformance with the Uniform Plumbing Code. Install couplings per manufacturer's written instructions, and tighten nuts or bolts heads alternately and gradually to manufacturer's specifications using an accurate torque wrench.]

Note: ONLY FOR ALTERATION PROJECTS - SPECIFIER TO USE JUDGEMENT

- D. Acid waste and vent pipe and fittings shall be tempered and annealed borosilicate glass and conform to Federal Specification DD-G-541A. Joints shall be made with compression type Series 300 stainless steel clamp and bolts with tetra-flouro-ethylene inner seal and Buna-N rubber liner. Underground pipe straight run shall be heavy schedule with factory applied expanded polystyrene protective coating. Underground fitting shall be wrapped with 5 mil thick polyvinyl.
- E. Acid (polypropylene) waste and vent piping for above ground and below ground shall be schedule 40 fire retardant polypropylene in accordance with dimensions and tolerance of ASTM F1412 and material in accordance with ASTM D4101.
Fitting shall be electrical fusion type and joined by using couplings in accordance with ASTM 1290. Fitting shall be manufactured of schedule 40 polypropylene material in accordance with ASTM D4101. Equipment submittal shall include installation recommendations.

2.02 STORM DRAINAGE PIPE

- A. Underground and concealed pipes shall be service weight cast iron pipe, hub and spigot fittings, double asphalt coated, ANSI A112.5.1 double coated fittings. Joints for cast iron hub and spigot fitting shall be made by use of positive double seal elastomeric compression gaskets conforming to ASTM C564, such as TY-seal or equal.
- B. Above ground exposed pipes and pipes cast in concrete shall be Schedule 40 galvanized steel, ASTM A53 with galvanized cast iron threaded drainage pattern fittings, ANSI B16.4.
- C. Above Ground Concealed Pipes: Pipes concealed in furred wall, enclosed under

floor spaces, or ceiling spaces may be ANSI A112.5.1 no-hub cast iron pipe and fitting. [Delete this paragraph for buildings greater than 2 stories.]

2.03 DOMESTIC WATER PIPE

- A. Underground pipes shall be Type "K" seamless rigid copper tubing conforming to ASTM B88 with wrought copper solder type fittings conforming to ANSI B16.22 or ANSI B16.18. Joints shall be brazed with a silver alloy filler metal.
- B. Underground pipes 4 inches and larger outside the building may be ductile iron conforming to ASTM A377 with mechanical joints and thrust block. Thrust blocks shall be in accordance with the Board of Water Supply of Honolulu Construction Standards.
- C. Above ground piping shall be Type "L" seamless rigid copper tubing conforming to ASTM B88 with wrought copper or cast copper alloy solder type fittings conforming to ANSI B16.22 or ANSI B16.18. Solder shall be 95-5 tin-antimony or approved equal.
- D. Solder and brazing flux shall meet ASTM B813 Standard, "Specifications for Liquid and Paste Fluxes for Soldering Applications of Copper and Copper Alloy Tube."
- E. T-Drill joints are prohibited.

2.04 CLEANOUTS AND ACCESS COVERS

Provide cleanouts where indicated and even if not indicated in the following locations. At junction of building drain with building sewer, at points of change in direction in horizontal drain exceeding 45 degree change of direction, at intervals of 50 feet in horizontal runs. Cleanouts shall be in the location accessible for easy removal and which will provide clearance for routing. Size shall be same as pipe served but need not be larger than 4 inches in any case.

Cleanouts and access covers as hereinafter specified are based on Josam Manufacture, similar product manufactured by Zurn, Wade, Smith, or equal in accordance with Plumbing Blue Book Comparison Chart, is acceptable.

- 1. Interior wall cleanouts shall be Smith 4472-U, Josam 58890-15, Wade W-8470-R, Zurn Z-1468, or approved equal, taper thread countersunk bronze plug with stainless steel round cover and vandalproof screw.
- 2. Exterior wall cleanouts shall be same as interior except with Smith 4730-U, Josam 58650-15, Wade 8480ST-2, Zurn Z-1462 or approved equal, chrome plated bronze square frame and cover with vandalproof screws; access opening shall be 6 inches x 6 inches minimum.
- 3. Floor cleanouts shall be Smith 4048-U, Josam 56020-22-15, Zurn ZN-1400-T-IC, or approved equal. Duco cast iron body, tapered thread bronze plug, square adjustable scoriated vandalproof nickel bronze top and with carpet cleanout marker when located in carpeted floor areas.
- 4. Cleanout to grade shall be Smith 4288, Josam 58470, Zurn Z-1402, or approved equal. Duco cast iron body, countersunk taper thread bronze plug and inside caulked outlet. Cleanout shall be set in 12 inches x 12 inches x 12

inches concrete pad flush to pavement, or one inch above finished grade with beveled edges down to finished grade.

5. Vehicular Traffic Cleanout shall be Smith 4248C-CSS, Josam 56040-22, Wade 6000-Z, Zurn Z-1400-HD or approved equal. Duco cast iron cleanout with taper threaded countersunk bronze plug, round adjustable scoriated ductile iron top, non-tilt tractor cover with vandal proof center securing screws. Cleanout shall be set in 24 inches x 24 inches x 6 inches concrete pad flush to pavement.

2.05 BACKFLOW PREVENTION DEVICES

Reduced pressure backflow preventer assembly shall be approved type such as manufactured by Beeco, Cla-Val, Watts or approved equal. Assembly shall include water hammer arrester, strainer, and isolation gate valves to provide isolation of the entire assembly. Assembly shall be Board of Water Supply approved (meets AWWA C511)

2.06 DIELECTRIC UNIONS AND FLANGES

Provide at connections between copper and ferrous metal piping materials.

1. Dielectric Unions or flanges shall be suitable for the required operating temperature and pressure. The metal parts of dielectric unions or flanges shall be separated to prevent current flow between the dissimilar metals.
2. ASTM F 441, Schedule 80, CPVC threaded pipe nipples, 4-inch minimum length, may be provided for dielectric connections in pipe sizes 2 inches and smaller.

2.07 VALVES

All valves shall be suitable for 125 lb steam working pressure minimum, and in accordance with the latest edition of ASTM and ANSI specifications as indicated. Valves shall be certified lead-free for potable water applications.

ITEM	SIZE	DESCRIPTION	
Gate Valves	2 inches and smaller	125-lb, SWP, bronze, rising stem, double wedge disc, union bonnet, screwed ends.	
		Nibco	T-111-LF (lead-free)
		Nibco	T-111
		Grinnell	3090
		Crane	430 UB
		Lunkenheimer	3125

Gate Valves	2-1/2 inches and larger	125-lb, SWP, IBBM, O.S. & Y solid wedge disc, flanged ANSI B16.1.		
		Nibco	F-617-0	
		Crane	465-1/2	
		Lunkenheimer	1430	
		Stockham	G-623	
		Grinnell	6020A	
ITEM	SIZE	DESCRIPTION		
Globe and Angle Valves	2 inches and smaller	125-lb, SWP, bronze, rising stem, inside screw, composition disc, screwed ends.		
			Globe	Angle
		Crane	7	17
		Lunkenheimer	2140	2141
		Stockham	B-22	B-222
		Nibco	T-211-B	T-311-Y
		Grinnell	3200	3220
Globe and Angle Valves	2-1/2 inches and larger	125-lb, SWP, IBBM, O.S.& Y bolted bonnet, renewable and regrindable disc and seat ring, flanged ANSI B16.1.		
			Globe	Angle
		Crane	351	353
		Lunkenheimer	1123	1124
		Walworth	906F	907F
		Powell	241	243
		Stockham	G512	G515
		Nibco	F-718-G	F-818-B
		Grinnell	6200A	

Check Valves (Vertical)	3 inches and smaller	Minimum 125 lb. SWP, pressure Valves smaller class, cast iron or semisteel, bronze trim, stainless steel spring, silent type, flanged.	
		Nibco	W-910-LF (lead-free)
		Williams- Hager	Fig. 329
		Miller	Fig. 153
		APCO	Series 300
Check Valves (Vertical)	4 inches and larger	Cast iron or semisteel, globe body, bronze trim, stainless steel spring, silent type, flanged.	
		Nibco	F-910-LF (lead-free)
		Williams- Hager	Fig.636
		Miller	Fig.162
		APCO	Series 600
ITEM	SIZE	DESCRIPTION	
Check Valves (Sewage Discharge Only)	2 inches and smaller	125-lb. SWP pressure class, ductile iron, swing flex type, flanged.	
		Val-Matic	Series 500
Check Valves (Horizontal)	2 inches and smaller	125-lb SWP, bronze, screwed cap, swing type, renewable disc, screwed ends.	
		Nibco	T-413-Y-LF (lead-free)
		Nibco	T-413-B
		Crane	34

		Lunkenheimer	2144
		Stockham	B-319
		Grinnell	3300
Check Valves (Horizontal)	2-1/2 inches and larger	125-lb SWP, IBBM, bolted cap, swing type, renewable disc and seat ring, flanged.	
		Nibco	F-938-33
		Nibco	F-918-B
		Crane	373
		Lunkenheimer	1790
		Stockham	G-931
		Grinnell	6300A
Balancing Cocks	2 inches and smaller	250-lb W.O.G., bronze plug cock, square head, screwed.	
		Nibco	T-1810-LF (lead-free)
		Crane	80E
		Lunkenheimer	872
		Walworth	476
Balancing Cocks	2-1/2 inches and larger	175-lb W.O.G., semi-steel, square head, lubricated plug, flanged; 6 inches and larger gear operated.	
		Powell 2201, 2201-G & 2208-G	
		Walworth 1718F & 1797F	
ITEM	SIZE	DESCRIPTION	

Ball Valves	2 inches and smaller	125 psi SWP, full port ball valve, bronze 2-piece body, stainless steel ball, virgin TFE seat, screwed ends, stainless steel lever handle with integral stop [and with stem extension to accommodate insulation where required].	
		Nibco	T-585-66-LF (lead-free)
		Nibco	T-585-70-66
		Apollo	70-140-10-35
Ball Valves	2-1/2 inches and larger	275-lb, W.O.G., ANSI 150-lb, flanges, full port ball valve, carbon steel, teflon seat, insulated 1/4 turn handle, [and with stem extension to accommodate insulation where required].	
		Nibco	T-FP-600A-LF (lead-free)
		Apollo	88A-200
		Crane	941-TF
Butterfly Valves	2 inches thru 20 inches	Seat to provide bubble tight shutoff at up to 150 psi on dead end isolation service without use of downstream flanges 10-position throttling handle equipped with memory stop for valves up to 6 inches size. Gear operated actuator with position indicator window for valves 8 inches and larger. Valves installed more than 7 feet above the floor in equipment rooms shall have chain operated handles with chain of sufficient length to be 6 feet-6 inches above the finished floor. Weather-proof actuators shall be furnished for valves exposed to weather.	
		Nibco LD-2000 and actuator (lead-free)	
		DeZurik Figure No. 632, L, D, RS66, 1, and actuator.	
		Grinnell LC-8280-6 and actuator.	

ITEM	SIZE	DESCRIPTION	
Motorized Valves	2 inches and 20 inches	Same as specified above for butterfly valves except with electric motor actuator. Motor shall be with NEMA 4 enclosure; 26 second minimum closing time; 120 volts, single phase; wrench operated motor shaft for back-up operation and safety interlock cap on motor shaft cap to cut power to motor when removed; 2 adjustable open and close limit switches located within motor unit; 150 psi shutoff pressure; position indicating potentiometer in the limit switch case.	
Y-Strainer	2 inches and smaller	300 psi W.O.G., bronze body, 20 mesh stainless steel screen, screwed ends, and hose end valve.	
		Watts	LF777S (lead-free)
		Nibco	No. T-221-A
		Watts	No. 777SI
Y-Strainer	2-1/2 inches and larger	175 psi W.O.G., iron body with 125 lb flange, 20 mesh stainless steel screen and one inch globe valve.	
		Watts	77F-DI-FDA-125 (lead-free)
		Nibco	No. F-721-A
		Watts	No. 77F-DI
Basket Strainer	2-1/2 inches and larger	175 psi W.O.G., iron body, stainless steel screen and 125 lb flange.	

Pressure Reducing Valve	2 inches and smaller	300 psi maximum initial Pressure bronze threaded end body, high temperature resistant up to 160 degrees F and suitable for hot and cold water service, renewable nickel alloy seat, water tight cage assembly, reduced pressure range shall be suitable to the application, valve shall be IAPMO approved and meet the requirements of ASSE Std 1003.	
		Watts	LFU5B (lead-free)
		Bailey	30A
ITEM	SIZE	DESCRIPTION	
Pressure Reducing Valve	2 inches and smaller	200 psi maximum initial pressure bronze threaded end body with union, suitable for cold and hot water service temperatures up to 200 degrees F., renewable stainless steel seat, renewable integral or separate 20 mesh stainless steel strainer, water tight cage assembly reduced pressure range shall be between 10 psi and 35 psi, valve shall be IAPMO approved and meet the requirements of ASSE Std 1003.	
		Watts	LFU5B (lead-free)
		Watts	U5BLPSC
		Bailey	30A
Pressure Reducing Valve	2-1/2 inches and larger	175 psi maximum initial pressure cast iron flanged end body, suitable for cold and hot water, temperatures to 180 degrees F, hydraulic operated, pilot controlled, renewable seat, reduced pressure range to suit the application, and stainless steel trim.	

		Cla-Val
		Bailey

2.08 ELECTRIC WATER HEATER (Commercial)

The heater shall be State, A.O. Smith Dura-Power Commercial Electric, Lochinvar, or an approved equal. Heater capacity and electrical characteristics shall be as scheduled on the drawings. The heater shall be [vertical] [horizontal] installation with lifting lugs and channel skid base. Vessel shall be constructed to Section IV of the ASME Code for 125 psi working pressure. Vessel shall be glass-lined with magnesium anode protection. Entire vessel and electrical controls shall be encased in a rectangular sheet metal enclosure baked enamel finish. Tank shall be insulated with foam insulation. Separate 3-1/2 inches dial type temperature gauge shall be mounted on the front of the enclosure. Enclosure shall have hinged locking door over electric controls. Heating elements shall be replaceable, incoloy sheathed heating elements each complete with prewired terminal leads. These elements shall be switched by magnetic contactors which shall be operated by 120V fused control circuit protected by manual reset high limit. Control circuit shall be activated by a master pilot switch and electronic low water cutoff. The thermostatic control of the contacts shall be thru solid state modulating step control which shall balance the water heating input to the demand. This control shall prevent the entire electrical load from being switched on instantaneously. The control shall have even load progressive sequencing which utilizes the "first on, first off" principle thereby equalizing the operating time of heating elements and contactors. Each magnetic contactor and heating element circuit shall be protected by a maximum of 60 amp cartridge type fuses with a minimum of 100,000 amp interrupting capacity. The entire water heating package will be prewired to solderless terminal lugs, factory tested, complete with ASME temperature and pressure relief valve and bear the Underwriters' Laboratories label.

Heater shall have a 3 year warranty.

2.09 ELECTRIC WATER HEATER

- A. Electric water heater shall be U.L. Listed according to safety specifications outlined in Underwriters' Laboratories, Inc. Standards for Safety (U.L. 174) meet or exceed energy-efficiency requirements of ASHRAE 90.1-2004 and comply with I.B.C. codes.
- B. Provide the following features:
 1. Foamite Polyurethane foam Insulation minimum 1-1/2 inch thick, R Value of 12.5.
 2. Double-Element: Direct-immersion threaded heating elements, upper and lower interlocking, non-simultaneous.
 3. Anode rod protects against tank corrosion.
 4. U.L. Listed energy Cut-off (E.O.C.) safety feature.

5. Automatic Thermostat.
 6. Nylon Drain Valve.
 7. Welded Steel Couplings.
 8. Maximum Hydrostatic Working Pressure: 150 PSI.
 9. 5-year warranty.
- C. Capacity and electrical rating shall be as scheduled on the drawings. Water heater shall be installed with time clock.

2.10 TIME CLOCK (FOR ELECTRIC WATER HEATER)

- A. Electromechanical Time Clock: Furnish and install electromechanical (7-day) time control with quartz (synchronous) time base and (DRDT) switch. Input voltage shall be 120 VAC and contacts will be rated at 16A/250 VAC. The 7-day time clock shall allow 4 on/off cycles per day. The time control shall also feature a manual override and load status indicator. To set the starting time and to provide a time indicator, the unit shall incorporate an authentic clock face. Time clock enclosure shall be suitable for location installed. Enclosure shall be surface or recessed, as indicated on drawings. The time clock shall be provided with 50 hours of battery back up in quartz version. Johnson Controls time clock Model C-7355-3 for panel mounting and C-7355-4 provided with enclosure for surface mounting.
- B. Mechanical Override Timer: Provide a manual wind, mechanically driven timer without "HOLD" feature. Time shall be adjustable for up to 6 hours of operation.

2.11 HOT WATER RETURN PUMP

The hot water return pump shall be centrifugal, end suction type, with all bronze construction mechanical seals and flexible coupling connected to motor. Pump shall not overload the motor at any point on the pump performance curve. Capacity and other electrical characteristics as shown on drawing. A NEMA rated starter shall be furnished to suit pump operation. Pump frame shall be cast iron or galvanized welded steel construction. Motors shall be as specified in paragraph "MOTORS". Aquastat shall be provided to energize pump at 120 degrees F or less and to de-energize at 135 degrees F.

2.12 MOTORS

- A. All motors 1 horsepower and larger shall be NEMA "Premium Efficiency" type. Efficiency rating shall be in accordance with NEMA MG1-12.536.
- B. Motors shall have a 1.15 service factor unless otherwise specified.
- C. Motors to be used with variable speed drives shall be provided with phase isolation, Class F insulation and a winding thermostat that will detect any motor overheat conditions.
- D. Motors shall be designed to operate at full capacity with a voltage variation of plus or minus 10 percent of the motor voltage rating. Motor size shall be sufficient for the duty to be performed and shall not exceed its full load nameplate

current rating when driven equipment is operated at specified capacity under the most severe conditions likely to be encountered. When motor size provided differs from the size indicated or specified, the Contractor shall make the necessary adjustments to the wiring, disconnect devices, and branch circuit protection to accommodate the equipment actually provided.

- E. Provide a motor starter for each motor.

2.13 VARIABLE FREQUENCY DRIVES

- A. Furnish complete variable frequency drives as specified herein for the fans and pumps designated on the drawing schedules to be variable speed. All standard and special features shall be included within the VFD enclosure, unless otherwise specified. VFD enclosure shall be NEMA 1 with inlet air filters.
- B. The VFD shall convert 3-phase, 60 Hz Utility power to adjustable voltage and frequency, 3 phase power for stepless motor speed control from 10 percent to 100 percent of the motor's 60 Hz speed. Input voltage shall be as specified on the drawing schedules.
- C. The VFD shall include a converter and an inverter section. The converter section shall convert fixed frequency and voltage AC utility power to DC voltage. All VFDs shall include input line reactors.
- D. The inverter section of the VFD shall invert the DC voltage into a quality output waveform, with adjustable voltage and frequency for stepless motor speed control. The VFD shall maintain a constant V/Hz ratio.
- E. The VFD and special features shall be tested to ANSI/UL Standard 508. The complete drive, including all specified options, shall be listed by a nationally recognized testing agency such as UL.
- F. Power line noise shall be limited to a voltage distortion factor and line notch depth as defined in IEEE Standard 519-1981, Guide for Harmonic Control and Reactive Compensation of Static Power Converters. The total voltage distortion shall not exceed 5 percent.
- G. The VFD shall not emit radiated RFI in excess of the limitations set forth in the FCC Rules and Regulations, Part 15 for Class A computing devices. The VFD shall carry a FCC compliance label. PWM type drives shall include RFI filters.
- H. Motor noise as a result of the VFD shall be limited to 3 Db over across the line operation, measured at 3 feet from the motor's center line.
- I. The VFD's full load amp rating shall meet or exceed NEC Table 430-150.
- J. Protective Features:
 - 1. Individual motor overload protection for each motor controlled.
 - 2. Protection against input power undervoltage, overvoltage, and phase loss.
 - 3. Protection against output current overload and instantaneous over current.
 - 4. Protection against overtemperature within the VFD enclosure.
 - 5. Protection against overvoltage on the DC bus.

6. Protect VFD from sustained power or phase loss. Undervoltage trip activates automatically when line voltage drops more than 10 percent below rated input voltage.
7. Automatically reset faults due to undervoltage, overvoltage, phase loss, or overtemperature.
8. Protection against output short circuit and motor winding shorting to case faults, as defined by UL508.
9. Status lights or digital display for indication of individual fault conditions.
10. Controller capable of operating without a motor or any other equipment connected to the drive output to facilitate start-up and troubleshooting.
11. Input line reactors shall be provided to minimize harmonics introduced to the AC line, and to provide additional protection to AC line transients.

K. Interface Features:

1. Door mounted hand/Off/Auto selector switch to start and stop the VFD. In the auto position, the VFD will start/stop from a remote contact closure. In the Hand Position, the VFD will run regardless of the remote contact position.
2. Manual speed control capability.
3. Local/Remote selector switch. In the remote position, motor speed is determined by the follower signal. In the local position, motor speed is determined by the manual speed control.
4. Power/on light to indicate that the VFD is receiving utility power.
5. Fault light to indicate that the VFD has tripped on a fault condition.
6. Digital meter with selector switch to indicate percent speed and percent load.
7. A set of form-C, dry contacts to indicate when the VFD is in the run mode.
8. A set of form-C, dry contacts to indicate when the VFD is in the fault mode.
9. A 0 to 10Vdc output signal to vary in direct proportion to the controller's speed.
10. VFD to have terminal strip to accept N.C. safety contacts such as freezstats, smoke alarms, etc. VFD to safely shut down in drive or bypass mode when contacts open.
11. VFD to accept an additional N.C. contact to interface with the Hand-Off-Auto switch for remote Stop/Start control.
12. VFD shall accept a 4 to 20mA, 0 to 5Vdc, 0 to 10Vdc or a 3 to 15psi pneumatic signal (if required).

L. Adjustments:

1. Maximum speed, adjustable 50 to 100 percent base speed.
2. Minimum speed, adjustable 0 to 50 percent base speed.
3. Acceleration time, adjustable 3 to 60 seconds.
4. Deceleration time, adjustable 3 to 60 seconds with override circuit to prevent

nuisance trips if decel time is set too short.

5. Current limit, adjustable 0 to 105 percent.
6. Overload trip set point.
7. Offset and gain to condition the input speed signal.

M. Service Conditions:

1. Ambient temperature, 32 to 104 degrees F.
2. 0 to 95 percent relative humidity, noncondensing.
3. Elevation to 3,300 feet without derating.
4. AC line voltage variation, -10 to + 10 percent of nominal.

N. Special Features:

1. The following special features shall be included in the VFD enclosure. The unit shall maintain its UL or ETL Listing.
 - a. Manual bypass shall provide all the circuitry necessary to transfer the motor from the VFD to the power line, or from the line to the controller. The bypass circuitry shall be mounted in a separate section of the VFD enclosure. Motor overload protection shall be provided in both drive and bypass modes.
 - b. A door interlocked, pad lockable drive disconnect switch shall be provided to disconnect power from the VFD only.

O. Quality Assurance:

1. To ensure quality and minimize infantile failures at the jobsite, the complete VFD shall be tested by the manufacturer. The VFD shall operate a dynamometer at full load and the load and speed shall be cycled during the test.
2. All optional features shall be functionally tested at the factory for proper operation.

P. Submittals:

1. Submit manufacturer's performance data including dimensional drawings, customer connection drawings, power circuit diagrams, installation and maintenance manuals, warranty description, VFDs FLA rating, certification agency file numbers and catalog information.
2. The specification lists the minimum VFD performance requirements for this project. Each supplier shall list any exceptions to the specification. If no departures from the specification are identified, the supplier shall be bound by the specification.

- Q. The manufacturer shall provide start-up commissioning of the variable frequency drive and its optional circuits by a factory certified service technician who is experienced in start-up and repair services. The commissioning personnel shall be the same personnel that will provide the factory service and warranty repairs at the customer's site. Sales personnel and other agents who are not factory certified technicians for drive field repair shall not be acceptable as

commissioning agents.

Start-up services shall include checking for verification of proper operation and installation for the VFD, its options and its interface wiring to the building automation system. Included in this service shall be (as a minimum):

1. Verification of contractor wire terminations to the VFD and its optional circuitry.
2. Installation verification for proper operation and reliability of the VFD, the motor being driven, and the building automation system.
3. Up to one hour of customer operator training on operation and service diagnostics at the time of the equipment commissioning.
4. Measurement of verification of proper operation on each of the following items:
 - a. Motor voltage and frequency. Verification of proper motor operation.
 - b. Control input for proper building automation system interface and control calibration.
 - c. Calibration check for the following set points (and adjustment as necessary) (1) minimum speed, (2) maximum speed, (3) acceleration and deceleration rates.

R. Warranty:

1. The VFD shall be warranted by the manufacturer for a period of 36 months from date of shipment or 12 months after acceptance of installation which ever is later.
2. The motor(s) which are directly connected to the VFD shall be warranted by the VFD manufacturer against insulation breakdown which is directly attributed to the VFD. The length of the motor insulation warranty shall be the same as the VFD warranty. The motor must never have been driven by another VFD.

S. Contractor to verify that jobsite conditions for installation meet factory recommended and code required conditions for VFD installation prior to start-up. These shall include as a minimum:

1. Clearance spacing.
2. Temperature, contamination, dust, and moisture of the environment.
3. Separate conduit installation of the motor wiring, power wiring, and control wiring.
4. Installation per the manufacturer's recommendations.

T. The VFD is to be covered and protected from installation dust and contamination until the environment is cleaned and ready for operation. The VFD shall not be operated while the unit is covered.

2.14 WATER-HAMMER ARRESTERS

Provide where indicated in water-supply distribution system water hammer

arresters TYPE AND SIZE as per manufacturer, Sioux Chief, Smith, Zurn, Watts, Wade, or Josam and approved by the Plumbing and Drainage Institute, Standard No. 201. Water hammer arresters shall be maintenance free and not require access panel.

2.15 FLASHING

Plumbing vent through roof flashing shall be 4 pounds per square foot sheet lead.

2.16 PIPING INSULATION

- A. All insulation material applied to the exterior surface of metal pipes shall have flame spread of not more than 25 and a smoke development rating of not more than 50 when tested as a composite installation, including insulation, facing material, tapes and adhesives as normally applied.
- B. All hot water supply and return lines except small fixture branches shall be insulated with Owens/Corning Fiberglass 25ASJ/SSL insulation with an embossed vapor barrier laminate sealed with pressure adhesive tape. Insulation shall have a minimum wall thickness of not less than the diameter of the pipe for a pipe up to 2 inches (50 mm) in diameter. Insulation wall thickness shall be not less than 2 inches (51 mm) for a pipe of 2 inches (50 mm) or more in diameter. Fitting and valve shall be insulated with segments of insulation coated with fitting mastic, then applied over fiberglass reinforcing cloth and coated with another coating of fitting mastic.
- C. All insulation exposed to weather or exposed within 7 feet of floor shall be provided with 0.016 inch thick aluminum jacket. Installation of snap and metal band shall be as recommended by manufacturer.
- D. Underground hot water supply and return piping shall be pre-insulated pipe.
 - 1. The inner or carrier pipe shall be Type K copper tubing as per A.S.T.M. Spec B88-72.
 - 2. The insulation between the carrier pipe and jacket pipe shall be cellular polyurethane foam. The polyurethane foam insulation shall be one inch thick foamed in place with a nominal density of 2-lb. per cubic foot with a "K" factor of .13.
 - 3. The casing shall be a solid wall jacket of P.V.C. with a minimum thickness of 110 mils.
 - 4. All elbows, tees, couplings, etc., shall be foam insulated in place with P.V.C. fitting cover.
 - 5. For buried systems, the trench shall be a minimum of 12 inches wider than the pipe and a minimum of 2 feet deep. Base of trench and all backfill within 12 inches of piping system shall be clean earth, sand, or screening free of any debris.
 - 6. All pressure tests will be conducted prior to burying of the system.

- E. Accessible Sinks and Lavatories - Drain piping and water piping [insulation shall be molded closed cell vinyl with anti-microbial additive. Installation shall be in compliance with the Americans with Disabilities Act. Insulation shall be self extinguishing and as manufactured by Truebro, McGuire Products, Brocar Products or approved equal.]

[Insulation shall be Armacell Armaflex II or approved equal.] Finish color shall be as specified by Architect.
- F. Insulate all soil, waste, and vent piping downstream of condensate drain connections with one inch thick Armacell Armaflex or approved equal. Insulation shall have a flame spread index of 25 or less and a smoke-developed index of 50 or less as tested by ASTM E84.

2.17 HOT EQUIPMENT INSULATION

- A. Hot equipment shall include hot water storage tank, and heat exchanger.
- B. Insulate all surfaces with 3 inches thick, 6 lbs/cubic feet fiber glass insulation board having a "K" value of 0.22 at 75 degrees F mean temperature.
- C. Installation shall be in accordance with manufacturer's recommendations.
- D. Finish shall be composed of one inch galvanized wire mesh over entire surface and 2 coats of insulating cement troweled to a hard smooth finish.

2.18 VIBRATION ISOLATORS

All isolators and fasteners exposed to weather shall be hot dipped galvanized. Isolators shall be as manufactured by Mason, Vibrex, Vibro Acoustics, Korfund or approved equal.

- 1. Neoprene Isolators: Double deflection neoprene mountings shall have a minimum static deflection of 0.35 inch. All metal surfaces shall be neoprene covered to avoid corrosion and have friction pads both top and bottom so they need not be bolted to the floor. Bolt holes shall be provided for these areas where bolting is required. On equipment such as small vent sets and close coupled pumps, steel rails shall be used above the mountings to compensate for the overhang. Mountings shall be type ND or rails type DNR as manufactured by Mason Industries, Inc.
- 2. Spring Mount Isolators: Spring type isolators shall be free standing and laterally stable without any housing and complete with 1/4 inch neoprene acoustical friction pads between the baseplate and the support. All mountings shall have leveling bolts that must be rigidly bolted to the equipment. Spring diameters shall be no less than 0.8 of the compressed height of the spring at rated load. Springs shall have a minimum additional travel to solid equal to 50 percent of the rated deflection.

Submittals shall include spring diameters, deflections, compressed spring height and solid spring height. Mountings shall be type SLF as manufactured by Mason Industries, Inc.

- 3. Spring Mount Restrained Isolator: Equipment with operating weight different

from the installed weight such as heat exchanger, boilers, etc. and equipment exposed to the wind such as roof top equipment shall be mounted on spring mountings as described in engineering Specification B, but a housing shall be used that includes vertical limit stops to prevent spring extension when weight is removed. The housing shall serve as blocking during erection and cooling tower mounts shall be located between the supporting steel and roof or the grillage and dunnage as shown on the drawings. The installed and operating heights shall be the same. A minimum clearance of 1/2 inch shall be maintained around restraining bolts and between the housing and the spring so as not to interfere with the spring action. Limit stops shall be out of contact during normal operations. Mountings used out of doors shall be hot dipped galvanized. Mountings shall be SLR as manufactured by Mason Industries, Inc.

4. Spring/Neoprene Hanger Isolator: Vibration hangers shall contain a steel spring and 0.3 inch deflection neoprene element in series. The neoprene element shall be molded with a rod isolation bushing that passes through the hanger box. Spring diameters and hanger box lower hole sizes shall be large enough to permit the hanger rod to swing through a 30 degrees arc before contacting the hole and short circuiting the spring. Springs shall have a minimum additional travel to solid equal to 50 percent of the rated deflection. Submittals shall include a scale drawing of the hanger showing the 30 degrees capability. Hangers shall be type 30N as manufactured by Mason Industries, Inc.
5. Spring Hanger Isolator: Vibration hangers shall contain a steel spring located in a neoprene cup manufactured with a grommet to prevent short circuiting of the hanger rod. The cup shall contain a steel washer designed to properly distribute the load on the neoprene and prevent its extrusion. Spring diameters and hanger box lower hole sizes shall be large enough to permit the hanger rod to swing through a 30 degrees arc before contacting the hole and short circuiting the spring. Springs shall have a minimum additional travel to solid equal to 50 percent of the rated deflection. Hangers shall be provided with an eye bolt on the spring end and provision to attach the housing to the flat iron duct straps. Submittals shall include a scale drawing of the hanger showing the 30 degrees capability. Hangers shall be type RMXA as manufactured by M.W. Sausse & Co.
6. Steel Base: Vibration isolator manufacturer shall furnish integral structural steel bases. Bases shall be rectangular in shape for all equipment other than centrifugal refrigeration machines and pump bases which may be "T" or "L" shaped. Pump bases for split case pumps shall include supports for suction and discharge base ells. All perimeter members shall be beams with a minimum depth equal to 1/10th of the longest dimension of the base. Beam depth need not exceed 14 inches provided that the deflection and misalignment is kept within acceptable limits as determined by the manufacturer. Height saving brackets shall be employed in all mounting locations to provide a base clearance of one inch. Bases shall be type WF as manufactured by Mason Industries, Inc.
7. Steel Saddle: Vibration isolator manufacturer shall provide steel members welded to height saving brackets to cradle machines having legs or bases

that do not require a complete supplementary base. Members shall be sufficiently rigid to prevent strains in the equipment. Inverted saddles shall be type ICS as manufactured by Mason Industries, Inc.

8. Concrete Inertia Pad: Vibration isolator manufacturer shall furnish rectangular structural beam or channel concrete forms for floating foundations. Bases for split case pumps shall be large enough to provide support for suction and discharge base ells. The base depth need not exceed 12 inches unless specifically recommended by the base manufacturer for mass or rigidity. In general, bases shall be a minimum of 1/12th of the longest dimension of the base, but not less than 6 inches. Pad thickness may be less than 1/12th of the longest span when structurally sound and when pad weight exceeds 5 times the equipment weight. Forms shall include minimum concrete reinforcement consisting of half-inch bars or angles welded in place on 6 inches centers running both ways in a layer 1-1/2 inches above the bottom, or additional steel as is required by the structural conditions. Forms shall be furnished with steel members to hold anchor bolt sleeves when the anchor bolts fall in concrete locations. Height saving brackets shall be employed in all mounting locations to maintain a one inch clearance below the base. Bases shall be type K as manufactured by Mason Industries, Inc., or as indicated.
9. Flexible Neoprene/Rubber Connector: Flexible neoprene connectors shall be used on all equipment as indicated on the drawings or on the equipment schedule. They shall be manufactured of multiple plies of nylon tire cord fabric and neoprene both molded and cured in hydraulic rubber presses. No steel wire or rings shall be used as pressure reinforcement. Straight connectors shall have 2 spheres. Connectors up to and including 1-1/2 inches diameter may have threaded ends. Connectors 2 inches and larger shall be manufactured with floating galvanized flanges recessed to lock the connector's raised face neoprene flanges. Hoses shall be installed on the equipment side of the shut-off valves.

Connectors shall be rated a minimum of 150 psi at 220 degrees F. Flanged equipment shall be directly connected to neoprene elbows in the size range 2-1/2 inches through 12 inches if the piping makes a 90 degrees turn at the equipment. All straight through connections shall be made with twin-spheres properly pre-extended as recommended by the manufacturer to prevent additional elongation under pressure. 12 inches and larger sizes operating above 100 psi shall employ control cables with end fittings isolated by means of 1/2 inch thick bridge bearing neoprene washer bushings designed for a maximum of 1000 psi.

Elbows shall be Mason-Flex type MFNEC, straight connectors Mason-Flex type MFTFU or MFTNC, and control cable assemblies type ACC, all as manufactured by Mason, Industries, Inc.

10. Flexible Bronze Pipe Connectors: Flexible Bronze hose shall have bronze braid and bronze sweat fittings. Sizes 2-1/2 inches and larger shall be flanged. Smaller sizes shall have male nipples. Lengths shall be as tabulated:

FLANGED	MALE NIPPLE
2 1/2 x 24	1/2 x 10
3 x 27	3/4 x 12
4 x 33	1 x 13
5 x 41	1-1/4 x 15
6 x 48	1-1/2 x 17
	2 x 20

Hoses shall be installed on the equipment side of the shut-off valves horizontally and parallel to the equipment shafts wherever possible. Hoses shall be type BSS as manufactured by Mason Industries, Inc.

11. Wall Penetration Isolators: Where piping passes through equipment walls, floors or ceilings, the vibration isolator manufacturer shall provide a split seal consisting of 2 bolted pipe halves with 3/4 inch or thicker neoprene sponge bonded to the inner faces. The seal shall be tightened around the pipe to eliminate clearance between the inner sponge face and the piping. Concrete may be packed around the seal to make it integral with the floor, wall or ceiling if the seal is not already in place around the pipe prior to the construction of the building member. Seals shall project a minimum of one inch past either face of the wall. Where temperatures exceed 240 degrees F., 10# density fiberglass may be used in lieu of the sponge. Seals shall be type SWS as manufactured by Mason Industries, Inc.
12. Pipe Riser Anchor: Vibration isolator manufacturer shall provide an all directional acoustical pipe anchor, consisting of a telescopic arrangement of 2 sizes of steel tubing separated by a minimum half inch thickness of heavy duty neoprene and duct or neoprene isolation material. Vertical restraints shall be provided by similar material arranged to prevent vertical travel in either direction. Allowable loads on the isolation material shall not exceed 500 psi and the design shall be balanced for equal resistance in any direction. All-directional anchors shall be type ADA as manufactured by Mason Industries, Inc.
13. Horizontal Pipe Hanger Isolator: The first 3 pipe hangers in the main lines near the mechanical equipment shall be spring/neoprene type hangers. Floor supported piping shall rest on spring mount restrained isolators. Heat exchanger shall be considered part of the piping run. All hangers or mounts as noted above, will have the same static deflection as specified for the mountings under the connected equipment. (Note: If piping is connected to equipment located in basements and hangs from ceiling under occupied spaces, the first 3 hangers shall have 0.75 inch deflection for pipe sizes up to and including 3 inches, 1.5 inches deflection for pipe sizes up to and including 6 inches, and 2.5 inches deflection thereafter.)

2.19 THERMOMETER

Mercury thermometer, Trerice, Weksler, Weiss, or equal, 9-inch scale with adjustable angle cast aluminum case, range 30 degrees F to 240 degrees F, remote type dial thermometers shall have a 4 inches to 4-1/2 inches dial face, cast aluminum case, mercury actuated and 30 degrees F to 240 degrees F scale.

Accuracy shall be within 1 percent of full scale. Thermometers shall be provided with a cast bronze thermometer well to allow replacing the thermometer without shutting down any system.

2.20 PRESSURE GAGE

4 inches to 4-1/2 inches dial bourdon tube with gage cock, cast aluminum case, 300 psi rating. 0-150 psi scale Weksler, Trerice, Foxboro or equal. Gage shall have an accuracy of one-half of one percent of full scale range. All gages shall be provided with a pressure snubber and gage cock.

2.21 PIPE SUPPORT

Products of Anvil, Superstrut, B-Line, Erico or approved equal. Hangers, supports and accessories used shall be applied in accordance with the manufacturer's recommendation for type of service and application. All supports, rods and accessories shall be galvanized. In addition, supports for copper pipe shall be plastic coated.

2.22 SEALANT

- A. Sealants shall be in accordance with Section 07920 - SEALANTS. Elastomeric sealant complying with ASTM C 920, Type S, Grade NS, Class 25, Use NT, formulated with fungicide: intended for sealing interior joints with non-porous substrates and subject to in-service exposure to conditions of high humidity and temperature extremes. Sealant shall be Dow Corning 786, SCS 1702 sanitary - General Electric Corp., Proglaze White - Tremco, Inc. or OmniPlus - Sonneborn.
- B. Fireproof sealant shall be in accordance with Section 07270 - FIRESTOPPING. Fireproof sealant shall be International Protective Coatings Corporation "Flame-Safe" a water-based compound. Product type and installation shall be in accordance with manufacturer's recommendations and in full compliance with Underwriters Laboratories U.L. 1479 and ASTM E-814. Printed installation instruction and detailed installation drawings shall be submitted with product literature.

2.23 PLUMBING FIXTURE

- A. As specified in Section 15410 - PLUMBING FIXTURES.

PART 3 - EXECUTION

3.01 PIPE INSTALLATION

- A. Underground piping shall be installed promptly after excavating for same,

- keeping all excavations open as short a time as possible. However, piping shall not be permanently closed up, furred in or covered over before it has been tested and inspected, and approved by the Plumbing Inspector and Architect.
- B. Horizontal storm drain, soil and waste piping shall be installed straight as possible to a uniform grade of not less than 1/4 inch per foot unless otherwise shown or directed. Vent piping graded to provide proper venting of the plumbing and to free itself of condensation.
 - C. Openings in pipes, drains, fittings, apparatus and equipment shall be sealed or securely plugged during erection, to prevent accumulating obstructions in same.
 - D. Underground piping outside of building shall have a minimum 12 inches cover except as otherwise shown. Piping in fill shall be properly supported to prevent settling and breaking. Sewer and water pipes shall not run or be laid in the same trench. A distance of minimum 2 feet shall be kept at all times. Except when crossing, the bottom of water piping at all points shall be at least twelve inches above the top of the sewer pipe.
 - E. All pipe appurtenances subject to unbalanced thrust shall be properly braced with concrete reaction blocks and/or tie rods.
 - F. Piping except where specifically shown otherwise, shall be concealed in walls, utility chases, partitions, ceiling spaces and roof spaces. Piping shall be installed to maintain headroom and keep passageways and access openings clear. Where necessary, piping shall offset to maintain the required clearances to coincide with structural features of building.
 - G. Springing, bending or forcing of pipe into place is not allowed; fittings shall be used for all offsets or changes in alignment of piping.
 - H. Rough outlets for all fixtures shall be set exactly to the measurements furnished by the manufacturer; fixtures in batteries with their rough outlets set in a straight line at equal spacing.
 - I. Each water branch connection to fixtures, including hose bibbs, shall be controlled by independent loose key stops. All exposed piping at fixtures shall be brass or copper with chrome plated finish.
 - J. Exposed pipes penetrating walls, ceilings, and floors shall be provided with chrome plated brass escutcheons. Pipes located in cabinets shall be considered exposed.
 - K. Copper pipe shall be isolated from direct contact with ferrous piping connections by approved isolating (dielectric) unions or couplings, and from contact with dissimilar metals outside of system by taping pipe at point of contact with plastic electricians tape.
 - L. Acid waste and vent piping system shall be installed in complete accordance with manufacturer's recommendations.
 - M. Damaged or otherwise defective piping, or piping showing excessive wrench marks, shall be replaced with new materials as directed by the Architect.
 - N. Verify fixture rough-in height and location with architectural drawings.

3.02 PIPE SUPPORTS, HANGERS, INSERTS

- A. Install hangers and supports for all pipe work to provide for expansion and contraction, prevent vibration and maintain required grading by proper adjustment. Supports, hangers, bolts, nuts, and washers shall be galvanized unless otherwise specified. Supports for copper pipe shall be additionally coated with plastic.
- B. Refer to structural drawings [and as built drawings] for type of construction from which piping and/or equipment is to be supported. Support from metal decking is prohibited unless specifically approved by the Structural Engineer.
- C. Drilled in Threaded Inserts: Where supports in walls, beams and joists are required after concrete has been poured, Phillips "Redhead" Drilled-In Threaded Inserts shall be provided, installed in accordance with manufacturer's recommendations and with the approval of the project Structural Engineer.
- D. Support horizontal overhead pipes with clevis hangers, rods inserts, clamps, on suspension suitable for type of building construction.
- E. Support horizontal pipes which are close to floor with pipe rest and floor flange or pipe roll stand on piers.
- F. Support horizontal pipes from walls with "J" hooks, or hangers suspended from wall brackets.
- G. Support vertical pipes at base of the pipe on every floor and at 10' intervals maximum with galvanized steel pipe clamps, special cast iron pipe rests, base fittings, or by other approved methods suitable for type of building construction.
- H. Horizontal Pipe Support Schedule:
 - 1. Support all piping at intervals in accordance with the Plumbing Code or requirements of this section, whichever is more stringent.
 - 2. Support horizontal lines of copper tubing with hangers spaced not more than 6 feet, center to center for all pipe sizes. All pipes shall be supported at elbows, branches and risers.

Support horizontal cast iron soil pipe with hanger, or pier, 2 for each 5 feet pipe length; locate support close to joints, except, pipe exceeding 5 feet in length shall be supported at no more than 5 feet intervals. Supports shall be located on both sides of all joints and within 6 inches of the joint.
 - 4. Gas piping horizontal support spacing shall not exceed 6 feet for all pipe sizes.
 - 5. Support acid (polypropylene) piping per manufacturers recommendation. All pipes shall be supported at elbows, joints, branches and risers.
 - 6. Horizontal pipe support spacing and hanger rod size shall conform to the following table:

Pipe Material

Max. Hanger

Hanger Rod

	<u>Spacing (feet)</u>	<u>Diameter (inches)</u>
Copper Tube: 2 inches and smaller	6	3/8
Copper Tube: 2 to 5 inches and larger	6	1/2
Steel: 2 inches and smaller	6	3/8
Steel: 2.5 inches and 3 inches	6	1/2
Steel: 4 inches and 5 inches	6	5/8
Steel: 6 inches	6	3/4
Steel: 8 to 12 inches	6	7/8
PVC and ABS DWV	4	3/8 (minimum)

- I. Pipes connected to equipment supported with vibration isolators shall be supported with spring isolators having a minimum static deflection equal to vibration isolator supporting the equipment but need not exceed 1-1/2 inches static deflection.
 1. Pipes 1-1/2 inches and smaller within ten feet run from the equipment connection shall be supported with spring isolators.
 2. Pipes 2 inches and larger within twenty feet run from the equipment connection shall be supported with spring isolators.
 3. In addition to the above specified locations, pipes shall be hung from spring isolator where indicated on the drawings.
- J. Provide [0 inches] thick mineral fiber felt between the hanger and glass acid waste and vent pipes.
- K. Provide all necessary supplemental structural steel for proper support or attachment of hangers. Steel shall be painted with one coat of rust-inhibitive primer, see Painting section of specifications.

3.03 PIPE INSULATION

- A. Insulate all hot water supply pipe up to individual fixture branches.
- B. Insulate all cold water pipes exposed to direct sun light.
- C. Insulate all hot water return pipes.
- D. All individual fixture branches more than 10 feet long shall be insulated to within 2 feet of the fixture.
- E. Insulate tailpiece, trap, trap arm and water supply pipes at accessible sinks and lavatories.
- F. Insulate all soil, waste, and vent piping downstream of condensate drain connections including piping inside of walls.

3.04 WATER HAMMER ARRESTOR AND AIR CHAMBER

Group of plumbing fixtures shall be protected from hydraulic shock by installing water hammer arrestor where indicated on plans. Individual plumbing fixtures shall be protected from hydraulic shock by installing air chamber minimum 12 inches in height.

3.05 VIBRATION ISOLATORS

Provide vibration isolators to vibrating and/or dynamic equipment, and install per equipment manufacturer's instructions. Electrical conduit connections to isolated equipment shall be looped to allow free motion of isolated equipment. Provide flexible connectors at piping and ductwork that is connected to isolated equipment.

3.06 SLEEVES

Contractor shall, unless otherwise specified elsewhere, furnish and install pipe sleeves for all pipes which pass through foundations, walls, partitions, floors, ceilings or roofs, in accordance with the following:

- 1. Sleeves for piping, tubing, etc., unless otherwise modified or specified, shall be of standard schedule 40 black galvanized pipe with ends cut square and reamed and of sufficient length to flush with finished surfaces at both ends of sleeves.
- 2. Sleeves for piping which pass through foundations and are below the ground shall be cast iron or ductile iron pipe. Space between pipe and sleeves (both ends) shall be thoroughly caulked with packed tarred oakum and lead wool or packed tarred oakum and poured lead to make a waterproof installation.
- 3. Spaces between pipe and floor sleeves shall be sealed with U.L. listed fire stopping material for the full depth of the floor.
- 4. Cutting or drilling of any structural members will not be permitted without the approval from the Architect.
- 5. Where applicable all sleeves shall meet the requirements specified in Section 15200 - NOISE, VIBRATION AND SEISMIC CONTROL.

3.07 VENT PIPE FLASHING

All pipes through roof shall be flashed and counter-flashed to provide a water tight installation with a 4-pound sheet lead, with base extending out 4 inches on roof all around pipe and at least 6 inches high into a counterflashing sleeve on the pipe or returned one inch down into pipe. Sheet lead shall be seamless or burned in with pure lead, solder will not be permitted. Work shall be performed in coordination with roofing work, as approved by the Architect.

3.08 PUMPS

- A. The pump shall be mounted level and installed in such a manner as to allow the complete removal without dismantling or removal of piping or valves.
- B. Adjacent piping shall be carefully fitted and erected so that the pump can be installed or removed from the piping without forcing or springing.
- C. Flexible connectors and pressure gauges shall be installed at the inlet and outlet of all pumps. Isolation gate valves and strainers shall be installed at the inlets of all pumps. A check valve and plug cock shall be installed at the outlets of all pumps.
- D. After the system has been completed and pump started, the pump and system shall be checked for vibration and excessive noise and any such noise or vibration shall be immediately corrected.

3.09 THERMOMETERS

- A. Thermometers shall be installed at the inlet and outlet of all water heaters, heat exchangers and where shown on drawings.
- B. Thermometers shall be installed so they can be read by standing on the floor without the use of ladders.

3.10 PRESSURE GAUGES

- A. Pressure gauges shall be installed at the inlet and outlet of all pumps and pressure control valves, at the outlets of commercial water heaters and boilers, at the outlets of pressure vessels and where shown on drawings.
- B. Pressure gauges shall be installed with gauge cock and pressure snubbers to provide easy replacement and protection from pressure surges.
- C. Pressure gauges shall be installed so they can be read while standing on the floor without the use of ladders.

3.11 DIELECTRIC UNIONS AND FLANGES

- A. Dielectric unions or flanges shall be installed when connecting dissimilar metal water piping, accessories or equipment.
- B. Copper water piping shall be isolated from ferrous material such as metal studs, hanger or clamps by wrapping the pipe with plastic electrician's tape.

3.12 FIXTURE INSTALLATION

- A. Each fixture shall be installed at the exact height and location shown on architectural drawings, or as directed.
- B. Fixture supplies, trap and trap arm shall be set square with wall, in line with fixture outlets without any offsets, angles, or bends.
- C. Each fixture shall be set level and in continuous contact with floor or wall; fixture in batteries shall be set on one line, at equal spacing.
- D. Joints between fixtures and walls or floor shall be adequately sealed, forming a smooth, even watertight joint. China caps shall be securely sealed into place over floor flange bolts, entirely covering washer and bolt hole.
- E. Wall Supports: Proper provisions for supporting all wall hung plumbing fixtures are totally within the scope of this section of the specifications. All metal supports shall receive one coat of red lead and oiled before erection.
- F. Chrome plated brass wall escutcheons shall be provided for all piping. Exposed piping shall be chrome plated. Pipe within cabinets shall be considered exposed and shall therefore be chrome plated.

3.13 GREASE INTERCEPTOR

- A. The contractor shall prepare and be responsible for an excavation in accordance with the grease interceptor manufacturers requirements.
- B. Suitable native soil or sub-base shall be prepared to handle anticipated loads. The contractor shall provide minimum 6 inches of base material at the bottom of the interceptor and sampling box, graded level and compacted to 90 percent maximum dry density or to the requirements of the project geotechnical engineer.
- C. The tank must be tested to insure that the system as a whole is water tight. Water tight testing must be completed and approved after installation, but before the tank is put into service. Backfilling may be required to prevent tank walls from failing or sustaining structural damage.
- D. Water testing will require the contractor to fill tank to operational liquid level with water and allowed to stand to achieve complete concrete absorption, then refill to the same level. Once refilled, there shall be no measurable liquid loss in the following hour.
- E. Vacuum testing will be allowed as an alternative to water testing. Vacuum testing methods should be approved and supervised by the grease interceptor manufacturer. The vacuum test shall be performed before the tank is back filled. Vacuum testing a tank that has been backfilled could have structural ramifications.
- F. Seal the empty tank and apply a vacuum of 4 inches of mercury. Hold the vacuum for 2 minutes. There should be no more than 10 percent loss in vacuum at the end of 2 minutes.
- G. Failure to comply with proper backfill procedures recommended by the grease interceptor manufacturer could result in structural damage or leakage from pipe connections, or tank, due to settling, point loading, impaction, etc. Backfill shall

be suitable material and shall be laid in equal lifts around the tank's perimeter and adequately compacted from bottom to top to prevent movement or settling under the pipe or fittings.

3.14 VALVE TAGS AND INDEX

Identification tags made of brass or aluminum shall indicate valve number, function, size, and working pressure and shall be installed on all valves. Tags shall be 1-1/2 inches minimum in diameter, and marking shall be stamped. Tags shall be wired to valve with 0.0808-inch diameter, No. 12 AWG, copper wires. Furnish a chart indicating location, index number and purpose of all valves for the Architect's review and approval.

3.15 STANDARDIZED PIPE IDENTIFICATION SYSTEM

- A. Use an arrow marker with each pipe content marker, the arrow shall always point away from the pipe marker and in the direction of the flow.
- B. If flow can be in both directions, use a double headed arrow marker.
- C. Apply pipe marker and arrow marker at every point of pipe entry or exit where line goes through wall.
- D. Apply pipe marker and arrow marker on each riser and "T" joint.
- E. Apply pipe marker and arrow marker every 20 feet on long continuous lines.
- F. Apply markers on the 2 lower quarters of the pipe and where view is unobstructed.
- G. Arrow markers shall be 4 inches long minimum, and pipe content marker lettering sizes shall be 1-1/2 inches minimum in height.

3.16 TESTING AND ADJUSTING

- A. All work completely installed and tested as required by this section and the applicable plumbing ordinances, and proven leak tight before inspection is required. Providing of all required equipment and labor to make the test and repeating of the tests to the satisfaction of those making the inspection is within the scope of this section of the specifications.

Any work concealed without the required test and approval shall be uncovered and tested at the Contractor's expense.

- B. Procedure:
 - 1. Soil, waste and vent piping: Filled with water to the highest point in each system, and left filled for eight hours with no noticeable change in water level; after approval, remove the test plugs and flush the line.
 - 2. Water Piping: At 150 psi and left for an eight hour period without loss of pressure; and left under line pressure for the balance of the construction period.
 - 3. Gas Piping: 60 psi air pressure test for a period of 24 hours. After test, all gas piping shall be purged of all gas.

4. Plumbing Fixtures: Filled with water and checked for leaks and/or retarded flow.
5. All Valves: Adjusted and balanced to provide for the proper operation of the various systems. After disinfecting, strainer screens shall be removed, cleaned and reinstalled.

3.17 DISINFECTING

All domestic cold and hot water lines shall be thoroughly flushed and drained after installation. Sterilization shall be accomplished by opening taps at the end of all branches, and slowly filling the system adding liquid chlorine, or hypochlorite solution, to the water until water flowing from all branches indicates not less than 50 P.P.M. residual chlorine; the system allowed to stand for not less than 24 hours, with all valves opened and closed several times during this period; then drained and thoroughly flushed until all traces of chlorine are eliminated 0.1 - 0.5 P.P.M. Certificate shall be submitted to the Architect. The Contractor shall be responsible for the proper disposal of chlorinated water to safeguard public health and environment in accordance with applicable Department of Health requirements.

3.18 INSTRUCTIONS FOR OPERATION AND BROCHURES

Contractor shall submit a complete bound set of operating and maintenance instructions in accordance with Section 15011 - GENERAL MECHANICAL PROVISIONS.

3.19 PAINTING

Painting shall be as specified in Section 09900 - PAINTING.

3.20 SPARE-PARTS DATA

After approval of materials and equipment and 2 months prior to the date of beneficial occupancy, the Contractor shall furnish a complete list of parts and supplies, with current source of supply.

3.21 PIPE PENETRATION

Where pipes penetrate fire rated walls and floors the space between the pipe and pipe sleeve shall be sealed with fireproof sealant.

Installation shall be in accordance with manufacturers instructions.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15410 - PLUMBING FIXTURES

PART 1 - GENERAL

1.01 SUMMARY

Provide plumbing fixtures and trim as scheduled.

1.02 SUBMITTALS

- A. Submit in accordance with Section 01330 - SUBMITTAL PROCEDURES
- B. Manufacturer's Data: Submit manufacturer's technical data for all materials.
- C. Operation and Maintenance Data: Submit operation and maintenance data including maintenance schedules, spare parts requirements, and procedures.
- D. LEED Submittals: Submit LEED submittal requirements according to Section 01352 - LEED REQUIREMENTS.

1.03 QUALITY ASSURANCE

- A. Single Source: Provide similar plumbing fixtures and trim from a single manufacturer.
- B. All work shall conform to the current edition of the Uniform Plumbing Code.

1.04 RELATED WORK

- A. Section 01352 - LEED REQUIREMENTS.
- B. Section 15400 – PLUMBING.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Acceptable Manufactures:
 - 1. Fixtures: Kohler, American Standard, Eljer, Acorn or approved equal.
 - 2. Faucets: Kohler, American Standard, Eljer, Moen, Sloan, Chicago, or approved equal.
 - 3. Water Closet Seats: Kohler, American Standard, Olsonite, Beneke, or approved equal.
 - 4. Electric Water Coolers, Drinking Fountains, and Bottle Fillers: Haws, Halsey Taylor, Elkay, Acorn, or approved equal.
- B. Where applicable, refer to the Index Creations cross reference "Blue Books". Fixtures, fittings, equipment or appliances listed as similar in the "Blue Books" shall be acceptable under this paragraph. Prequalification is not required.

- C. All fixtures shall include accessories to comply with the energy conservation and water conservation requirements of the Building Code and Plumbing Code of the County.
- D. All fixtures designated "Accessible" shall conform to the accessible requirements of the Building Code of the County, and Americans with Disabilities Act Accessibility Guidelines (ADAAG). Sections [602 for Drinking Fountain and Water Coolers] [604 for Water Closets,] [605 for Urinals,] [606 for Lavatories,] [607 for Bathtubs,] [608 for Showers,] [606 for Sinks,] [309 for Controls and Operating Mechanisms].
- E. Faucet hole covers shall be provided for extra faucet holes. Faucet hole covers shall be polished stainless steel.
- F. All plumbing fixtures shall include stops, P-traps, trap arms and escutcheons of the following type unless otherwise specified.
 - 1. Stops shall be chrome plated brass with compression fittings, chrome plated copper tubing risers and chrome plated brass escutcheons.
 - 2. P-traps and Trap Arm shall be 17 gauge chrome plated brass with slip joint. Slip joints which are not accessible, such as tub waste fittings, shall be soldered.
- G. Electronic sensor operated valves, or faucets shall be 120 volts UL Listed, or 24 volts UL Listed with transformer supplied with the valve, or faucet. Wiring up to and including a junction box in the plumbing wall space shall be provided and installed under DIVISION 16 of these specifications. All wiring from junction box provided in the plumbing wall space to valves and sensor shall be provided and installed under this section of the specifications in accordance with applicable sections of DIVISION 16 - ELECTRICAL. All wiring including 24 volt wiring shall be placed in conduit. Solenoid and compression valves, strainers, control modules and transformers shall be installed in a recessed stainless steel wall box.

2.02 FIXTURE SCHEDULE

The following general description is given for quality only. Substitutes are acceptable if approved in writing by the Architect.

- A. WATER CLOSET Commercial Type (WC-4): Shall be floor mounted floor outlet, 1.28 gallons per flush maximum, flush valve, siphon jet, elongated bowl, vitreous china with mounting bolts, washers, china bolt caps, and 1-1/2 inches top spud.

American Standard 2234.001 "Madera FloWise 15" Height" (1.28 gpf)

Seat: White solid plastic commercial weight elongated open front seat with self-sustaining check hinges: American Standard #5901.100 Heavy duty open front less cover or approved equal.

Flush valve assembly shall be chrome-plated brass diaphragm type with vacuum breaker, one inch angle control screwdriver stop with bumper, wall and spud escutcheons.

- B. WATER CLOSET Ligature Resistant Type (WC-2): Shall be on-floor, wall outlet,

February 27, 2026

1.28 gallons per flush maximum, flush valve, blowout jet, ligature resistant elongated bowl, 304 Stainless steel and polished to a satin finish, rear mount, concealed flush valve style with 1-1/2" NPT connection.

Acorn LR2140-W-2-RM "Secur-Care – Ligature Resistant" (1.28 gpf)

Flush Valve Options:

1. -FVH Flush Valve, Hydraulic (N/A for Top Supply)

Toilet Options

1. -CO1: Cleanout with O-Ring to No-Hub 2-3/7" x 4"

Product Options

1. -EGE: Enviro-Glaze Color Specify EG10
2. -SW: Wall Sleeve

Carriers shall be cast iron providing positive support for wall hung fixture with vertical adjustment to suit mounting height, adjustable extension nipple, chrome plated fixture cap nuts and washers, and pipe fitting either vertical or horizontal to suit piping arrangement. Separate face plate, rod support feet, carrier anchor foot, and carrier assembly shall be provided when necessary to position carrier immediately behind chase wall. Carrier manufacturers shall be Josam, Smith, Wade, Zurn, or approved equal.

- C. WATER CLOSET ACCESSIBLE Commercial Type (WC-3): Shall be floor mounted, floor outlet, 1.28 gallons per flush maximum flush valve, blowout jet, elongated bowl, vitreous china with mounting bolts, washers, china bolt caps, 1-1/2 inches top spud and minimum 2-1/8 inches waste trapway. Maximum height of fixture rim shall be 16.5 inches from finished floor.

American Standard 3043.001 "Madera FloWise 16-1/2" Height" (1.28 gpf)

Flush valve assembly shall be chrome plated brass diaphragm type, with vacuum breaker, one inch angle control screwdriver stop with bumper, wall and spud escutcheons. Valves shall be as manufactured by Sloan, Delany, or Zurn. Flush valve actuator shall be located on the wide side of the water closet stall.

ADA (ADAAG SECTION 309 AND 604) Compliant Handle:

Sloan "Regal" 111-1.28

Delany "Flushboy" F402-1.28-G

Zurn "Aquaflush" Z6000-HET-YO (1.28 gpf)

- D. WATER CLOSET ACCESSIBLE Ligature Resistant Type (WC-1): Shall be on-floor, wall outlet, 1.28 gallons per flush maximum flush valve, siphon jet, elongated bowl, 304 Stainless steel and polished to a satin finish, rear mount, concealed flush valve style with 1-1/2" NPT connection. Maximum height of fixture rim shall be 18 inches from finished floor.

Acorn LR2140-W-2-RM "Secur-Care – Ligature Resistant LR2140" (1.28 gpf)

Flush Valve Options:

1. -FVH Flush Valve, Hydraulic (N/A for Top Supply)

Toilet Options

1. -CO1: Cleanout with O-Ring to No-Hub 2-3/7" x 4"

Product Options

1. -EGE: Enviro-Glaze Color Specify EG10
 2. -SW: Wall Sleeve
- E. LAVATORY - WALL HUNG Commercial Type (LAV-3, LAV-4): American Standard 0955001EC "Murro" or approved equal, 22 inches x 21 inches vitreous china wall hung lavatory, 4 inch faucet hole centers, rear overflow, recessed self-draining deck, for concealed arm or wall support.
1. Faucet: Chicago Faucets 3502-E2805ABCP chrome-plated metering faucet with non-aerating spray, vandal-proof. Provide 0.5 gpm flow control device. Connect cold water to both faucet inlet connections if there is no hot water provided.
 2. Drain: American Standard 2411.015 or Kohler K-7129-A, 1-1/4 inches chrome-plated brass tailpiece with integral grid (perforated) drain.
 3. Shutoff Valve: Brass Craft KTSCR19XC or approved equal 1/2 inch angle 1/4-turn ball supply with loose key stop.
 4. Piping: ProFlo PFPTB103 or approved equal, 1-1/4 inches x 1-1/2 inches chrome-plated 17-gauge tubular P-trap and ProFlo PFE11 escutcheon (wall flange).
- Notes:**
- a. See Architectural drawings for lavatory mounting heights. Mounting height for accessible lavatories shall be in accordance with the accessible clearance requirements of the City and County of Honolulu Building Code and ADAAG Section 606. Fixture substitutions shall show that they meet the accessible clearance requirements of the Building Code and ADAAG Section 606.
 - b. Drain piping and water piping insulation shall be molded closed cell vinyl with anti-microbial additive. Installation shall be in compliance with the Americans with Disabilities Act (ADAAG Section 606). Insulation shall be self extinguishing and as manufactured by Truebro, McGuire Products, Brocar Products or approved equal.
- F. LAVATORY - WALL HUNG Ligature Resistant Type (LAV-1, LAV-2): Whitehall WH3740BAR "Ligature Resistant ADA Compliant Bariatric Stainless Steel Basin Powder Coated White", 22 inches x 20 inches 304 stainless steel wall hung lavatory, 4 inch faucet hole centers, rear overflow, basin, countertop, backsplash, and side splash. Conceal P-trap, trap cover to be constructed of 18 gage, type 304 stainless steel and powder coated white. Fixture is rated at 1,000 lbs when used with an appropriate system.
1. Faucet: Whitehall WH3375-SO "Ligature Resistant Sensor Activated Faucet" chrome-plated electronic faucet with non-aerating spray, vandal-proof. Provide 0.5 gpm flow control device, multi-stream laminar spray nozzle, 9VDC sensor and faucet connections. Faucet valve shall be sensor activated and include Auto-Purge feature. Connect cold water to both faucet inlet connections if there is no hot water provided.

February 27, 2026

2. Drain: American Standard 2411.015 or Kohler K-7129-A, 1-1/4 inches chrome-plated brass tailpiece with integral grid (perforated) drain.
3. Shutoff Valve: Brass Craft KTSCR19XC or approved equal 1/2 inch angle 1/4-turn ball supply with loose key stop.
4. Piping: ProFlo PFPTB103 or approved equal, 1-1/4 inches x 1-1/2 inches chrome-plated 17-gauge tubular P-trap and ProFlo PFE11 escutcheon (wall flange).

Notes:

- a. See Architectural drawings for lavatory mounting heights. Mounting height for accessible lavatories shall be in accordance with the accessible clearance requirements of the City and County of Honolulu Building Code and ADAAG Section 606. Fixture substitutions shall show that they meet the accessible clearance requirements of the Building Code and ADAAG Section 606.
 - b. Drain piping and water piping insulation shall be molded closed cell vinyl with anti-microbial additive. Installation shall be in compliance with the Americans with Disabilities Act (ADAAG Section 606). Insulation shall be self extinguishing and as manufactured by Truebro, McGuire Products, Brocar Products or approved equal.
- G. CORNER FLOOR SERVICE SINK (MS): Kohler K-6710 "Whitby" or approved equal. 28 inches x 28 inches acid-resisting enameled cast iron service sink complete with drain strainer and K-8940 removable vinyl coated wire rim guard.
- Kohler K-838T60-4A "Triton Bowe" or approved equal mixing faucet with 2.2 gpm faucet flow restrictor, pail hook, vacuum breaker, hose thread spout, and loose key stops. Include rubber hose and wall hook. Connect cold water to both faucet connections if there is no hot water provided.
- H. WASH MACHINE SUPPLY FITTING: Symmons W-400 "Laundry-Mate" Water Control Valve for automatic washing machine with square head cock shut off on risers.
- I. WASHER BOX: Symmons LM600 "Laundry-Mate" box with 3/4 inch hose outlets, 2 inch drain and 1/2 inch angle screwdriver stops with escutcheon.
- J. LABORATORY SINK (SK-1 and SK-2):
- (SK-1): Elkay ELUH2816PD "Lustertone Classic Stainless Steel 30-1/2" x 18-1/2" x 7-1/2" Single Bowl Undermount Sink with Perfect Drain"
- (SK-2): Elkay ELUHAD281655PD "Lustertone Classic Stainless Steel 30-1/2" x 18-1/2" x 5-3/8" Single Bowl Undermount ADA Sink w/Perfect Drain"
1. Faucet shall be Chicago Faucet model 434-ABCP, for hot and cold water, single lever, pulldown side spray, chrome plated. Integral, tubular brass spout. Dual-pattern 1.5 GPM outlet. 1/2" NPSM supply inlets for 3/8" or 1/2" flexible riser.
 2. Plumber shall provide and install faucet, tailpiece, p-trap, trap arm, chrome plated brass 1/2 inch 1/4-turn ball supply stops, escutcheons, and accessories necessary to complete final connection.
- K. SHOWER ACCESSIBLE Commercial Type (SH-2):

1. Chicago Faucets SH-TP2-11-013 shower valve shall be chrome-plated brass single handle pressure balanced mixing valve with temperature limit stops, screwdriver check stops, 1/2 inch inlets and outs, wall elbow with in-line vacuum breaker shower head with ball joint, 2.5 gpm flow restrictor, mounting plate and bolts to suit installation.
 2. Shower drain shall be same as specified floor drain commercial type.
- L. SHOWER ACCESSIBLE Ligature Resistant Type (SH-1):
1. Whitehall WH538-FH-CSH-SRCH shower heads are chrome-plated brass with 14 gage type 304 stainless steel white mounting flange powder coated and provides a vandal and ligature resistant shower head with a conical shape. Temperature and pressure mixing valve automatically mixes hot and cold water, 1/2 inch inlets and outs, spray pattern is non-adjustable multi-stream style and provides 1.5 gpm flow rate.
 2. Shower drain shall be same as specified floor drain ligature resistant type.
- M. BOTTLE FILLER (LIGATURE RESISTANT): Acorn Whitehall Model WHBF3 or approved equal. Semi-Recessed Pushbutton operated Ligature Resistant Cup Filler. Unit also has a strong, Ligature Resistant, and Vandal-Resistant design for years of trouble-free service. When installed properly the Cup Filler complies with ADA forward and side reach requirements. Cup Filler is fabricated of type 304 stainless steel and provided with EG10 White powder coating. Unit is certified to ANSI A117.1, Public Law 111-380 (NO-LEAD), CHSC 116875 and NSF/ANSI 61, Section 9. Optional WF3000 PFAS Certification for Lead, Bacteria, Chlorine, Microplastics, and NSF/ANSI for Cyst and total PFAS reduction.
- N. ICE MAKER: Scotsman HID207AX-1 "Meridian Air-cooled Ice and Water Dispenser Nugget-Style Countertop with Touchfree Infrared 196 Lb/Day ENERGY STAR" with UV-LED Sanitation, 115V/60HZ/1PH, and 1/2" water inlet connection.
- O. HOSE BIBB (INTERIOR): Chicago No. 952 chrome plated sill faucet with integral vacuum breaker, 3/4 inch hose thread outlet, lock shield cap, No. 293-6 loose key tee handle and 1/2 inch female inlet. Chicago No. 1771 built-in chrome plated straightway loose key shutoff valve with 1/2 inch female inlet and outlet and wall flange.
- P. HOSE BIBB (EXTERIOR): Chicago No. 998 rough chrome plated exterior sill faucet with integral vacuum breaker, 3/4 inch hose thread outlet, No. 293-6 removable tee handle, lock shield cap, 3/4 inch female inlet, McDonald 9802W or Lunkenheimer 454 3/4 inch bronze square head service cock.
- Q. FLOOR DRAIN Commercial Type (FD-2): Smith 2010-A (Round Top) or approved equal. Cast iron body and flashing collar with nickel bronze adjustable heel proof and vandal proof grate. When indicated on drawing, floor drain body shall be provided with a trap primer connection. Size of strainer shall be 6 inches, 8 inches, and 10 inches diameter for drain outlet sizes 2 inches, 3 inches, and 4 inches respectively. Outlet size shall be as indicated on drawings.
- R. FLOOR DRAIN Ligature Resistant Type (FD-1): Smith 2005-A (Round Top) or approved equal. Cast iron body and flashing collar with nickel bronze adjustable heel proof and vandal proof grate. When indicated on drawing, floor drain body shall be provided with a trap primer connection. L Speedi-Set Service Weight.

Size of strainer shall be 6 inches, 8 inches, and 10 inches diameter for drain outlet sizes 2 inches, 3 inches, and 4 inches respectively. Outlet size shall be as indicated on drawings.

- S. FUNNEL FLOOR DRAIN (FFD): Same as floor drain specified above with 4 inches diameter bronze funnel, Smith 3580-PB, Josam F4 Wade EF-4, Zurn ZB-328 or approved equal. When indicated on drawing, floor drain body shall be provided with a trap primer connection. Strainer and funnel shall be bronze finish.
- T. AREA DRAIN - SECURED YARD (AD): Smith 1610T or approved equal. Cast iron body, ADA Flat Strainer, bronze clamp ring, shallow sump with flashing flange. Provide vandal proof screws. Outlet size shall be as indicated on drawings.
- U. TRAP SEAL PRIMER VALVE: Precision Plumbing Products Trap Primer, MIFAB M-500-NPB, or approved equal. Pressure drop activated type, corrosion resistant brass material, with no springs or diaphragms, integral vacuum breaker and backflow preventer, distribution unit and UPC approval.
- V. THERMOSTATIC MIXING VALVE: Valve shall be thermostatic type, pressure-balanced or combination thermostatic and pressure-balanced. Thermostatic mixing valve shall be sized according to the flow capacity required from the valve. The body shall be of heavy cast bronze, and interior parts shall be brass, bronze, corrosion-resisting steel or copper. The valve shall be equipped with necessary stops, check valves, and unions on the inlets and shall be lead-free compliant. Permissible tempered water temperature variation above and below setpoint shall be per ASSE 1017 requirements.
- W. ELECTRONIC LAVATORY FAUCET RECESSED VALVE BOX: MIFAB or approved equal. Box shall be 16 gauge satin coat steel box with stainless steel type 304 door and frame. Box shall be waterproof with continuously welded joints. Door shall be provided with a continuous hinge and key operated cylinder lock. Box size shall be indicated on drawings.

PART 3 - EXECUTION

3.01 FIXTURE INSTALLATION

- A. Set all plumbing fixtures in an approved workmanlike manner. Point up edges against wall with approved sealant.
- B. Flanges at wall penetrations shall be flush against wall and shall not spin when rotated by hand.
- C. Adjust equipment and plumbing fixtures and trim to operate properly and clean all fixtures just prior to final inspection.
- D. Rough outlets for all fixtures shall be set exactly to the measurements furnished by the manufacturer; fixtures in batteries with their rough outlets set in a straight line at equal spacing.
- E. Verify fixture rough-in height and location with architectural drawings.
- F. Each fixture shall be installed at the exact height and location shown on architectural drawings, or as directed.

February 27, 2026

- G. Fixture supplies, trap and trap arm shall be set square with wall, in line with fixture outlets without any offsets, angles, or bends.
- H. Each fixture shall be set level and in continuous contact with floor or wall; fixture in batteries shall be set on one line, at equal spacing.
- I. Joints between fixtures and walls or floor shall be adequately sealed, forming a smooth, even watertight joint. China caps shall be securely sealed into place over floor flange bolts, entirely covering washer and bolt hole.
- J. Wall Supports: Proper provisions for supporting all wall hung plumbing fixtures are totally within the scope of this section of the specifications. All metal supports shall receive one coat of red lead and oiled before erection.
- K. Chrome plated brass wall escutcheons shall be provided for all piping. Exposed piping shall be chrome plated. Pipe within cabinets shall be considered exposed and shall therefore be chrome plated.

3.02 TESTING AND ADJUSTING

- A. All work completely installed and tested as required by this section and the applicable plumbing ordinances, and proven leak tight before inspection is required. Providing of all required equipment and labor to make the test and repeating of the tests to the satisfaction of those making the inspection is within the scope of this section of the specifications.
- B. Procedure:
 - 1. Plumbing Fixtures: Filled with water and checked for leaks and/or retarded flow.
 - 2. All Valves: Adjusted and balanced to provide for the proper operation of the various fixtures. After disinfecting, strainer and aerator screens shall be removed, cleaned and reinstalled.

3.03 SPARE-PARTS DATA

After approval of materials and equipment and 2 months prior to the date of beneficial occupancy, the Contractor shall furnish a complete list of parts and supplies, with current source of supply.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15500 - FIRE PROTECTION SYSTEMS

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700 - GENERAL CONDITIONS OF THE CONTRACT.

1.02 MECHANICAL GENERAL PROVISIONS

As specified in Section 15011 - GENERAL MECHANICAL PROVISIONS shall apply to work specified in this Section.

1.03 DESCRIPTION OF WORK

- A. Provide a complete wet pipe automatic fire sprinkler system for the entire building, as required by code and authority having jurisdiction. The sprinkler system layout as shown on drawings is intended only to describe the general scope of work required and is not to be construed as being a complete workable design in accordance with the Building and Fire Codes of the County of Kauai, and all the applicable NFPA Codes and Regulations. Final design and providing of the Sprinkler System meeting all applicable codes and regulations shall be the sole responsibility of the Contractor. The electrical work to be included under this section is limited to labor and materials required for providing a complete working local supervisory system, include the circuitry between panels, alarms, detectors, etc.

Design and provide each system giving full consideration to blind spaces, piping, electrical equipment, ductwork, and other construction and equipment in accordance to detailed drawings to be submitted for review. Locate sprinkler heads in a consistent pattern with ceiling grid, lights, and air devices. Center sprinkler heads with respect to ceiling grids, unless otherwise indicated.

- B. Fire extinguisher cabinets.

- C. Related Sections:

1. Section 01330 - SUBMITTALS.
2. Section 01352 - LEED REQUIREMENTS.
3. Section 15011 - GENERAL MECHANICAL PROVISIONS: As specified in Section 15011 - GENERAL MECHANICAL PROVISIONS shall apply to work specified in this Section.

1.04 SUBMITTALS

- A. Submit in accordance with Section 01300 - SUBMITTALS and Section 15011 - GENERAL MECHANICAL PROVISIONS.
- B. Product Data.

February, 27, 2026

- C. Layout shop drawings.
- D. Design Calculations.
- E. Shop and Permit Drawings: Submit a layout of the proposed system shop.
- F. LEED Submittals: Submit LEED submittal requirements according to Section 01352 - LEED REQUIREMENTS, paragraph 1.05, Item F., LEED Documentation Submittals:
 - 1. Credit EQ 4.1 - Low-Emitting Materials for Adhesives and Sealants: Using the "ENVIRONMENTAL MATERIALS REPORTING FORM" appended to the end of Section 01352 - LEED REQUIREMENTS, for all adhesives and sealants installed in the building interior (defined as inside the weatherproofing system and applied on-site) submit manufacturer information along with cut sheets, MSDS, and/or letters from product manufacturers indicating the product meets testing and product requirements of the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.

1.05 RELATED WORK SPECIFIED IN OTHER SECTION

- A. Smoke detectors to be connected to fire alarm system by electrical.
- B. All electric power wiring and conduit for flow switch and other equipment required under this section shall be provided under the Electrical Work.

1.06 REFERENCE SPECIFICATION

Latest edition of the Building and Fire Codes of the County of Kauai shall be followed. Where these specifications vary from said standards, the more rigid requirements shall apply.

1.07 STANDARDS

Comply with the local ordinances; requirements of Local Authority, Standards of the National Fire Protection Association regulations of the County of Kauai Building and Fire Departments, and all other applicable regulatory bodies.

1.08 SUBSTITUTIONS

Substitutions shall be in accordance with DIVISION 1- GENERAL REQUIREMENTS.

1.09 COORDINATION

Coordinate with the various trades. Where items must fit spaces previously constructed, verify measurements at the site. Coordinate with other work to ensure that all required inserts, sleeves, and attachments are properly set and that adequate provision is made for installing this work.

1.10 PERMITS AND INSPECTIONS

Obtain and pay for permits, arrange for periodic inspection by local authorities

and deliver certificates of final inspection and compliance to the Architect.

1.11 DRAWINGS

- A. Contract Drawings: Follow architectural plans of Building and diagrammatic fire protection layouts wherever practicable. Locations are approximate, and before installing, study adjacent architectural details and make installation in an appropriate manner.
- B. Shop and Permit Drawings: Submit a layout of the proposed system shop drawings in compliance with the Section "Special Provision", and copies of brochures or catalogs cuts of fixtures and equipment including detailed construction drawings, for approval by the agency having jurisdiction, and by the Architect. Drawings shall be stamped by the contractor's licensed mechanical engineer registered in the State of Hawaii. Show all fire protection work, indicating where piping is exposed or concealed and location of all valves and equipment. No work shall be commenced until these locations are approved by the Architect. Shop drawings shall be submitted in accordance with Section 15011 - GENERAL MECHANICAL PROVISIONS.
- C. Material and Equipment: Material or equipment brochures for the following items shall be submitted in accordance with Section 15011 - GENERAL MECHANICAL PROVISIONS.

Fire Extinguishing Cabinets

Fire Department Connection

Hangers and Supports

Piping and Fittings

Seismic Restraints

Sprinklers Heads

Seismic Restraints

Valves and Accessories

- D. As-built drawings shall be provided in accordance with Section 15011 - GENERAL MECHANICAL PROVISIONS.

1.12 GUARANTEE

Guarantee all work for a period of one (1) year from date of final acceptance and in accordance with Section 15011 - GENERAL MECHANICAL PROVISIONS.

1.13 DESIGN

- A. Design automatic wet pipe fire extinguishing sprinkler systems in accordance with the required and advisory provisions of Building and Fire Codes of the County of Kauai, by hydraulic calculations for uniform distribution of water over the design area. Each system shall include materials, accessories, and equipment inside and outside the building to provide each system complete and ready for use. Design and provide each system to give full consideration to blind spaces, piping, electrical equipment, ducts, and other construction and equipment in accordance with detailed working drawings to be submitted for approval. Locate sprinkler heads in a consistent pattern with ceiling grid, lights, and air supply diffusers. Devices and equipment shall be for fire use in wet pipe

sprinkler systems. Design systems for earthquake protection.

- B. Heads in relation to the ceiling and the spacing of sprinkler heads shall not exceed that permitted by the Building and Fire Codes of the County of Kauai. Uniformly space sprinklers on the branch piping. Unless otherwise indicated on drawings, heads shall be located in the center of ceiling panels.
- C. Pipe sizing shall limit water velocities to 20 feet per second maximum.
- D. Submit electronic copy and at least 1 hardcopy set of hydraulic calculations to the Architect for review and approval. Use pressure information indicated on the drawings; hydraulic calculations shall add 10 percent, but not less than 5 psi safety factor to the calculated required water pressure at the required flow. If computer calculations are used, submittal shall include legend of all abbreviations and step-by-step detailed explanation of printouts. Incomplete submittal will be returned without review.
- E. Submit electronic copy and at least 1 hardcopy set of complete shop drawings stamped by the contractor's licensed mechanical engineer to the Architect for review and approval.
- F. Obtain fire and building department permit for construction. Provide amount of shop drawings and calculations sets as required by the Building Department.

1.14 WORKMANSHIP

All materials and equipment shall be installed in accordance with the Building and Fire Codes of the County of Kauai to conform with the contract documents. The system shall be installed by an experienced firm regularly engaged in the design and installation of fire-protection sprinkler systems in accordance with the Building and Fire Codes of the County of Kauai. The Architect may reject any proposed installer who cannot show evidence of such qualifications. Architect's approval will not relieve the Contractor from his responsibilities to perform all work in accordance with specifications to contract terms.

1.15 INSTRUCTIONS TO OWNER

The Contractor shall provide the Owner with the necessary (as required by the Building and Fire Codes of the County of Kauai) information concerning the care, operation and maintenance of the system.

1.16 CONFORMANCE TO AGENCY REQUIREMENTS

Where materials or equipment are specified to be approved by the Underwriters' Laboratories, Inc., the Contractor shall submit proof that the items furnished under this section of the specifications conform to such requirements. The label of or listing in the Underwriters' Laboratories, Inc., Building Materials List, or the Electrical Appliance and Utilization Equipment List will be acceptable as sufficient evidence that items conform to Underwriters' Laboratories, Inc., requirements.

1.17 NAMEPLATES

Each major component of equipment shall be engraved with the manufacturer's name, address, and catalog number and electrical data on a metal plate

February, 27, 2026

mechanically attached to the item of equipment.

1.18 VERIFICATION OF DIMENSIONS

The Contractor shall be responsible for the coordination and proper relation of his work to the building structure and to the work of all trades. The Contractor shall visit the premises and thoroughly familiarize himself with all details of the work and working conditions, to verify all dimensions in the field, and to advise the Architect of any discrepancy before performing any work. Fabrication of piping shall be in accordance with field measurements.

1.19 DELIVERY AND STORAGE

All equipment and materials shall be delivered and stored in a manner to preclude any damage from the weather, humidity, temperature variations, dirt and dust, or other contaminants. Additionally, all piping shall be capped or plugged until installed.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. All valves, fittings, and alarm devices shall be UL listed and FM approved for use in wet pipe sprinkler systems.

2.02 MANUFACTURER

UL listed Sprinkler and Alarm equipment shall be products of Central, Reliable, Viking, Automatic Sprinkler Corp., Tyco or approved equal.

2.03 SPRINKLER HEADS

- A. UL and Factory Mutual Laboratory approved automatic closed pendent or upright type, ordinary degree temperature ratings (165 degrees F). All fire sprinkler heads shall be chrome plated, 1/2-inch orifice, and 1/2-inch NPT unless otherwise noted on drawings. For areas that require ligature resistant devices, as indicated on drawings, fire sprinkler heads shall be institutional type. See drawings for special requirements.
- B. Cover plates for concealed pendent sprinkler heads shall be color coordinated to match surroundings. Coordinate colors with the Architect prior to ordering.
- C. Sprinklers in light hazard and ordinary hazard occupancies shall be of the quick response type.
- D. Water shields shall be provided as needed.
- E. All surface type escutcheons shall be not more than 5/8 inch deep. Recessed type escutcheons shall be supplied by the same manufacturer as the sprinkler head. Escutcheons shall be chrome plated steel.
- F. Furnish extra sprinklers, sprinkler stoppers and wrenches as required by the Building and Fire Codes of the County of Kauai. Provide where directed an approved metal cabinet with hinged door, lock and 2 keys, for storing extra

sprinklers, sprinkler stoppers and wrenches.

2.04 FIRE SPRINKLER PIPE AND FITTINGS

- A. Aboveground: NFPA 13, except as modified herein. Piping shall be black steel, Schedule 40. (Light wall steel pipe and copper tubing are not allowed). Fittings into which sprinkler heads, sprinkler head riser nipples, or drop nipples are connected shall be threaded. Other pipe fittings shall be welded, or threaded. Plain-end fittings with mechanical couplings and fittings which use steel gripping devices to bite into the pipe when pressure is applied will not be permitted. When space is available, rubber gasketed grooved-end pipe and fittings with mechanical couplings shall be permitted in pipe sizes 1.5 inches and larger. Mechanical couplings manufacturer shall supply fittings and rubber gaskets. Sprinkler pipe and fittings shall be metal. Piping and fittings shall be shipped pre-coated with end caps from the factory. Rusted items delivered and installed at the job site will be rejected.
- B. Underground: Provide outside-coated, cement mortar-lined, ductile-iron pipe and fittings conforming to NFPA 24 for piping under the building and less than 5 feet outside of the building walls. Anchor the joints in accordance with NFPA 24; provide concrete thrust block at the elbow where the pipe turns up toward the floor, and restrain the pipe riser with steel rods from the elbow to the flange above the floor. Minimum depth of cover shall be 3 feet.

2.05 WATER - FLOW ALARM

Provide water-flow alarm valve complete with electric alarm switch, alarm retarding device; local, water motor alarm gong weather-proof type; valves, pressure gages, fittings; install complete as per manufacturer's printed installation direction.

2.06 SUPPORT

- A. Support sprinkler system piping from building structure by means of hangers, inserts and other supports, as per requirements in the Building and Fire Codes of the County of Kauai and as indicated on drawings.
- B. Provide all necessary supplemental structural steel for proper support or attachment of hangers. Steel shall be hot dipped galvanized.
- C. All ferrous items including but not limited to hangers, fasteners rods and accessories shall be galvanized.

2.07 PIPE SLEEVES, ESCUTCHEONS

Furnish and set cast iron (below grade) or Schedule 40 steel pipe sleeves to accommodate pipes passing through foundations, walls, floors, partitions; provide escutcheons at exposed finished surfaces pierced by pipes. Extend sleeves above finished floor and pack space between pipe and sleeve as recommended by the Building and Fire Codes of the County of Kauai.

2.08 SPRINKLER WATER FLOW SWITCH

February, 27, 2026

Vane-type water flow detector or pressure switch shall be installed as indicated on the drawings. The detector shall have a minimum of 2 contacts. The detector shall incorporate a retard element to prevent false signals and be installed in accordance with the manufacturer's recommendations. Local electric audible alarm activated by the detector circuit shall also be provided by Sprinkler Contractor.

2.09 GAUGES

Shall be 3-1/2 inches dial type.

2.10 VALVES

Flanged gate valves shall be O.S. & Y. type, iron body, brass trim, 175 pounds working pressure. Flanged check valves shall be iron body, brass seat and discs, clearway swinging type, with drip connections, 175 pounds working pressure. Valves used in conjunction with valve supervisory devices shall have items notched or otherwise modified to suit the supervisory device.

When indicated on drawings valves located in pit shall be equipped with an indicator post with valve position locking device. UL listed butterfly valves may be used in lieu of gate valve with the Architect's approval.

2.11 FIRE DEPARTMENT CONNECTION

Potter Roemer Co., No. 5715 free standing cast bronze body, Underwriters Labeled 2 way inlet connections with 4 inches N.P.T. outlet, 2, 2-1/2 inch satin chrome finish inlet snoots with National Standard Hose Thread, clapper type independent check valves with ground seats, satin chrome finish bronze snoots plugs with chain and with satin chrome finish coat bronze nameplate lettered as indicated on drawings; and Potter Roemer Co., 5970 Series Identification Plate that describe the name of the building(s) it serves. Complete installation shall include check valve and other accessories as required by the Building and Fire Codes of the County of Kauai.

2.12 ALARM CHECK VALVE ASSEMBLY

The riser or risers shall be installed where shown on plans. The alarm shall consist of a variable pressure alarm check valve, and water motor gong. Contractor shall also completely install a flow switch; wiring by Electrical Contractor.

2.13 FIRE EXTINGUISHER CABINETS

- A. Fire Extinguisher Cabinet: Potter Roemer, Croker, J.L., or approved equal, unit consisting of 20-gauge aluminum box with anodized aluminum door, style "E" break glass (25 square inch), decal Figure No. 1970, cylinder lock. Finish shall be baked enamel inside, rust resistant prime coat outside except for aluminum door and trim. 10 lb. dry chemical fire extinguisher, UL rating of 4A:80B:C. See architectural drawings for mounting heights.

Overall

Recess

F.E.C.-R	Fully Recessed 1704-E	13 inches x	10 inches x
		28 inches x	25 inches x
		6 inches	5.5 inches
F.E.C.-SR	Semi Recessed 1724-E	13 inches x	10 inches x
		28 inches x	25 inches x
		6 inches	4 inches

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

- A. Do not scale the plans. Check all measurements at the building and adjust the work to fit the space allotted. Close cooperation between all trades will be required. Any work done without regard for the work of other trades shall be moved if necessary, at the option of the Architect, without extra charge, to permit the proper installation of other work.
- B. When work is not in progress, open ends of pipe and fittings shall be securely closed so that no trench water, earth, or other substances can enter the pipe or fittings.
- C. The responsibility for the care and protection of the equipment and work rests with the Contractor until it has been tested and accepted.
- D. Work shall not proceed before obtaining a building permit, and approved shop drawing and approved equipment submittals.

3.02 CUTTING AND PATCHING

- A. Place sleeves for piping penetrating through poured concrete or masonry construction prior to pouring of concrete or construction of masonry.
- B. Do not cut any openings in any structural member until location is approved by the Architect.
- C. Cutting of holes in hardened concrete is not permitted except by special permission of the Architect, which will be on an individual basis and require the use of small hand tools, diamond drills, or other controlled means at the Architect's discretion.
- D. Cutting of reinforcing bars is not permitted. Splay bars to clear or move holes as required.
- E. If necessary to cut holes in slabs or concrete walls, first prelocate holes to clear beams, joists, columns, etc. Cut hole neat and clean using diamond core drill or small chipping gun. Leave all reinforcing bar intact; enlarge holes if necessary.

February, 27, 2026

- F. If necessary to cut holes in masonry walls, carefully remove a minimum amount of masonry.
- G. Install sheet metal or black iron pipe sleeves through holes cut in slabs, concrete walls or masonry walls. In concrete slab walls, install sleeves to clear reinforcing bars and tightly pack concrete around sleeve for full thickness of walls. In masonry walls, rest or re-grout all loose masonry units; pack cement grout tight and solid around sleeves for full thickness of wall.

3.03 FITTINGS

Fittings for above ground piping shall be of a type specifically approved for use in sprinkler systems. Bushings shall be used only where standard fittings of the required size are not available. The use of bushings is further restricted to requirements of the Building and Fire Codes of the County of Kauai.

3.04 REDUCERS

Reductions in pipe sizes shall be made with one-piece reducing fittings.

Bushings will not be acceptable, except when standard fittings of the proper size are not available. Where used, face bushings shall be installed with the outer face flush with the face of the fitting opening being reduced. Bushings shall not be used in elbow fittings in more than one outlet of a tee, in more than 2 outlets of a cross, or where reduction in size is less than 1/2 inch.

3.05 PIPE SUPPORTS AND HANGERS

- A. The recommended methods and requirements for supporting or hanging pipe as set forth in the Building and Fire Codes of the County of Kauai shall be mandatory.
- B. Install hangers and supports for all pipe work to provide for expansion and contraction, prevent vibration and maintain required grading by proper adjustment.
- C. Refer to structural drawings for type of construction from which piping and/or equipment is to be suspended. Drilling of pre-stressed concrete is not permitted without written approval from the Structural Engineer.
- D. Drilled in Threaded Inserts: Where supports in beams and joists are required after concrete has been poured, Phillips "Redhead" Drilled-In Threaded Inserts shall be provided, installed in accordance with the manufacturer's recommendations and U.L. listed for seismic applications. Locations shall be approved by the Structural Engineer.

3.06 EARTHQUAKE (SEISMIC) PROTECTION

Install sprinkler systems with seismic protection to prevent pipe breakage during an earthquake. Provide flexible couplings, swing joints, sway bracings and adequate clearances in accordance with NFPA 13. Provide seismic protection in accordance with IBC 2018, Chapter 9 and Section 1613 - Kauai.

3.07 PIPE SLEEVES

Pipes passing through concrete or masonry walls or concrete floors shall be provided with pipe sleeves fitted into place at the time of construction. All rectangular and square openings shall be as detailed. Each sleeve shall extend through its respective wall or floor, and be cut flush with each surface. Unless otherwise indicated, sleeves shall be of such size as to provide a minimum of 1/4-inch all-round clearance between the pipe and sleeve. Sleeves in bearing walls, waterproofing membrane floors, and wet areas shall be steel pipe or cast iron pipe. Sleeves in non-bearing walls, floors, or ceilings may be steel pipe, cast iron pipe, or galvanized sheet metal with lock-type longitudinal seam.

3.08 BRACING AND CLAMPING

The connection between the underground piping and the base of the riser shall be anchored by means of tie rods and pipe clamps. Bends, plugs, and tees shall be braced or clamped in accordance with the requirements of NFPA 24.

3.09 THRUST BLOCKS

Adequate concrete reaction thrust blocks conforming to NFPA 24 shall be installed at underground pipe fittings.

3.10 TESTS

- A. Subject Sprinkler System to tests required by and in presence of representatives of agencies having jurisdiction. Notify the Fire Protection Engineer a minimum of 5 working days in advance of flushing and testing. Conduct, duration, other details of tests not covered by agencies' requirements shall be in accordance with the Building and Fire Codes of the County of Kauai. Provide instruments, equipment; pay expenses incurred in making tests; obtain approvals, and certificates. Where evidence of stoppage appears in piping or equipment, disconnect, clean, repair, reconnect obstructed parts; also bear cost of cutting and patching adjoining work necessitated by such cleaning and repairing. Provide material and test certificate for underground and aboveground piping per NFPA 13 with the necessary information. Aboveground and belowground piping shall be hydrostatically tested at 200 psi for 2 hours without any pressure loss.

Note: The Fire Protection Engineer must witness tests and sign certificate.

3.11 SPECIAL CONDITIONS

- A. Conformance with provision of the IBC 2018, Chapter 9 and Section 1621 - Kauai (as amended and adopted) are hereby made a part of this section of the specifications.
- B. Fire Sprinkler Heads shall be located in the center of ceiling panels. When centering sprinkler heads in the ceiling panel require additional sprinkler heads, additional sprinkler heads shall be added.
- C. Brace excessively long sprigs and drops at individual sprinkler heads. In general, sprigs and drops shall not exceed 20 inches without additional bracing.

3.12 WATER SUPPLY CONNECTION

Connect sprinkler system to new main water service pipe outside of building with detector check meter. Before connecting, flush water service through unrestricted opening at least 4 inches diameter. Refer to civil drawing for detector check meter location.

3.13 DRAIN AND TEST CONNECTIONS

Install horizontal piping graded to low points and in manner to make it possible to test and empty entire system; provide valves and piping of sizes and in locations in accordance with the requirements of the Building and Fire Codes of the County of Kauai. Drain valve and discharge fittings shall be visible; use sight-drain fittings if necessary. Provide flushing connections at end of cross mains, consisting of capped nipple same diameter as pipe but not larger than 2 inches.

3.14 VALVE SEALS, TAGS, CHARTS

- A. Seals: Provide approved seal for each manually operated shut-off valve required to be sealed in open position.
- B. Signs: Provide identification signs of standard design, fasten securely at designated locations as per the Building and Fire Codes of the County of Kauai.
- C. Tags: Provide brass tags 1-1/2 inches diameter; stamp with designator numbers, secure with 12-gauge copper wire to spindle of all control valves.
- D. Charts: Provide 2 copies of approved sprinkler system diagram and valve chart, giving designating number, function, location of each valve; mount in painted, glazed frames, and hang where directed.

3.15 TESTING AND FLUSHING

Testing and flushing shall be done in accordance with the Building and Fire Codes of the County of Kauai.

3.16 DISINFECTION

Disinfect the new water piping and existing water piping affected by Contractor's operations in accordance with AWWA C601. Fill piping systems with solution containing minimum of 50 parts per million of available chlorine and allow solution to stand for minimum of 24 hours. Flush solution from the systems with clean water until maximum residual chlorine content is not greater than 0.2 parts per million. Exercise caution when mixing chlorine disinfection solutions. Flushing of chlorinated water shall be done in accordance with NFPA 25 - INSPECTION, TESTING AND MAINTENANCE OF SPRINKLER SYSTEMS. The Contractor shall be responsible for the proper disposal of chlorinated water to safeguard public health and environment in accordance with the applicable Department of Health requirements.

3.17 FIELD PAINTING

- A. Clean, pre-treat, prime, and paint all new fire sprinkler systems including valves, piping, conduit, hangers, supports, miscellaneous metalwork, and accessories.

February, 27, 2026

- Apply coatings to clean, dry surfaces, using clean brushes. Clean the surfaces to remove dust, dirt, rust, and loose mill scale. Immediately after cleaning, provide the metal surfaces with one coat of oil base primer applied to a minimum dry film thickness of 1.0 mil.
- B. Clean, pre-treat, prime and paint (as described above) existing fire sprinkler system, where indicated on drawing.
 - C. Finish painting shall consist of 2 coats - material and dry film thickness as specified in Section 09900 - PAINTING.

3.18 STANDARDIZED PIPE IDENTIFICATION SYSTEM

- A. Use an arrow marker with each pipe content marker, the arrow shall always point away from the pipe marker and in the direction of the flow.
- B. If flow can be in both directions, use a double headed arrow marker.
- C. Apply pipe marker and arrow marker at every point of pipe entry or exit where line goes through wall.
- D. Apply pipe marker and arrow marker on each riser and "T" joint.
- E. Apply pipe marker and arrow marker every 20 feet on long continuous lines.
- F. Apply markers on the 2 lower quarters of the pipe and where view is unobstructed.
- G. Arrow markers shall be 4 inches long minimum and pipe content marker lettering sizes shall be 1-1/2 inches minimum in height.

END OF SECTION

SECTION 15600 - AIR CONDITIONING AND VENTILATION

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700 – GENERAL CONDITIONS OF THE CONTRACT.

1.02 MECHANICAL GENERAL PROVISIONS

As specified in Section 15011 - GENERAL MECHANICAL PROVISIONS shall apply to work specified in this Section.

1.03 DESCRIPTION OF WORK

A. This section covers the furnishing, fabrication, delivery and installation of the air conditioning and ventilation systems complete, including but not limited to the following:

1. Ventilation system.
2. Air conditioning units, controls and wiring.
3. Air diffusers, registers, and grilles.
4. Air filters
5. Duct silencers.
6. Sheet metal duct, and duct insulation.
7. Vibration Isolation.
8. Pipe Insulation.
9. Operation and maintenance instructions.
10. Manufacturer's literature, shop drawings, and record drawings.
11. Inspection, test, and guarantee.
12. One year maintenance service.

B. Related Sections:

1. Section 01300 - SUBMITTALS.
2. Section 01352- LEED REQUIREMENTS

1.04 SUBMITTALS

- A. Submit in accordance with Section 01300 - SUBMITTALS and Section 15011 - GENERAL MECHANICAL PROVISIONS.
- B. Product Data.
- C. Layout shop drawings.

- D. Design Calculations.
- E. Shop and Permit Drawings: Submit a layout of the proposed system.
- F. As-built drawings. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS.

1.05 ELECTRICAL WORK

Electrical motor driven equipment specified herein shall be provided complete with motors, motor starters, and controls. Electric equipment and wiring shall be in accordance with DIVISION 16 - ELECTRICAL. Electrical characteristics shall be as indicated. Motor starters shall be provided complete with properly sized thermal overload protection and other appurtenances necessary for the motor control. Each motor shall be of sufficient capacity to drive the rating of the motor. Manual or automatic control and protective or signal devices required but not shown on the electrical plans, shall be provided under this section of the specifications.

1.06 CODES, ORDINANCES AND PERMITS

- A. Codes and Ordinances: The work shall be in accordance with the governing State and Local Ordinances, Codes and Regulations, including NFPA Regulations and Factory Mutual, all of which are hereby made a part of these requirements. However, when these and/or drawings call for or describe materials, workmanship or construction of a better quality, higher standard, or larger size than is required by the above rules and regulations, the provisions of these requirements and/or drawings shall take precedence over the requirements of the said rules and regulations. The Contractor shall furnish, without any extra charge, any additional material or labor, or both, required for compliance with these rules and regulations, although not mentioned in these requirements nor indicated on the contract drawings.
- B. Permits: The Contractor shall secure and pay for all permits, inspections and certificates of any inspection of any governmental body having jurisdiction over all or any part of the work included under this section, and/or such inspections, etc., required by these requirements.

1.07 CONTRACT DRAWINGS

- A. Contract drawings are essentially diagrammatic, indicating general layout and approximate locations towards establishing the scope for uniform estimating basis for all bidders; they are not intended to be detailed construction working drawings. Reasonable modifications to indicated locations and arrangement to suit job conditions shall not constitute basis for requesting of additional funds from the Owner.
- B. Where apparatus and equipment have been indicated on the drawings, dimensions have been taken from typical equipment of the class indicated. The shop drawings shall show the details of construction and installation of the particular equipment furnished; they shall be fully dimensioned to show that the equipment and connections thereto fit the space provided with adequate

maintenance space.

- C. Capacities of all equipment and materials shall be not less than those indicated.

1.08 SHOP DRAWINGS

Shop drawings shall be provided in accordance with Section 15011 - GENERAL MECHANICAL PROVISIONS.

1.09 MATERIAL AND EQUIPMENT

Material or equipment brochures shall be made in a single submittal for the following items in order to demonstrate that these items of material and equipment have been properly coordinated and will function properly with each other:

Attenuator	Air Filter
Dampers, Fire/Smoke	Dampers
Drain	Diffusers, Registers, Grilles
Duct Insulation	Duct Access Doors
Duct Work	Duct Sealer
Flexible Pipe Connectors	Equipment Supports
Pipe Insulation	Flexible Duct Connectors
Smoke Detectors	Temperature Controls
Valves and Accessories	Ventilation Fans, Blowers
Vibration Isolators	UV-C Lamps

If departures from the contract drawings are deemed necessary by the Contractor, details of such departures, including changes in related portions of the project and the reasons therefore, shall be submitted with the shop drawings. Approved departures shall be made at no additional cost to the Owner.

Submittal shall be in accordance with Section 15011 - GENERAL MECHANICAL PROVISIONS.

1.10 AS-BUILT DRAWINGS

The Contractor shall maintain at the job site one (1) set of full size contract drawings, marking them in red to show all variations between the construction actually provided and that indicated or specified in the contract documents, including buried or concealed construction.

Where a choice of material or method is permitted herein or where variations in scope or character of work from that of the original contract or authorized, the drawings shall be marked to define the construction actually provided. Where equipment installation is involved, the size, manufacturer's name, model number, power input or characteristic as applicable shall be shown on the as-built drawings.

The representation of such changes shall conform to standard drafting practice

and shall include such supplementary notes, legends, and details as necessary to clearly portray the as-built construction.

The drawings shall be maintained and updated on a daily basis. The Contractor shall sign, and date each sheet to certify that the dimensions and details shown on the drawings reflect the dimensions and details, and specifications as constructed in the field. As-built drawings shall be provided in accordance with Section 15011 - GENERAL MECHANICAL PROVISIONS.

1.11 CONFORMANCE TO AGENCY REQUIREMENTS

Where materials or equipment are specified to be approved by the Underwriters' Laboratories, Inc., the Contractor shall submit proof that the items furnished under this section of the specifications conform to such requirements. The label of or listing in the Underwriters' Laboratories, Inc., Building Materials List, or the Electrical Appliance and Utilization Equipment List will be acceptable as sufficient evidence that items conform to Underwriters' Laboratories, Inc., requirements.

1.12 NAMEPLATES

Each major component of equipment shall be provided with a nameplate engraved with the manufacturer's name, address, and catalog number, serial number and electrical data on a metal plate mechanically attached to the item of equipment.

1.13 VERIFICATION OF DIMENSIONS

The Contractor shall be responsible for the coordination and proper relation of his work to the building structure and to the work of all trades. The Contractor shall visit the premises and thoroughly familiarize himself with all details of the work and working conditions, to verify all dimensions in the field, and to advise the Architect of any discrepancy before performing any work. Fabrication of ductwork and piping shall be in accordance with field measurements.

1.14 OMISSIONS

It is the intent of the plans and specifications to provide a complete installation. Should there be omissions, the Contractor shall call the attention of the Architect to such omissions in fifteen (15) days advance of the date of bid openings so that the necessary corrections can be made.

1.15 SUBSTITUTIONS OF EQUIPMENT

- A. Substitutions shall be in accordance with Section 00700 – GENERAL CONDITIONS OF THE CONTRACT.
- B. The Contractor shall assume full responsibility for proper fit, performance and additional work relating to other sections of the specifications.
- C. Redesign made necessary by the use of approved substitutions shall be the responsibility and at the expense of the Contractor.

1.16 WELDERS QUALIFICATIONS

All welders shall be certified, by an independent testing laboratory and certificates shall be submitted to the Architect for approval. Testing of welders shall be in accordance with the welding section of ANSI B-31.09 "Building Services Piping".

1.17 CLEANING EQUIPMENT AND PREMISES

- A. During the process of the work, the premises shall be kept reasonably free of all debris and waste materials resulting from the work performed under the various sections of the General Contract. All such debris and rubbish shall be removed from the site.
- B. Upon completion and before final acceptance of the work, all debris, rubbish, left over materials, tools and equipment shall be removed from the site.

1.18 GUARANTEE

The entire mechanical installation described herein shall be guaranteed in writing as a complete working unit for a period of one year starting only after 30 days of trouble free operation after the date of system acceptance. Other requirements shall be in accordance with Section 15011 - GENERAL MECHANICAL PROVISIONS.

1.19 LEED

Coordinate with requirements in Section 01016 – OCCUPANCY, AIR QUALITY REQUIREMENTS AND Section 15911 – DESIGN COMMISSIONING OF BUILDING SYSTEMS. Requirements include but are not limited to:

- A. Construction Indoor Air Quality Management Plan
 - 1. Provision to meet 5 requirements of SMACNA IAQ Guideline for Occupied Buildings Under Construction, 1995, Chapter 3.
 - 2. Provision to protect stored on-site or installed absorptive materials from moisture damage.
 - 3. Provision to protect HVAC equipment during construction
 - 4. If permanently installed AHUs are used during construction, air filtration media with a minimum MERV of 8 shall be used at each return air grille.
 - 5. Provision to replace all filtration media immediately prior to occupancy.
 - 6. After construction ends, prior to occupancy and with all interior finishes installed, perform a building flush out by supplying a total air volume of 14,000 cu. Ft. of outdoor air per sq. ft. of floor area while maintaining an internal temperature of at least 60 degrees F and relative humidity no higher than 60 percent.

PART 2 - PRODUCTS

2.01 CORROSION PROTECTION

- A. Finned Tube Coils: Finned tube coils shall be protected with "Blygold Polual", a polyurethane based metal impregnated coating that can satisfactorily pass salt spray testing of minimum 11,000 hours based on ASTM B117 test method.
 - 1. Coating thickness and application shall be applied in strict accordance with the coating manufacturer's recommendation.
 - 2. The coating shall be performed by a qualified and experienced factory certified applicator such as International A/C Coatings, Honolulu, Hawaii, Thermoguard Pacific, Inc., or an approved applicator.
- B. Cabinet and Exterior Surfaces: Unit cabinet shall be coated with Ameron PSX 700 Engineered Siloxane or "Thermoguard Casing Guard". Metal preparation shall provide a surface profile that shall include degreasing and etching.
 - 1. The coating shall be applied to all interior and exterior surfaces. Coating thickness and application shall be applied in strict accordance with coating manufacturer's recommendations.
 - 2. After the coating has totally cured, the equipment shall be assembled using care not to damage the coating during assembly. Fasteners shall be stainless steel with bonderized rubber washer attached. Any touch up required shall be performed in accordance with the manufacturer's recommendations.
 - 3. Special protection for cabinets is not required for equipment coated by the manufacturer with a corrosion-inhibiting coating or paint system that have been proven capable of satisfactorily withstanding the following tests: Test method shall be ASTM B117. Period of test shall be 125 hours for equipment intended for installation indoors; test period shall be 500 hours for equipment intended for installation outdoors or which will be otherwise subjected to marine atmosphere. Each specimen shall have a standard scratch as defined in ASTM D 1654.
- C. The coating shall be performed by a qualified and experienced factory certified applicator such as International A/C Coatings, Honolulu, Hawaii, Thermoguard Pacific, Inc. or an approved applicator.

2.02 FANS

Fans shall be sound and air tested and rated in accordance with the standards of the Air Movement and Control Association, Inc. Fans shall be directly connected to the motor shaft or indirectly connected to the motor by means of a V-belt drive as noted on equipment schedule. Where V-belt drives are used, motor sheaves shall be adjustable to provide not less than 20 percent speed variation. Sheaves shall be selected to drive the fan at such speed as to produce the specified capacity at field static pressure when set at the approximate midpoint of the sheave adjustment. Motors for V-belt drives shall be provided with adjustable rails or bases. Fans shall be provided with personnel screens or guards on both suction and supply ends except where ducts or dampers are connected to the fan. Provide aluminum bird screen at discharge of aluminum fans and stainless steel bird screens for steel fans. Fans and motors shall be provided with

vibration isolation supports or mountings. Each fan shall be selected to produce the capacity required at the fan total pressure indicated. Standard AMCA arrangement, rotation and discharge shall be as indicated on the drawing. Motor efficiency shall be as specified in paragraph "MOTORS". Fans shall be manufactured by Penn, Greenheck, ACME, Cook, Carnes, Twin City, or approved equal. When sound criteria is indicated on drawings, equipment shall be AMCA certified for Air and Sound. Otherwise equipment shall be AMCA certified for Air only. Provide integral backdraft damper or duct mounted backdraft damper where integral damper is not available.

1. Inline Fans: Supply or exhaust fans shall be belt driven inline type unless otherwise noted. The square shaped fan housing shall be of heavy gauge formed steel. One of the sides shall be hinged and shall support the entire drive assembly and wheel allowing the assembly to swing out for cleaning, inspection, or service without dismantling the unit in any way. The motor shall be mounted on the hinged side exterior isolated from the airstream. The belt and pillow block ball bearing shall be protected from the airstream by an enclosure. The shaft shall be keyed to both the wheel and pulley.

The fan inlet shall be a spun venturi throat overlapped by a backward curved centrifugal wheel with spun cone for maximum performance.

2. Ceiling Fan:

- a. Ceiling Exhaust: The ceiling fan shall be Greenheck Model SP. The fan housing shall be constructed of phosphatized steel with an oven baked enamel finish. The housing interior shall be acoustically lined with 1/2 inch thick insulation. The discharge outlet shall be adaptable to horizontal or vertical positions. The terminal box shall be internally mounted for motor hook-up. The motor shall be mounted on resilient elastic grommets. The fan shall have a forward curved centrifugal wheel.
- b. In-Line Arrangement: The cabinet fan shall be Greenheck Model CSP. The fan housing shall be constructed of phosphatized steel with an oven baked enamel finish. The housing interior shall be acoustically lined with 1/2 inch thick insulation. The terminal box shall be internally mounted for motor hook-up. The motor shall be mounted on resilient elastic grommets. The fan shall have a forward curved centrifugal wheel. Also provide resilient elastic grommets for hanger vibration isolations.

2.03 MOTORS

- A. All motors 1 horsepower and larger shall be energy efficient type. Efficiency rating shall be in accordance with NEMA Premium.
- B. Motors shall have a 1.15 service factor.
- C. Motors to be used with variable speed drives shall be provided with phase isolation, Class F insulation and a winding thermostat that will detect any motor overheat conditions.
- D. Motor shall be designed to operate at full capacity with a voltage variation of plus or minus 10 percent of the motor voltage rating. Motor size shall be sufficient for the duty to be performed and shall not exceed its full load nameplate current

rating when driven equipment is operated at specified capacity under the most severe conditions likely to be encountered. When motor size provided differs from the size indicated or specified, the Contractor shall make the necessary adjustments to the wiring, disconnect devices, and branch circuit protection to accommodate the equipment actually provided, at no cost to the Owner.

- E. Provide a motor starter for each motor.

2.04 VARIABLE SPEED DRIVE

- A. Furnish complete variable frequency VFDs as specified herein for the fans and pumps designated on the drawing schedules to be variable speed. All standard and optional features shall be included within the VFD enclosure, unless otherwise specified. VFD shall be housed in a metal [NEMA 12] [or NEMA 1] enclosure, or other NEMA type according to the installation and operating conditions at the job site. The VFD's UL listing shall allow mounting in plenum or other air handling compartments. If a NEMA 12 enclosure is required for the plenum rating, the manufacturer must supply a NEMA 12 rated VFD.
- B. The VFD shall convert incoming fixed frequency 3-phase AC power into a variable frequency and voltage for controlling the speed of 3-phase AC motors. The motor current shall closely approximate a sine wave. Motor voltage shall be varied with frequency to maintain desired motor magnetization current suitable for centrifugal pump and fan control and to eliminate the need for motor derating.
- C. With the motor's rated voltage applied to the VFD input, the VFD shall allow the motor to produce full rated power at rated amps, RMS fundamental volts, and speed without using the motor's service factor. VFDs utilizing sine weighted/coded modulation (with or without 3rd harmonic injection) must provide data verifying that the motors will not draw more than full load current during full load and full speed operation.
- D. The VFD shall include an input full-wave bridge rectifier and maintain a fundamental power factor near unity regardless of speed or load.
- E. The VFD and options shall be tested to ANSI/UL Standard 508. The complete VFD, including all specified options, shall be assembled by the manufacturer, which shall be UL-508 certified for the building and assembly of option panels. Assembly of the option panels by a third-party panel shop is not acceptable. The appropriate UL stickers shall be applied to both the VFD and option panel, in the case where these are not contained in one panel. When these VFDs are to be located in Canada, CSA or C-UL certifications shall apply. Both VFD and option panel shall be manufactured in ISO 9001 certified facilities.
- F. The VFD shall have a DC link reactor on both the positive and negative rails of the DC bus to minimize power line harmonics. VFDs without a DC link reactor shall provide a minimum 3percent impedance line reactor.
- G. The VFD's full load amp rating shall meet or exceed NEC Table 430-150. The VFD shall be able to provide full rated output current continuously, 110percent of rated current for 60 seconds and 160percent of rated current for up to 0.5 second while starting.
- H. The VFD shall be able to provide full torque at any selected frequency from 28

Hz to base speed to allow driving direct drive fans without derating.

- I. An automatic energy optimization selection feature shall be provided standard in the VFD. This feature shall automatically and continually monitor the motor's speed and load and adjust the applied voltage to maximize energy savings and provide up to an additional 3percent to 10percent energy savings.
- J. Input and output power circuit switching shall be able to be accomplished without interlocks or damage to the VFD. Switching rate may be up to 1 time per minute on the input and unlimited on the output.
- K. An automatic motor adaptation test algorithm shall measure motor stator resistance and reactance to optimize performance and efficiency. It shall not be necessary to run the motor or decouple the motor from the load to run the test.
- L. Galvanic and/or optical isolation shall be provided between the VFD's power circuitry and control circuitry to ensure operator safety and to protect connected electronic control equipment from damage caused by voltage spikes, current surges, and ground loop currents. VFDs not including either galvanic or optical isolation on both analog I/O and discrete I/O shall include additional isolation modules.
- M. VFD shall minimize the audible motor noise through the use of an adjustable carrier frequency. The carrier frequency shall be automatically adjusted to optimize motor and VFD efficiencies while reducing motor noise.
- N. Protective Features:
 - 1. Class 20 I²t electronic motor overload protection for single motor applications and thermal-mechanical overloads for multiple motor applications shall be provided.
 - 2. Protection against input transients, loss of AC line phase, output short circuit, output ground fault, overvoltage, undervoltage, VFD overtemperature and motor overtemperature. The VFD shall display all faults in plain English. Codes are not acceptable.
 - 3. Protect VFD from sustained power or phase loss. The VFD shall provide full rated output with an input voltage as low as 90percent of the nominal. The VFD will continue to operate with reduced output with an input voltage as low as 164 V AC for 208/230 volt units, and 313 V AC for 460 volt units.
 - 4. The VFD shall incorporate a motor preheat circuit to keep the motor warm and prevent condensation build up in the stator.
 - 5. VFD package shall include semi-conductor rated input fuses to protect power components.
 - 6. To prevent breakdown of the motor winding insulation, the VFD shall be designed to comply with IEC Part 34-17. Otherwise the VFD manufacturer must ensure that inverter rated motors are supplied.
 - 7. VFD shall include a "signal loss detection" circuit to sense the loss of an analog input signal such as 4 to 20 mA or 2 to 10 V DC, and shall be programmable to react as desired in such an instance.
 - 8. VFD shall function normally when the keypad is removed while the VFD is

running and continue to follow remote commands. No warnings or alarms shall be issued as a result of removing the keypad.

9. VFD shall catch a rotating motor operating forward or reverse up to full speed.
 10. VFD shall be rated for 100,000 amp interrupting capacity (AIC).
 11. VFD shall include current sensors on all 3 output phases to detect and report phase loss to the motor. The VFD will identify which of the output phases is low or lost.
 12. Drive shall continue to operate without faulting until input voltage reaches 300 V AC on 208/230 volt VFDs, and 539 V AC on 460 volt VFDs.
- O. Interface Features:
1. Hand/Start, Off/Stop and Auto/Start selector switches shall be provided to start and stop the drive and determine the speed reference.
 2. The VFD shall be able to be programmed to provide a 24 V DC output signal to indicate that the VFD is in Auto/Remote mode.
 3. The VFD shall provide digital manual speed control. Potentiometers are not acceptable.
 4. Lockable, alphanumeric backlit display keypad can be remotely mounted up to 10 feet away using standard 9-pin cable.
 5. The keypads for all sizes shall be identical and interchangeable.
 6. To set up multiple VFDs, it shall be possible to upload all setup parameters to the VFD's keypad, place that keypad on all other VFDs in turn and download the setup parameters to each VFD. To facilitate setting up VFDs of various sizes, it shall be possible to download from the keypad only size independent parameters.
 7. Display shall be programmable to display in 9 languages including English, Spanish and French.
 8. The display shall have 4 lines, with 20 characters on 3 lines and 8 large characters on one line.
 9. A red FAULT light, a yellow WARNING light and a green POWER-ON light shall be provided. These indications shall be visible both on the keypad and on the drive when the keypad is removed.
 10. A quick setup menu with factory preset typical HVAC parameters shall be provided on the VFD eliminating the need for macros.
 11. The VFD shall include a standard RS 485 serial communications port and be connected at a future date to a Johnson Controls N2 Metasys or Siemens FLN system at no additional cost to the owner. The connection shall be software selectable by the user.
 12. As a minimum, the following points shall be controlled and/or accessible:
 - a. VFD Start/Stop

- b. Speed reference
- c. Fault diagnostics
- d. Meter points
 - 1) Motor power in HP
 - 2) Motor power in kW
 - 3) Motor kW-hr
 - 4) Motor current
 - 5) Motor voltage
 - 6) Hours run
 - 7) Feedback signal #1
 - 8) Feedback signal #2
 - 9) DC link voltage
 - 10) Thermal load on motor
 - 11) Thermal load on VFD
 - 12) Heatsink temperature
- 13. Four additional Form C 230 volt programmable relays shall be available for factory or field installation within the VFD.
- 14. LonWorks communication shall be available for factory or field installation within the VFD.
- 15. Two set-point control interface (PID control) shall be standard in the unit. VFD shall be able to look at 2 feedback signals, compare with 2 set-points and make various process control decisions.
- 16. Floating point control interface shall be provided to increase/decrease speed in response to switch closures.
- 17. Four simultaneous displays shall be available. They shall include frequency or speed, run time, output amps and output power. VFDs unable to show these 4 displays simultaneously shall provide panel meters.
- 18. Sleep mode shall be provided to automatically stop the VFD when its speed drops below set "sleep" level for a specified time. The VFD shall automatically restart when the speed command exceeds set "wake" level.
- 19. The sleep mode shall be functional in both follower mode and PID mode.
- 20. Run permissive circuit shall be provided to accept a "system ready" signal to ensure that the VFD does not start until dampers or other auxiliary equipment are in the proper state for VFD operation. The run permissive circuit shall also be capable of sending an output signal as a start command to actuate external equipment before allowing the VFD to start.
- 21. The following displays shall be accessible from the control panel in actual units: Reference Signal Value in actual units, Output Frequency in Hz or percent, Output Amps, Motor HP, Motor kW, kWhr, Output Voltage, DC Bus

Voltage, VFD Temperature in degrees, and Motor Speed in engineering units per application (in percent speed, GPM, CFM, etc.). VFD will read out the selected engineering unit either in a linear, square or cubed relationship to output frequency as appropriate to the unit chosen.

22. The display shall be programmed to read in inches of water column (in-wg) for an air handler application, pressure per square inch (psi) for a pump application, and temperature (degrees F) for a cooling tower application.
 23. VFD shall be able to be programmed to sense the loss of load and signal a no load/broken belt warning or fault.
 24. If the temperature of the VFD's heat sink rises to 80 degrees C, the VFD shall automatically reduce its carrier frequency to reduce the heat sink temperature. If the temperature of the heat sink continues to rise the VFD shall automatically reduce its output frequency to the motor. As the VFD's heat sink temperature returns to normal, the VFD shall automatically increase the output frequency to the motor and return the carrier frequency to it's normal switching speed.
 25. The VFD shall have temperature controlled cooling fans for quiet operation and minimized losses.
 26. The VFD shall store in memory the last 10 faults and record all operational data.
 27. Eight programmable digital inputs shall be provided for interfacing with the systems control and safety interlock circuitry.
 28. Two programmable relay outputs, one Form C 240 V AC, one Form A 30 V AC, shall be provided for remote indication of VFD status.
 29. Three programmable analog outputs shall be provided and shall accept a direct-or-reverse acting signal. Analog reference inputs accepted shall include 2 voltage (0 to 10 V DC, 2 to 10 V DC) and one current (0 to 20 mA, 4 to 20 mA) input.
 30. Two programmable 0 to 20 mA analog outputs shall be provided for indication of VFD status. These outputs shall be programmable for output speed, frequency, current and power. They shall also be programmable to provide a selected 24 V DC status indication.
 31. Under fire mode conditions the VFD shall automatically default to a preset speed.
- P. Adjustments:
1. VFD shall have an adjustable carrier frequency in steps of not less than 0.1 kHz to allow tuning the VFD to the motor.
 2. Sixteen preset speeds shall be provided.
 3. Four acceleration and 4 deceleration ramps shall be provided. Acceleration and deceleration time shall be adjustable over the range from 0 to 3,600 seconds to base speed. The shape of these curves shall be automatically

contoured to ensure no-trip acceleration and deceleration.

4. Four current limit settings shall be provided.
5. If the VFD trips on one of the following conditions, the VFD shall be programmable for automatic or manual reset: undervoltage, overvoltage, current limit, and inverter overload.
6. The number of restart attempts shall be selectable from 0 through 20 or infinitely and the time between attempts shall be adjustable from 0 through 600 seconds.
7. An automatic "on delay" shall be selected from 0 to 120 seconds.

Q. Bypass:

1. Provide a manual 3-contactor bypass consisting of a door interlocked main fused disconnect padlockable in the off position, a built-in motor starter and a 4 position DRIVE/OFF/BYPASS/TEST switch controlling 3 contactors. In the DRIVE position, the motor is operated at an adjustable speed from the VFD. In the OFF position, the motor and VFD are disconnected. In the BYPASS position, the motor is operated at full speed from the AC power line and power is disconnected from the VFD so that service can be performed. In the TEST position, the motor is operated at full speed from the AC line power while power is applied to the input of the VFD. This allows the VFD to be given an operational test while continuing to run the motor at full speed in bypass. In case of an external safety fault, a customer supplied normally closed dry contact shall be able to stop the motor whether in DRIVE or BYPASS mode .
2. Service personnel shall be able to defeat the main power disconnect and open the bypass enclosure without disconnecting power. This shall be accomplished through the use of a specially designed tool and mechanism while meeting all local and national code requirements for safety.

R. Service Conditions:

1. Ambient temperature, -10 to 40 degrees C (14 to 104 degrees F).
2. 0 to 95percent relative humidity, non-condensing.
3. Elevation to 3,300 feet without derating.
4. AC line voltage variation, -10 to +10percent of nominal with full output.
5. No side clearance shall be required for cooling of any units. All power and control wiring shall be done from the bottom.

S. Quality Assurance:

1. To ensure quality and minimize infantile failures at the jobsite, the complete VFD shall be tested by the manufacturer. The VFD shall operate a dynamometer at full load and speed shall be cycled during the test.
2. All optional features shall be functionally tested at the factory for proper operation.

T. Submittals:

1. Submit manufacturer's performance data including dimensional drawings, power circuit diagrams, installation and maintenance manuals, warranty description, VFD's FLA rating, certification agency file numbers and catalog information.
2. The specification lists the minimum VFD performance requirements for this project. Each supplier shall list any exceptions to the specification. If no departures from the specification are identified, the supplier shall be bound by the specification.
3. Harmonic filtering. The seller shall, with the aid of the buyer's electrical power single line diagram, providing the data required by IEEE-519, perform an analysis to initially demonstrate the supplied equipment will meet the IEEE standards after installation. If, as a result of the analysis, it is determined that additional filter equipment is required in the bid. A harmonic analysis shall be submitted with the approval drawings to verify compliance with the latest version of IEEE-519 voltage and current distortion limits as shown in table 10.2 and 10.3 at the point of common coupling (PCC). The PCC shall be defined as the consumer-utility interface or primary side of the main distribution transformer.

U. Start-up Service

1. The manufacturer shall provide start-up commissioning of the VFD and its optional circuits by a factory certified service technician who is experienced in start-up and repair services. Sales personnel and other agents who are not factory certified shall not be acceptable as commissioning agents. Start-up services shall include checking for verification of proper operation and installation for the VFD, its options and its interface wiring to the building automation system.
2. Warranty
 - a. The VFD shall be warranted by the manufacturer for a period of [18 months] [36 months] from date of shipment. The warranty shall include parts, labor, travel costs and living expenses incurred by the manufacturer to provide factory authorized on-site service. The warranty shall be provided by the VFD manufacturer.

V. Examination

1. Contractor to verify that job site conditions for installation meet factory recommended and code-required conditions for VFD installation prior to start-up, including clearance spacing, temperature, contamination, dust, and moisture of the environment. Separate conduit installation of the motor wiring, power wiring, and control wiring, and installation per the manufacturer's recommendations shall be verified.
2. The VFD is to be covered and protected from installation dust and contamination until the environment is cleaned and ready for operation. The VFD shall not be operated while the unit is covered.

- W. Isolation Transformer: Unit shall be provided with an isolation transformer in a NEMA I enclosure and be of a class H insulation dry type construction [Designer option].

2.05 DISPOSABLE FILTER (FOR FAN COIL UNITS AND AIR HANDLING UNITS):

Air filters shall be as scheduled, medium efficiency, pleated, disposable type. Each filter shall consist of a non-woven cotton fabric media, media support grid and enclosing frame. The filter shall be listed by Underwriters' Laboratories as Class II.

1. Filter Media: Filter media shall be of the non-woven cotton fabric type. The filter media shall have an average efficiency of 25-30percent on ASHRAE Test Standard 52.76. It shall have an average arrestance of 90-92percent in accordance with that test standard.
2. 4-Inch: The effective filter media shall be not less than 7.0 square feet of media per 1.0 square foot of filter face area and shall contain not less than 11 pleats per linear foot. Initial resistance at 600 fpm approach velocity shall not exceed 0.35 inch w.g.
3. 2-Inch: The effective filter media shall be not less than 4.6 square feet of media per 1.0 square foot of filter face area and shall contain not less than 15 pleats per linear foot. Initial resistance at 500 fpm approach velocity shall not exceed 0.28 inch w.g.
4. 1-Inch: The effective filter media shall be not less than 2.3 square feet of media per 1.0 square foot of filter face area and shall contain not less than 16 pleats per linear foot. Initial resistance at 500 fpm approach velocity shall not exceed 0.45" w.g.
5. Media Support Grid: The media support shall be a welded wire grid with an effective open area of not less than 96percent. The welded wire grid shall be bonded to the filter media to eliminate the possibility of media oscillation and media pull-away. The media support grid shall be formed in such a manner that it effects a radial pleat design, allowing total use of filter media.
6. Enclosing Frame: The enclosing frame shall be constructed of a rigid, heavy duty, high wet strength beverage board, with diagonal support members bonded to the air entering and air exit side of each pleat, to ensure pleat stability. The inside periphery of the enclosing frame shall be bonded to the filter pack, thus, eliminating the possibility of air bypass.
7. Holding Frame: Holding frames shall be Farr Type 8, factory fabricated of 16 gauge galvanized steel and shall be equipped with gaskets and 4 spring type positive sealing fasteners. Fasteners shall be capable of being attached or removed without the use of tools.
8. Spare Filters: A set of filters shall be supplied for use during the testing and balancing period. A new set of filters shall be installed after testing and balancing, and after system operation for an aggregate total of 24-hours.

2.06 PRE-FILTER

Provide pre-filter at each outside air intake upstream of AHUs, FCUs, SFs, EFs, etc. The pre-filter shall be 3/8 inch thick honeycomb polypropylene media in rigid panel filter, galvanized steel frame. The pre-filter shall be constructed of three dimension inherently electrostatic media (2 layers), UV protected, washable, and

UL Class III. The pre-filter shall have an average atmospheric arrestance efficiency of 72 percent. Initial resistance at 300 feet/minute shall not exceed 0.05 inches wg.

2.07 VIBRATION ISOLATORS

A. Vibration Isolators shall be in accordance with Section 15072 – Vibration Isolation and Seismic Control Measures.

2.08 DIFFUSERS, REGISTERS, AND GRILLES

Material and Finishes: Construction of diffusers, registers and grilles shall be extruded aluminum. All supply air outlets shall be supplied with gaskets to prevent smudging. Finish color shall be black in the Lobby, and white enamel in all other areas. Finish and color shall be approved by the Architect. Grilles shall be as manufactured by Carnes, Anemostat, ~~Krueger~~Price, Titus, Metalaire or approved equal. Include performance data for review.

1. Ceiling Diffusers, Ligature Resistant Type (CD-1): Diffuser shall be Price Model MSRRCD Maximum Security Risk Resistant Ceiling Diffusers or approved equal. Diffuser shall be louvered face and symmetrical in design with one inch nominal flange type frame and air distribution pattern as shown on drawings. Diffuser shall be designed to resist ligature restraint and be accepted by New York State Office of Mental Health for high risk areas. Provide factory fabricated, single key operated, opposed blade volume damper.
2. Ceiling Diffusers, Commercial Type (CD-2): Diffuser shall be louvered face and symmetrical in design with one inch nominal flange type frame, removable core, and air distribution pattern as shown on drawings. Provide factory fabricated, single key operated, opposed blade volume damper.
3. Supply Registers (SR-2): Supply registers shall be double deflection type with one inch nominal flange, 1/2 inch horizontal face bar spacing. Provide factory fabricated, key operated opposed blade volume damper.
4. Return Registers, Ligature Resistant Type (RR-1): Registers shall be Price Model MSPG security perforated face grilles or approved equal. The face will have the following perforated pattern: P5 with 1/8inch diameter holes staggered on 3/16 centers. Accepted by New York State Office of Mental Health. Provide factory fabricated, key operated opposed blade volume damper. Exhaust, Outside Air and Transfer shall be the same type as return registers. (Ligature Resistant type TR-1, ER-1)
5. Return Registers, Commercial Type (RR-2): Registers shall match supply registers. (TR-2, ER-2 respectively)
6. Return Grilles, Ligature Resistant Type (RG-1): Grilles shall be same as specified for registers except without volume dampers. Exhaust, Outside Air and Transfer Grilles shall be the same type as return grilles. (Ligature Resistant type TG-1, EG-1)
7. Return Grilles, Commercial Type (RG-2): Grilles shall match supply grilles.

(TG-2, EG-2 respectively)

8. Linear Diffuser and Grilles:

- a. Air diffusers shall be Price SDS (supply) and Price SDR (return) with 3/4 inch slot spacing. Sizes as shown on the drawings. The diffusers shall have 1 discharge slot with 3/4 inch slot width. Units shall have factory catalog performance ratings, which conform to CFM, Static Pressure Drop, Throw and Noise Criteria designated. Noise shall not exceed NC 30.
- b. The frame and support bars shall be constructed of heavy gauge extruded aluminum. The pattern controller shall be aerodynamically curved "ice-tong" shaped steel deflector capable of 180-degree pattern adjustment from the face of the diffuser and shall allow dampening.
- c. Continuous length units shall be provided with factory assembled corner modules to suit drawings and site conditions. Splice plates and alignment plates shall be provided to align continuous slot assemblies.
- d. The finish shall be baked anodic acrylic paint A-BL Tech Black on the face and B17 black on the pattern controllers. The pencil hardness must be 2H as tested in accordance with ASTM D3363. The paint must pass a 1000-hour ASTM B117 Corrosive Environments Salt Spray Test without creepage, blistering, or deterioration of film. The paint must pass a 500-hour ASTM D870 Water Immersion Test. The paint must also pass the ASTM D-2794 Reverse Impact Cracking Test with a 50-inch pound force applied.
- e. Heavy gauge extruded aluminum end borders, end caps, and mitered corners shall be provided to close off the ends of the diffusers.
- f. Plenums shall be internally insulated with minimum one inch thick, 1-1/2 pound density fiberglass insulation, and shall be of the same manufacturer as the linear diffusers. Plenums shall be Price SDB or approved equal.

2.09 BIRD SCREENS

Bird screens shall be 1/2 inch x 1/2 inch wire mesh with 0.063 inch diameter stainless steel wire. Bird screen frame shall have mitered joints and be fabricated with stainless steel.

2.10 VOLUME DAMPERS

- A. Low Velocity (1,500 FPM or Less): Furnish and install Ruskin Model CD35 standard dampers suitable for use in temperature from 0 degrees F to 200 degrees F. Frames shall be 5 inches x one inch x 16 gage galvanized sheet hat channel. Blades shall be roll formed, triple V-groove 16 gage galvanized steel, maximum of 6 inches wide. Axles shall be 1/2 inch plated steel hex. Bearings shall be molded synthetic and linkage concealed in frame. Maximum single section size shall be 48 inches wide and 72 inches high. When applications

require more than one damper section to fill opening, sections shall be interconnected by approximate jack shafting.

- B. Low Velocity/Low Leak For Outside Air Duct (1,500 FPM or Less): Furnish and install Ruskin Model (specifier select one) CD35 or CD36 standard dampers suitable for use in temperatures from -25 degrees F to 180 degrees F. Frames shall be 5 inches x one inch x 16 gage galvanized steel hat channel. Blades shall be roll formed, triple V-groove 16 gage galvanized steel, maximum of 6 inches wide. Axles shall be 1/2 inch plated steel hex. Bearing shall be molded synthetic and linkage concealed in frame. Maximum single section size shall be 48 inches wide and 72 inches high. When applications require more than one damper section to fill opening, sections shall be interconnected by appropriate jack shafting. (Specify following for CD36 only). Blade edge shall be extruded dual durometer vinyl. Jamb seals shall be flexible metal, compression type.
- C. High Velocity (Greater than 1,500 FPM): Furnish and install Ruskin Model CD80AF3 suitable for use in pressure differentials up to 13 inches w.g. and temperatures to 200 degrees F. Damper frame and airfoil blades shall be steel with all damper materials equivalent to Ruskin standard construction. Axles shall be 3/4 inch diameter plated steel supported by stainless steel sleeve bearings bolted to frame. Finish shall be mill galvanized.
- D. High Velocity/Low Leak (Greater than 1,500 FPM): Furnish and install Ruskin Model CD80AF3 suitable for use in pressure differentials up to 13 inches w.g. and temperatures up to 200 degrees F. Damper frame and airfoil blades shall be steel with all damper materials equivalent to Ruskin standard construction. Axles shall be 3/4 inch diameter plated steel supported by stainless steel bearings bolted to frame. Finish shall be mill galvanized. Blade edges seals shall be extruded vinyl. Jam seals shall be flexible metal, compression type.
- E. Approved equal manufacturers are Titus, Carnes, Pottorff, Airstream, Metalaire and Anemostat.

2.11 FIRE DAMPERS

Dampers shall be Underwriters Laboratories tested, rated, and labeled in accordance with UL-555 and UL-555C standard is applicable to the installation required by the drawings. Unless otherwise noted on the drawings all dampers shall be rated for use in a dynamic system and have a 1.5 hours heat rating, or rating as noted on drawings with a 165 degree fusible link. Sleeves shall be provided as required to maintain the damper UL rating. Duct access shall be provided for all the dampers. Access doors shall be as specified in paragraph Duct Access Doors. Unless otherwise noted on the drawings all ceiling or wall access panels required for damper service shall be provided by the general Contractor. Submittal of dampers shall include installation instructions, which will provide for installation compliance with its UL listing.

1. Fire Dampers (FRD) shall be the curtain type Style A unless otherwise noted on drawings. Dampers located in ducts with air velocities greater than 1000 FPM shall be classified for dynamic closure up to a minimum of 2300 FPM. Dampers located in ducts with air velocities 1000 FPM or less shall be classified for dynamic closure up to a minimum of 1500 FPM. Damper shall

be rated to close with specified air velocities and 4 inches water gauge of air pressure.

2. Fire Dampers (FRD) in walls between transfer grilles shall be of the thin wall design Style A, classified for dynamic closure to a minimum 1500 FPM air velocity and 4 inches water gauge of air pressure.
3. Fire Dampers located at fire rated ceilings shall be tested, rated and labeled in accordance with Underwriters Laboratories UL555C Standard. Dampers shall be installed with the damper blade parallel to the air flow in the branch duct. Fire damper installation shall include diffuser radiation shield, insulation and other accessories required to maintain the UL listing.

2.12 TURNING VANES AND EXTRACTORS

Factory-fabricated and factory-or-field-assembled units consisting of curved double thickness turning vanes for uniform air distribution and change of direction with minimum turbulence and pressure loss. Fabrication shall be in accordance with applicable SMACNA Publications.

2.13 DUCT ACCESS DOORS

Hinged access doors shall be provided at all automatic dampers, fire dampers, heaters, thermostats, sensors and all other apparatus requiring service and inspection in the duct system. Access doors shall be 15 by 18 inches unless indicated otherwise. Where size of duct will not accommodate this size, access doors shall be made as large as practical. Doors shall be provided with galvanized continuous hinge with steel pin and galvanized steel cam latch at 12 inches O.C. maximum spacing. All doors 48 inches by 48 inches or larger shall be provided with fasteners that can be operated from both sides. Access doors in insulated ducts shall be of the insulated type with one inch foam or mineral fiber insulation. Doors in field fabricated air handlers shall be installed so that fan pressure or suction holds the door closed, unless otherwise indicated. Door and frame shall be galvanized sheetmetal.

2.14 DUCT TEST HOLES

Holes with patches in ducts and plenums shall be provided where directed or necessary for using pitot tubes for taking air measurements to balance the air systems. At each of these locations where ducts or plenums are insulated, extension shall be provided with plug fittings.

2.15 UV-C LAMPS

- A. UVC Emitter and fixture shall be factory assembled and tested. They shall consist of a housing, power source, reflector, Emitter sockets and emitter and shall be constructed to withstand HVAC environments. They shall be UL listed for damp locations.
- B. Housing shall be constructed of hospital grade stainless steel and equipped with 1/2 inch conduit openings on each end to facilitate coupling fixture and wiring to

power. It shall incorporate all components into one integral assembly that maximizes serviceability. It shall be designed to be mounted inside the airstream and downstream or upstream of the cooling coil.

- C. Power source shall be a Class P2, rapid start type with a power factor of 0.95 and a power conversion of not less than 70percent in 115 Vac and shall be designed to maximize photon production, radiance and reliability in cold or moving air streams of 35-170 degrees F, 100percent RH and at any velocity. The design shall include RF and EMI suppression.
- D. Reflector shall be constructed of heavy gauge, specular finished aluminum alloy with a minimum 86percent reflectance at 254 nm.
- E. Sockets shall be medium bi-pin, double click safety, twist lock type. They shall be constructed of a UVC resistant polycarbonate.
- F. Emitter tube shall be a very high output, hot cathode, T5 diameter, medium bi-pin type that produces broadband UVC of 250-260 nm. Each tube shall produce the specified output at any airflow velocity and air temperature of 35-170 degrees F. It shall produce no ozone or other secondary contamination.
- G. Independent testing: When tested in accordance with the general provisions of IES Lighting Handbook, 1981 Applications Volume, output per one inch arc length shall be not less than 10 uW/cm² at 1 meter in a 400 FPM airstream of 45 degrees F.

2.16 DUCT ATTENUATOR

- A. Duct Attenuators shall be in accordance with Section 15811 – Duct Silencers.

2.17 FIRE PROTECTION DEVICES

Provide smoke detectors in the return and the supply air ducts in accordance with NFPA 90A. Detectors shall be UL listed for duct installation.

- 1. Smoke Detectors: Provide in systems having air handling capacity over 2,000 cfm. Design for detection of abnormal smoke densities by the photoelectric principle, responsive to both invisible and visible particles of combustion, and not susceptible to operation by changes to relative humidity. Provide duct detectors with an approved duct housing, mounted exterior to the duct, and with perforated sampling tubes extending across the width of the duct. Activation of duct detectors shall cause shut down of the associated air handling unit and operation of dampers; [and annunciation of the signal source and tripping of the master fire alarm box or other building fire alarm transmitter, but shall not cause sounding of the building interior alarm devices. Smoke control and exhaust systems shall have provisions for manual operation by means of a key operated switch to override any other shutdown features and shall be located adjacent to the fire alarm system control panel.] [Provide contacts for connection to fire alarm system.]

2.18 DUCTWORK

All sheet metal ducts shall be erected in a first class and workmanlike manner,

true to the dimensions indicated on the drawings, unless otherwise approved, straight and smooth on the inside with neatly finished airtight joints. The ducts shall be securely anchored to the building in an approved manner and shall be so installed as to be completely free from vibration under all conditions of operation. The ducts shall be properly braced and reinforced with steel angles or other structural members. All slip joints shall be made in the direction of flow, and unless otherwise indicated on the drawings, all elbows shall have a centerline radius equal to 1-1/2 times the width of the duct or turning vanes shall be used. The sheet metal used shall be ASTM A 653 galvanized steel sheet of lock forming quality. Galvanized coating to be 1.25 ounces per square foot, both sides of sheet, G90 in accordance with ASTM A90 except as otherwise hereinafter specified. The thickness of the sheet metal and size and spacing of the stiffeners used shall be in accordance with the requirements of the latest edition of the SMACNA Duct Construction Standard. Connections to diffusers, grilles and register faces shall be absolutely airtight.

1. Minimum acceptable duct pressure class, for all ductwork except transfer ductwork, is 1.5 times the equipment total static pressure but in all cases not less than 2 inch W.G. positive or negative, depending on the application. Transfer ductwork minimum acceptable duct pressure class is 1 inch W.G. positive or negative, depending on the application.
2. Seal all transverse joints on ducts with Minnesota Mining and Mfg. Co. Duct Sealer 800 Premium Grade, Foster 32-19 Fire Resistive Duct Sealer, Polymer Adhesives Sealant Systems, Inc. Airseal # 22 or approved equal.
3. Moisture laden ducts from dishwasher hood shall be ASTM A167, 304 stainless steel with continuous external welded seams, grounded to a finish matching the connecting ducts.
4. Moisture laden ducts from large shower rooms shall be ASTM A167, 304 stainless steel. Exposed ducts in finished areas shall be ground to finish matching the connected ducts.
5. Flexible Duct: Flexible air duct shall be Flexmaster U.S.A Type 6M, acoustical flex duct, or approved equal. Flexible air duct shall be listed by Underwriters' Laboratories under UL 181 standards as Class 1 flexible Air Duct Material and complying with NFPA Standards 90A and 90B. Flexible duct shall be a factory fabricated assembly composed of a polymeric liner duct bonded permanently to a coated spring steel wire helix and supporting a fiber glass insulating blanket. Low permeability outer vapor barrier of fiber glass reinforced film laminate shall complete the assembly. Duct shall be rated for 6 inches w.g. positive pressure, one inch w.g. negative pressure, and operating temperature up to 250 degrees F.

2.19 DUCT AND PLENUM INSULATION

A. Duct Lining:

1. Materials: Ductliner shall be fiberglass board conforming to ASTM C 1071, Type II, one inch thick, black mat faced, minimum 3 lbs. per cubic feet density. The liner shall meet the Life Safety Standards as established by NFPA 90A. The liner surface and attachment system shall be designed for a

minimum 5,000 feet per minute duct air velocities. Owens Corning Fiberglas ductliner board, Johns-Manville Permacote Linacoustic R-300, Certainteed Manson Tough Gard 300 or approved equal. The duct liner shall have an NRC of not less than 0.65 based on ASTM C423 Type A Mounting, K Factor not exceeding 0.23 at 75 degrees F mean temperature and 25/50 flame and smoke rating when tested in accordance with UL 723.

2. Application: Insulation shall be installed in accordance with manufacturer's recommendations, except that all edges shall be coated. Provide metal nosing at all supply and return duct connections to all Air Handling Units and Fan Coil Units.
 3. Exterior and Unconditioned Ducts: All ducts located outside the building, and in unconditioned spaces (such as mechanical rooms) shall be lined with 2 inches thick duct liner.
 4. All duct and plenum sizes shown on drawings are net inside dimensions and do not include internal insulation thickness.
 5. All duct lining shall be coated with an EPA registered antimicrobial agent that will effectively prevent the growth and spread of mold, mildew, fungus, and odor-causing bacteria on its surface. Application shall be in accordance with manufacturer's instructions. Foster 40-20, Ruskin INDEQ or approved equal.
- B. Duct Wrap (Flexible Blanket):
1. Material: 1-1/2 inches flexible glass fiber blanket, 1.5 lbs. per cubic feet density, K factor not to exceed 0.25 at 75 degrees mean temperature. Insulation shall be furnished with a factory applied foil scrim-kraft facing consisting of aluminum foil (minimum 0.7 mil thick) reinforced with fiberglass yarn mesh and laminated to 40 lb. chemically treated, fire resistant kraft. Insulation shall have a 25/50 flame and smoke rating when tested as a composite installation, including insulation, facing materials, tapes, and adhesives as normally applied in accordance with UL 723.
 2. Application: Insulation shall be installed in accordance with manufacturer's recommendations.
- C. Plenum Liner:
- Plenum liner shall be the same as duct liner except liner shall be 1-1/2 inches thick. Plenums located outside the building shall have 2 inches thick liner.
- D. All substitution request shall include samples and manufacturers literature.

2.20 ACOUSTIC DUCT WRAP

- A. The barrier shall be constructed of a 0.10 inch (3 mm) thick barium sulphate loaded limp vinyl sheet bonded to a thin layer of reinforced aluminum foil on one side. The barrier shall have a nominal density of 1 psf (4.88 kg/m²) and shall have a minimum STC rating of 28. The barrier shall exhibit minimum flammability ratings of 0.0 seconds for flame out and afterglow and 0.2 inches for char length when tested in accordance with Federal Test Standard No. 191-5903. The barrier

shall have a minimum thermal conductivity "K" value of 0.29 and a rated service temperature range of -40 degrees F to 220 degrees F (-40 degrees C to 105 degrees C). When tested for Surface Burning Characteristics per ASTM E84, the barrier will have a Flame Spread Index of no more than 25 and a Smoke Development Index of no more than 50.

- B. The decoupling layer shall be a combination of one inch (25 mm), 2 inches (50 mm) fiber glass batting, non-woven porous scrim-coated glass cloth, quilted together in a matrix of 4 inches (100 mm) diamond stitch pattern which encapsulates the glass fibers. The barrier shall be type KNM and the decoupling layer shall be type KFA by Kinetics. The composite material shall be fabricated to include a nominal 6 inches (152 mm) wide barrier overlap tab extending beyond the quilted fiberglass to facilitate a leak-tight seal around field joints. Nominal barrier width 54 inches (1372 mm), nominal decoupler width 48 inches (1219 mm).

The barrier shall be Model KNM-100ALQ by Kinetics Noise Control, Inc.

2.21 SAFETY SWITCHES AND STARTERS

Equipment motor safety switch and starter shall be provided under this section. Three phase motor shall have overload protection devices on each leg sized according to the nameplate rating of motor. Enclosures shall be NEMA type as required by the location installed except that switches located in areas with fire sprinklers shall have weatherproof or raintight NEMA type 3R enclosure. Allen-Bradley, Westinghouse, General Electric, or approved equal.

1. Safety Switches: Safety switches shall be general or normal duty. The cover shall be interlocked so that it cannot be opened when the switch is in the "on" position. However, voidable interlocks shall be provided in order to bypass this feature when necessary. Switches shall be capable of being locked in the "off" position. Switches shall be fusible or non-fusible as indicated. Fusible switches shall be supplied with non-renewable fuses, sized as indicated. Where current limiting type or time-lag dual element fuses are indicated on the plans, switches shall be labeled to restrict fuses to the type indicated.
2. Magnetic Motor Starters: Starters shall be non-reversing, full-voltage type. Starters shall have 3 thermal overload protection heaters sized according to the nameplate ratings of the actual installed motor. Units shall have under-voltage protection when used with maintained contact control devices. The starter cover shall be equipped with push buttons or other control switches which are required for proper operation.
3. Starters for 20 HP or larger motors shall be [reduced voltage starter] [soft start type] unless otherwise indicated.
4. Voltage Monitor:
 - a. Provide a line voltage monitor for all equipment with motors 5 horsepower or larger. Power monitor shall de-energize equipment to prevent damaging equipment due to irregular power.
 - b. Power shall be monitored for Voltage unbalance, over/under voltage,

phase loss, phase reversal, incorrect phase sequencing, faulty or degrading contacts, front side (source) fault, back side (load) fault, and rapid system recycling.

- c. Light emitting diode display shall be provided for setup and diagnosis. Display shall indicate incoming line voltage, faults, and system setpoints.
- d. System set-points shall include:
 - 1) Line voltage: 190-600 VAC
 - 2) Voltage imbalance: 2-20percent
 - 3) Delay on break period: 0-10 minutes
 - 4) Fault interrogation: 0-15 seconds
 - 5) Over/under voltage: 2-25percent
 - 6) Reset modes Auto or 0-10 times.
 - 7) Control modes: on-off

2.22 SEALANTS

Sealants shall be in accordance with Section 07920 - SEALANTS. Firestopping shall be in accordance with Section 07270 - FIRESTOPPING.

PART 3 - EXECUTION

3.01 PROTECTION OF WORK IN PROGRESS

Pipe and duct openings shall be closed with caps or plugs until connections are made. Equipment shall be securely covered for protection against physical or chemical damage. In areas exposed to weather, materials unused at the end of each day's work shall be stored in weather-protected locations. Damage to materials or equipment due to the Contractor's neglect shall be repaired or replaced to the satisfaction of the Architect by, and at the expense of the Contractor. Ductwork openings shall be covered and protected from dust and moisture daily. No equipment, ductwork, piping, or insulation shall be installed if contaminated by dust or moisture. Objects shall be cleaned or dried before installation.

3.02 SLEEVES

- A. Pipes passing through wall waterproofing membrane or concrete floors shall be provided with pipe sleeves fitted into place at time of construction. Sleeves shall not be installed in structural members unless noted. Each sleeve shall extend through its respective wall or floor and shall be cut flush with each surface. Unless otherwise indicated, sleeves shall be of such size as to provide a minimum of 1/4 inch clearance between pipe or jacket over insulation and sleeves. Sleeves in bearing walls, waterproofing membrane floors, and wet areas shall be schedule 40 steel pipe or cast iron pipe.

- B. When penetrating waterproofing membrane for floors, the metal jacket shall extend from a point below the backup material to a minimum of 2 inches above the flashing sleeve. For other areas, the metal jacket shall extend from a point below the backup material to a point 12 inches above the floor, or when passing through walls shall extend a minimum of 4 inches on either side of the wall.
- C. Where pipes or ducts penetrate fire rated walls and floors the space between the pipes or ducts and sleeves shall be sealed with fireproof sealant. Installation shall be in accordance with manufacturers instructions.

3.03 FLOOR, WALL, AND CEILING ESCUTCHEONS

Escutcheons shall be provided at all finished surfaces where exposed piping, bare or insulated, passes through floors, walls or ceilings except in utility, or equipment rooms.

Escutcheons shall be fastened securely to pipe or pipe covering and shall be chromium plated brass, either one piece or split pattern, held in place by internal spring tension or setscrew.

3.04 DUCTS

- A. Supports:
 - 1. Refer to structural drawings for type of construction from which ducts are to be suspended. Support from steel decking is prohibited unless specifically approved by the Structural Engineer.
 - 2. Drilled in Threaded Inserts: Where supports in beams and joists are required after concrete has been poured, Phillips "Redhead" Drilled In Threaded Inserts shall be provided, installed in accordance with manufacturer's recommendations.
 - 3. Ducts and accessories shall be supported in accordance with SMACNA HVAC Duct Construction Standards Metal and Flexible Ducts (1995). Additional hangers shall be provided within 6 inches of each cross sectional joint on each duct section. This will result in all duct sections having 2 hanger locations, one at each end.
- B. Duct Seams and Joints:
 - 1. Longitudinal seams shall be Pittsburgh seams, standing seams, grooved, or snap lock. Snap lock seams shall be formed with rollers and designed and set up specifically for the metal gage being worked. Seams shall be caulked.
 - 2. Transverse joints in low velocity round ducts shall be slip type secured with sheet metal screws equally spaced on 6 inches centers maximum with a minimum of 3 screws per joint. Exposed inside edge of duct at joint shall point in direction of air flow. Joints shall be sealed with an approved tape or mastic.
 - 3. All seams and joints in rectangular ductwork shall be constructed in accordance with ASHRAE Handbooks, except as otherwise noted.
- C. Duct Accessories: Turning vanes or extractors shall be installed in all changes in

direction of air flow, whichever is applicable.

D. Firestop around ducts penetrating floor slabs.

E. Duct Leakage Testing:

1. Contractor shall leak test medium pressure ductwork from AHU discharge to terminal unit connections.
2. Contractor shall, at the beginning of the work construct, erect and leak test a representative sample of the duct construction to be used at the 3 inches pressure class. The sample specimen shall include at least 5 transverse joints, typical seams, and at least 2 typical branch connections plus 2 elbows, from the AHU discharge to the terminal unit.
3. The leakage amount shall not exceed the allotted amount for the pressure class or the allotted amount for that portion of the system, whichever is applicable.

DUCT CONSTRUCTION CLASS	LEAKAGE CLASS
3 inches w.g.	12

(Note: Designer to modify for applicable pressures.

4. Leakage test procedures shall follow the outlines and classifications in the SMACNA HVAC Duct Leakage Test manual, and shall provide written test report results.
5. Contractor shall notify engineer a minimum of 3 days in advance of duct testing.
6. If specimen fails to meet allotted leakage level, the contractor shall modify to bring it into compliance and shall retest it until acceptable leakage is demonstrated. Engineer at his discretion may require additional duct sections tested.
7. Tests necessary repair shall be completed prior to concealment of ducts or installation of exterior duct wrap.

3.05 INSULATION

- A. Ducts: All air conditioning supply, return air ducts and outside air ducts shall be insulated with duct wrap.
1. First 15 feet of supply and return air ducts from air handling equipment shall be additionally lined with duct liner.
 2. Duct wrap shall overlap duct liner a minimum of 3 inches.
 3. Accessories such as attenuators and volume dampers shall be provided with 1- 1/2 inches thick rigid fiberglass external insulation.
 4. All edges of duct and plenum liners shall be coated. Provide metal nosing at all supply and return duct connections to all air handling equipment.

3.06 TEMPERATURE CONTROLS

- A. General: Temperature controls shall be electric type that will provide the required sequence of operation and control. Items not specified herein or shown on the drawings but necessary to perform the functions specified shall be provided.
- B. Installation: The automatic equipment shall be installed by or under the direct supervision of the manufacturer's representative, in strict accordance with manufacturer's instructions. All control wiring or tubing shall be provided under this section of the specifications. Before the air conditioning installation is accepted, the Contractor shall deliver to the Architect a statement from the manufacturer or his authorized agent, certifying that the automatic control equipment has been inspected and found to be properly installed and is functioning satisfactorily.

3.07 EQUIPMENT INSTALLATION

Necessary supports shall be provided for equipment, appurtenances and pipe, as required. These include frames or supports for air conditioners, and other similar type items requiring supports.

3.08 VIBRATION ISOLATORS

No rigid connections between equipment and building structure shall be made that degrades the noise and vibration isolation system herein specified. Electrical conduit connections to isolated equipment shall be looped to allow free motion of isolated equipment. Provide vibration isolators to vibrating and/or dynamic equipment, and install per equipment manufacturer's instructions.

3.09 CLEANING AND ADJUSTING

Pipes shall be cleaned free of scale and thoroughly flushed of all foreign matter. Strainers and valves shall be thoroughly cleaned. Equipment shall be wiped clean, with all traces of oil, dust, dirt, or paint spots removed. Temporary filters shall be provided for all fans that are operated during construction, and after all construction dirt has been removed from the building, new filters shall be installed.

Bearings shall be properly lubricated with oil or grease as recommended by the manufacturer. Belts shall be tightened to proper tension. All control valves and other miscellaneous equipment requiring adjustment shall be adjusted to setting indicated or directed. Fans shall be adjusted to the speed indicated by the manufacturer to meet specified conditions. Clean all strainer screens 10 days after acceptance of this project.

3.10 LEAK TESTING

Upon completion of installation of the system before any piping is insulated, test factory - and field-installed refrigerant piping with an electronic-type leak detector. Use ~~same type of refrigerant to be provided in the system~~ nitrogen for leak testing per equipment manufacturer's recommendations. ~~When nitrogen is used to boost system pressure for testing~~ Once testing is completed, ensure that ~~all~~ nitrogen is eliminated from the system before charging with refrigerant. Minimum

refrigerant leak field test pressure shall be as specified in ASHRAE 15, except that test pressure shall not exceed 1034 kPa (gage) 150 psig on hermetic compressors unless otherwise specified as a low side test pressure on the equipment nameplate. If leaks are detected at time of installation or during warranty period, remove the entire refrigerant-nitrogen charge from the system, correct leaks, and retest system.

3.11 TESTING, ADJUSTING AND BALANCING SYSTEMS

- A. The Contractor shall obtain the services of an independent test and balance agency that specializes in and whose business is limited to the testing and balancing of air conditioning systems.
- B. Testing, adjusting and balancing shall be performed in complete accordance with ASHRAE Testing, Adjusting and Balancing.

Recommendations by ASHRAE shall be considered mandatory. Adjustment of equipment and air outlet quantities to suit actual field conditions shall be within the scope of Testing, Adjusting and Balancing.

- C. Instruments used for testing and balancing of air and hydronic systems must have been calibrated within a period of 6 months and checked for accuracy prior to start of work.
- D. An electronic copy and at least 1 hard~~Six~~copies of the complete test report shall be submitted to the Architect prior to final acceptance of the project. Reports shall be submitted on standard SMACNA Forms.
- E. All strainer screens shall be removed, cleaned and reinstalled after 8 hours of operation and prior to balancing.
- F. All air filters shall be replaced with new filters after 8 hours of operation and prior to balancing.
- G. Balancing:
 - 1. Variable Flow Chilled Water System Balancing: The following procedures shall be used to balance a variable flow chilled water system.
 - a. Close coil valves except the one on the critical branch that appears to have the highest pressure drop. This valve shall be left wide open.
 - b. Adjust the differential pressure controller so that the pump delivers design flow through this branch.
 - c. Then close the coil valve on this branch and run the pump at full speed to be sure that there is no flow in the branch and that the actuator closes the valve tightly against the maximum pump head. Check chiller chilled water flow to make sure minimum flow is achieved.
 - d. Check the other branches in the same manner to ensure that the drop on the remaining branches is less than the apparent critical branch and that all valves close tightly.
 - e. If another branch has a higher pressure drop, then reset the differential pressure controller upward to satisfy this branch.

When testing the pressure drop in the branches, all readings may be taken at the remote coil branch where the differential pressure sensor is located. There is no flow and, therefore, no pressure drop in the main between the sensor and the branch under test.

It is not necessary to move the differential pressure test gauge to the branch being tested because the differential pressure will read the same across the branch as it reads across the sensor as long as all other branch valves are closed.

If the building has an operational DDC system, all branch flows and all valves may be tested at the DDC console when the testing procedure outlined above is followed.

The branch differential pressure may all be read across the hydraulically most remote branch sensor and the branch flows may all read through flow sensor FS-1 located at the CHR main to the chilled water plant. This procedure shall also be done annually, as part of the maintenance program, to detect any valves that have deteriorated and may not be closing tight.

2. Duct systems shall be balanced as follows:
 - a. System (or air moving device) to not less than design CFM. Adjusting shall include changing of sheaves to suit field static pressures.
 - b. Control zones or major duct branches to plus or minus 5percent.
 - c. Registers and grilles, initially, to plus or minus 10percent, thereafter, adjust to field conditions.
3. Test Data: The Contractor shall provide the Architect with typewritten schedules of readings taken during the balancing and testing operations indicating the required or specified reading, the first reading taken, and final balanced reading for the following items:
 - a. Fans: Size, Type, speed in rpm, outlet velocity in fpm, static pressure in inches of water, air quantity in cfm, and motor load in amperes. Fan pulleys shall be changed or adjusted to meet system field static pressure requirement.
 - b. Air Handling Units: Size, type, fan speed in rpm, outlet velocity in fpm, external static pressure in inches of water, total static pressure in inches of water, air quantity cfm, and motor load in amperes.
 - c. Air outlets and inlets: Size, velocity in fpm, and air quantity in cfm.
 - d. Coils: Size; face velocity in fpm; air temperature entering coil and air temperature leaving coil, wet-bulb and dry-bulb degrees F.; water temperature entering coil and water temperature leaving coil, degrees F; and water quantity in gpm.
 - e. Ducts: Size, velocity in fpm, and air quantity in cfm.
 - f. Control Settings: On-site settings for all automatic controls including thermostats, humidity controls, safety controls, minimum damper settings, fire-safety thermostats, pressure controls, temperature controls, and other

similar items shall be provided in the form of a typed tabulated list indicating type of control, location, setting, and function.

- g. Fill out attached Operational Performance Test form.

3.12 PAINTING

Painting shall be as specified in Section 09900 - PAINTING.

3.13 SPARE-PARTS DATA

After approval of materials and equipment and 2 months prior to the date of beneficial occupancy, the Contractor shall furnish a complete list of parts and supplies, with current source of supply.

3.14 OPERATING AND MAINTENANCE MANUAL

Provide operating and maintenance manual on all equipment and the system in accordance with Section 15011- GENERAL MECHANICAL PROVISIONS.

3.15 FIELD INSTRUCTIONS

Upon completion of the work and at a time designated, the services of one or more qualified personnel shall be provided by the Contractor for a period of not less than 2 days to instruct the Owner's representative in the operation and maintenance of the air conditioning system and ventilation system. These field instructions shall cover all the items contained in the bound instructions.

3.16 VALVE TAGS AND INDEX

Identification tags made of brass or aluminum shall indicate valve number, function, size, and working pressure and shall be installed on all valves. Tags shall be 1-1/2 inches minimum in diameter, and marking shall be stamped. Tags shall be wired to valve with 0.0808-inch diameter, No. 12 AWG, copper wires. Furnish a chart indicating location, index number and purpose of all valves for the Architect's review and approval.

3.17 STANDARDIZED PIPE IDENTIFICATION SYSTEM

- A. Use an arrow marker with each pipe content marker, the arrow shall always point away from the pipe marker and in the direction of flow.
- B. If flow can be in both directions, use a double headed arrow marker.
- C. Apply pipe marker and arrow marker at every point of pipe entry or exit where line goes through wall.
- D. Apply pipe marker and arrow marker on each riser and "T" joint.
- E. Apply pipe marker and arrow marker every 20 feet on long continuous lines.
- F. Apply markers on the 2 lower quarters of the pipe and where view is unobstructed.

- G. Arrow markers shall be 4 inches long minimum, and pipe content marker lettering sizes shall be 1-1/2 inches minimum in height.

3.18 ONE YEAR GUARANTEE AND MAINTENANCE SERVICE CONTRACT

- A. In addition to the Guarantee on material and workmanship, the installer shall submit an electronic copy and at least 1 hardcopy of the Maintenance Service Contract, countersigned by the General Contractor, that will validate said Guarantee.
- B. The Guarantee and maintenance service shall extend for a period of one year commencing after 30 consecutive days of trouble-free operation after the Project Acceptance Date or the air conditioning equipment acceptance date, if earlier than the Project Acceptance Date, and shall include all labor, materials, equipment and parts necessary to service the complete system, in accordance with the attached Schedule of Maintenance Service, so as to assure proper operation and function of the system. All costs for the periodic maintenance, including emergency calls, shall be borne by the Contractor. This maintenance period and the guarantee period shall run concurrently (same start and end dates).

Trouble-free operation is defined as a non-disabling condition or a non-recurring failure or disruption and the following:

- 1. The system shall be free of all discrepancies, contamination and debris which requires correction in excess to those described for the monthly service which is included in the Schedule of Maintenance Service.
- 2. The system is maintaining operational conditions and other parameters as measured during acceptance test.
- C. The Contractor shall keep a separate log recording all regular and emergency maintenance calls to the project at his office. The log shall include at least the following information:
 - 1. Name of person making service call.
 - 2. Date of call.
 - 3. Time in and out from project.
 - 4. Nature of call; if emergency, who contacted service company.
 - 5. Temperature and pressure readings from all available pressure gauges and thermometers. Readings from all other gauges, thermometers, level indicators, status indicators, sensors, Ambient temperature and humidity at the site.
 - 6. The type and cost (labor, materials, parts and equipment) of repair work performed on the unit, if any.
 - 7. All items indicated to be recorded in the Schedule of Maintenance Service.
 - 8. Other data required.

In addition, the Contractor shall submit written reports of maintenance service performed within 5 working days of performance of service to the Owner.

The maintenance service report shall include pertinent pages of the maintenance log.

- D. The Installer shall include a listing of the following items along with the Maintenance Service Contract:
 - 1. Name of the Servicing Contractor.
 - 2. Air Conditioning system acceptance date.
 - 3. Service contract expiration date. Service contract expiration date shall be amended after the completion of the 30 consecutive days of trouble free operation specified in paragraph B. above.
 - 4. Monthly inspection schedule for the maintenance period.
 - 5. Itemized listing of the equipment covered under the service contract, including a description of the equipment identified, its model and serial number(s) and manufacturer's name(s).
 - E. The Maintenance Service Contract shall be submitted along with the Operations and Maintenance Manual 30 days before the Project Acceptance Date.
 - F. Certification of Maintenance Work: All work done under this maintenance contract shall be certified by a responsible employee of the Contractor who is in charge of or who performs the maintenance work. Service reports shall be made out for all service periods, i.e., monthly, quarterly, semi-annual, annual, emergency, etc.. Certification of work by the Contractor shall be construed to mean that work has been performed in accordance with recommended and accepted maintenance procedures in conformance with the full intent of the service contract. Service reports shall include findings by the service personnel and description of work performed to maintain the systems in proper operating condition. [All service reports shall be reviewed with the University Mechanical Engineer who will acknowledge and sign reports.]
 - G. Work Schedule/Advance Notification:
 - 1. All maintenance work shall be performed between the hours of 7:30 a.m. to 4:00 p.m., on normal working days, Monday through Friday, excluding County Holidays.
 - 2. Contractor shall notify Owner prior to any maintenance work that will cause mechanical equipment outages or in any way affect the facility's user in the performance of their duties. Contractor shall inform the Owner a minimum of 5 working days in advance of any work.
 - H. Trouble Calls: Emergency service and repairs required between regular service calls shall be rendered within 24 hours after the Contractor is notified, non-work days [included] [excluded].
- The Contractor shall call Owner the next working day after being notified of the problem and report the status of repairs.
- I. Maintenance Report/Checklist: The Contractor shall prepare and maintain a maintenance service report/checklist which shall include the following:

1. Date maintenance service was performed.
2. The name of the mechanic who performed said maintenance.
3. The type and cost (labor, materials, parts and equipment) of repair work performed on the unit, if any.
4. Documents and other data pertaining to the maintenance performed.

It will be the responsibility of the Contractor to maintain the report/checklist by recording the above noted data after each scheduled maintenance and emergency repairs, and have the checklist available for inspection at the building site. The report shall be sufficiently detailed to properly reflect the past maintenance history of the equipment.

Reports shall be certified by a representative of the being served and shall be submitted to Owner at the completion of the Service Contract.

- J. Cleanup and Work Practices: The Contractor shall keep the job site free of debris, litter, discarded parts, etc. and shall clean all oil drippings during the daily progress of work. The Contractor shall remove all tools, parts, and equipment from the service areas upon completion of the work.

The Contractor shall exercise caution during the progress of his maintenance and repair work to prevent damage to the ceilings, roofing and other building structure. The Contractor shall restore all damages, caused by his negligence, to its original condition, at his own expense.

- K. All periodic maintenance services performed by the Contractor shall include applicable items listed but shall not be limited to the following maintenance tasks:

SCHEDULE OF MAINTENANCE SERVICE

1. VENTILATING FANS (Exhaust and Supply)

Quarterly Service

- a. Check motor-controlled and back-draft dampers for proper operation; lubricate linkage for free movement. Correct, record and report all discrepancies and actions taken.
- b. Lubricate fan motors and bearings. Correct, record and report all discrepancies and actions taken.
- c. Check belt wear and tension and record findings; adjust or replace as needed. Correct, record and report all discrepancies and actions taken.
- d. Check sheaves for wear and record findings. Replace as needed. Correct, record and report all discrepancies and actions taken.
- e. Check fan collar, bearings, and shaft for wear. Correct, record and report all discrepancies and actions taken.
- f. Replace air filters where installed; clean grilles, registers and diffusers. Correct, record and report all discrepancies and actions taken.
- g. Read and record motor power supply voltage and amperes. Correct,

record and report all discrepancies and actions taken.

- h. Check 2-speed motor for proper operation; check refrigerant sensor control of motor speed for proper operation. Correct, record and report all discrepancies and actions taken.
- i. Certify performance of quarterly scheduled maintenance service and that all discrepancies have been reported and corrected.

Semi-Annual Service

- a. Check and clean fan wheels and housings of dust, dirt, and grease. Correct, record and report all discrepancies and actions taken.
- b. Remove and wash all intake grilles and dampers and repair or replace deteriorated bird screens. Correct, record and report all discrepancies and actions taken.
- c. Certify performance of semi-annual scheduled maintenance service and that all discrepancies have been reported and corrected.

2. TEMPERATURE AND PNEUMATIC CONTROLS

Quarterly Service

- a. Check automatic dampers for tightness in closing; check for bent blades and defective linkage; lubricate connections for free movement. Correct, record and report all discrepancies and actions taken.
- b. Lubricate all actuators, damper motors, plungers, valves. Correct, record and report all discrepancies and actions taken.
- c. Adjust thermostat to maintain a design room temperature of 75 degrees F, and other set-points required by building users. Correct, record and report all discrepancies and actions taken.
- d. Calibrate all thermostats with controlling devices. Correct, record and report all discrepancies and actions taken.
- e. Certify performance of quarterly scheduled maintenance service and that all discrepancies have been reported and corrected.

Annual Service

- a. Calibrate all thermostats with controlling devices. Correct, record and report all discrepancies and actions taken.
- b. Certify performance of annual scheduled maintenance service and that all discrepancies have been reported and corrected.

3. PACKAGE OR SPLIT DX AIR CONDITIONER

Monthly Service

- a. Clean and clear all drain pan and flush all related condensate drain line with [nitrogen] or compressed air. Install drain pan tablets to control algae growth. (Note: Contractor will be liable for water damage due to clogged drains under this contract.) Repair, record and report all

discrepancies and actions taken.

- b. Change all disposable air filters at least once a month. Use filters of equal capacity and performance characteristics as original design. Repair, record and report all discrepancies and actions taken.
- c. Wash permanent type filters with an approved detergent and spray coat with an approved filter treatment solution. Replace deteriorated permanent type filters which cannot be cleaned. Repair, record and report all discrepancies and actions taken.
- d. Check all HEPA filters/filter bank to ensure that filters are performing properly; e.g. no bypass, leakage, defects, etc. Repair, record and report all discrepancies and actions taken.
- e. Perform operational test of all motorized inlet vanes and variable frequency drives (VFD) where installed, to insure that equipment is operating properly. Repair, record and report all discrepancies and actions taken.
- f. Lubricate and oil all fan and motor bearings, connections of dampers and vanes, linkages, automatic motors, valves, and actuators. Correct, record and report all discrepancies and actions taken.
- g. Check all drives for wear; adjust belt tension if necessary. Change belts as required. Correct, record and report all discrepancies and actions taken.
- h. Check pressure and temperature differential across cooling coils and record readings. Correct, record and report all discrepancies and actions taken.
- i. Operate equipment to check for proper operation, unusual noise and vibration; adjust or repair all equipment and controls as required; clean-up all equipment. Provide operational simulation of controls at various conditions. Correct, record and report all discrepancies and actions taken.
- j. Check time clock for proper operation and time settings. Correct, record and report all discrepancies and actions taken.
- k. Read and record motor power supply voltage and amperes. Correct, record and report all discrepancies and actions taken.
- l. Check Compressor oil level and refrigerant sight glass. Add oil as needed and change filter/drier if moisture is indicated. Correct, record and report all discrepancies and actions taken.
- m. Check refrigerant system for leaks, unusual noise and vibration. Record suction, discharge and oil pressures. Correct, record and report all discrepancies and actions taken.
- n. Certify performance of monthly scheduled maintenance service and that all discrepancies have been reported and corrected.

Annual Service

- a. Adjust alignment of bearings and sheaves; lubricate fan and motor bearings. Replace worn or noisy bearings. Repair, record and report all discrepancies and actions taken.
- b. Check and record condition of fan blades. Replace fan wheel as required. Repair, record and report all discrepancies and actions taken.
- c. Clean cooling coils of dirt accumulation using nitrogen, high pressure air/water, steam, or chemical coil cleaner solution. Repair, record and report all discrepancies and actions taken.
- d. Clean supply and return air grilles, registers, and diffusers, and outside air intake grilles, screens and dampers. Repair or replace deteriorated bird screens. Correct, record and report all discrepancies and actions taken.
- e. Clean and adjust valves, and clean all fan wheels and interior and exterior of equipment housings. Repair, record and report all discrepancies and actions taken.
- f. Secure all loose housing, seal leaks and touch up paint after cleaning rust. Repair, record and report all discrepancies and actions taken.
- g. Check and calibrate control valve. Repack valve system as necessary. Repair, record and report all discrepancies and actions taken.
- h. Service thermostats, clean, and calibrate. Repair, record and report all discrepancies and actions taken.
- i. Check and calibrate all pneumatic and/or direct digital and/or electric/electronic temperature controls. Repair, record and report all discrepancies and actions taken.
- j. Check and record motor power supply voltage and amperes. Correct, record and report all discrepancies and actions taken.
- k. Check compressor coupling alignment. Lubricate or replace noisy bearings. Correct, record and report all discrepancies and actions taken.
- l. Clean condenser coils of dirt accumulated using nitrogen, high pressure air/water, steam or chemical coil cleaner solution. Correct, record and report all discrepancies and actions taken.
- m. Test compressor crankcase oil and replace if contaminated. Submit test results with maintenance service report. Clean or replace strainer and oil filter. Correct, record and report all discrepancies and actions taken.
- n. Test and check system response at various cooling load conditions for proper operation. Record settings, adjust as required. Recalibrate all safeties, capacity, and temperature controls to proper settings. Correct, record and report all discrepancies and actions taken.
- o. Check and clean the inside and outside of all unit housing. Seal leaks and remove rust from exterior components and touch-up paint. Correct, record and report all discrepancies and actions taken.
- p. Megger (electrical test to measure wire insulation resistance, i.e. condition) compressor motor and submit report and recommendation.

Check starter, relays, and control contacts. Check electrical connections for tightness. Correct, record and report all discrepancies and actions taken.

- q. Certify performance of annual scheduled maintenance service and that all discrepancies have been reported and corrected.

4. AIR FILTERS

Monthly Service

- a. Replace filters. Repair, record and report all discrepancies and actions taken.
- b. Check for leaks at filter access. Repair, record and report all discrepancies and actions taken.
- c. Certify performance of monthly scheduled maintenance service and that all discrepancies have been reported and corrected.

5. CLEANING OF MECHANICAL EQUIPMENT ROOMS OR ENCLOSURES

Monthly Service

- a. Vacuum or wipe clean all equipment surfaces and all related appurtenances. Repair, record and report all discrepancies and actions taken.
- b. Vacuum clean or sweep complete floor and platform areas. DO NOT wet floor and platform area where there is no waterproofing. Repair, record and report all discrepancies and actions taken.
- c. Wet wash complete floor and platform area with tap water where there is waterproofing. Correct, record and report all discrepancies and actions taken.
- d. Remove all used, deteriorated, replaced, discarded parts and related debris. Report all discrepancies and actions taken.

CAUTION: DO NOT splash water onto the electrical and mechanical equipment.

- e. Notify Manager-in-Charge of any dangerous conditions, improper storage of furniture, materials and supplies which impacts your work within rooms and enclosures, including vandalism. Repair, record and report all discrepancies and actions taken.
- f. Certify performance of monthly scheduled maintenance service and that all discrepancies have been reported and corrected.

END OF SECTION

SERVICE MAINTENANCE REPORT

DATE: _____ SHEET NO. _____

1. Name of Facility and Location: _____

2. Submitted By: _____

3. Date of Service Call: _____

4. Name of Person(s) Making Call: _____

5. Time In; Time Out at Site: _____

6. Person(s) Contacted: _____

7. Nature of Service Call: (Routine Maintenance, or Emergency Explain).

February 27, 2026

8. Equipment Readings and Maintenance Performed: (List all items serviced; identify - 8a, 8b, 8c...etc.)

9. Remarks:

February 27, 2026

[illegible]

Signature of Person Making Report:

SECTION 233319 – DUCT SILENCERS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes duct silencers.

1.02 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.03 REFERENCES

- A. Air Movement and Control Association (AMCA):
 - 1. AMCA 511 – Certified Ratings Program – Product Rating Manual for Air Control Devices
 - 2. AMCA 1011 – Certified Ratings Program – Product Rating Manual for Acoustical Duct Silencers
- B. American National Standards Institute (ANSI):
 - 1. ANSI S12.51 – 2002/ISO 3741:1999 Acoustics-Determination of Sound Power Levels of Noise Sources Using Sound Pressure-Precision Method for Reverberation Rooms
 - 2. ANSI/ASHRAE 41.3 – Standard Methods for Pressure Measurement
 - 3. ANSI/ASHRAE 62.1 – Ventilation for Acceptable Indoor Air Quality
 - 4. ANSI/AMCA 500 – Standard Laboratory Methods of Testing Louvers for Rating
- C. American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE):
 - 1. 2023 ASHRAE HVAC Applications Handbook, Chapter 49 “Noise and Vibration Control”
- D. American Society of Testing and Materials (ASTM):
 - 1. ASTM A653 / A653M – Standard Specification of Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - 2. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials
 - 3. ASTM E90 – Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
 - 4. ASTM E413 – Classification for Rating Sound Insulation
 - 5. ASTM E477 – Standard Test Method for Laboratory Measurements of Acoustical and Airflow Performance of Duct Liner Materials and Prefabricated Silencers
- E. National Fire Protection Association (NFPA):

1. NFPA 90A – Standard for the Installation of Air-Conditioning and Ventilating Systems
2. NFPA 90B – Standard for the Installation of Warm Air Heating and Air-Conditioning Systems
3. NFPA 255 – Standard Method of Test of Surface Burning Characteristics of Building Materials

F. National Voluntary Laboratory Accreditation Program (NVLAP)

G. Sheet Metal & Air-Conditioning Contractors' National Association (SMACNA):

1. SMACNA HVAC Duct Construction Standards – Metal and Flexible

H. Underwriters Laboratories (UL):

1. UL 723 – Standard for Test for Surface Burning Characteristics of Burning Materials

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's product data indicating materials, dimensional data, air volume, pressure losses and acoustical performance at octave band center frequencies from 63 Hz to 8,000 Hz.
- B. Shop Drawings: Submit shop drawings indicating assembly, thicknesses, dimensional data, pressure losses, acoustical performance, layout and connection details.
- C. Design Data: Provide engineering calculations, referenced to specifications and standards, indicating that maximum sound levels are not exceeded.
- D. Test Reports: Submit laboratory acoustic test reports to indicate dynamic insertion loss and noise generated values meet or exceed specified values. Acoustic performance data must be submitted for octave band center frequencies from 63 Hz to 8,000 Hz.
- E. Instructions: Indicate installation requirements, which maintain integrity of acoustic performance.

1.05 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing the products specified herein with a minimum 5 years' experience.
- B. Comply with NFPA 90A and NFPA 90B.
- C. Silencer performance must have been substantiated by laboratory testing in a duct-to-reverberant room test facility according to ASTM E477. The test facility must provide for airflow in both directions through the test silencer. The test set-up, procedure and facility shall eliminate all effects due to flanking, directivity, end-reflection, standing waves and reverberation room absorption. The aero-acoustic laboratory must be currently NVLAP or IAS accredited for the ASTM E477 test standard.
- D. Silencer manufacturer shall provide a written test report by a third-party organization showing silencer assemblies have flame-spread index not exceeding 25 and smoke-developed index not exceeding 50 when tested according to ASTM E84, NFPA 255 or UL 723

1.06 WARRANTY

- A. Manufacturer warranty 5 years from the date of shipment for silencers.
- B. Manufacturer warranty 12 months from the date of shipment for acoustic louvers.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Subject to compliance with requirements, provide product by one of the following:
 - 1. IAC Acoustics
 - 2. Pottorff
 - 3. Price Industries
 - 4. Vibro-Acoustics
 - 5. Approved Equal

2.02 DUCT SILENCERS

- A. General:
 - 1. Silencers shall be of the size, configuration, capacity and acoustic performance as scheduled on the drawings. Silencers shall be fabricated by the same manufacturer.
 - 2. Silencer inlet and outlet connection dimensions must be equal to the duct sizes shown on the drawings. Duct transitions at silencers are not permitted unless shown on the contract drawings or approved by the project engineer.
- B. Construction:
 - 1. Silencers shall be constructed in accordance with ASHRAE and SMACNA standards for the pressure and velocity classification specified for the air distribution system in which it is installed. Material gauges noted in other sections are minimums. Material gauges shall be increased as required for the system pressure and velocity classification. The silencers shall not fail structurally when subjected to a differential air pressure of 8 inches water gauge.
 - 2. All casing seams and joints shall be lock-formed and sealed, or stitch-welded and sealed, to provide leakage-resistance construction. Airtight construction shall be achieved by use of a duct-sealing compound supplied and installed by the contractor at the jobsite.
 - 3. All perforated steel shall be adequately stiffened to insure flatness and form. All spot welds shall be painted.
 - 4. Fire-Performance Characteristics: Silencer assemblies, including acoustic media fill, film liner, sealants and acoustical spacer, shall have flame-spread index not exceeding 25 and smoke-developed index not exceeding 50 when tested according to ASTM E84, NFPA 255 or UL 723.
 - 5. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

6. Outer casing shall be ASTM A653 / A653M, G90 galvanized steel, gauge as listed below:
 - a. Rectangular Silencers: 22-gauge
 - b. Rectangular Elbow Silencers: 22-gauge
 - c. Circular Silencers:
 - 1) For units up to 20 inches in diameter: 22-gauge
 - 2) For units 21 through 44 inches in diameter: 18-gauge
 - 3) For units over 44 inches in diameter: 16-gauge
7. Inner perforated metal liner shall be supplied in accordance with ASTM A653 / A653M, G90 galvanized sheet steel in the following gauge thicknesses according to silencer type or connection size:
 - a. Rectangular Silencers: 22-gauge
 - b. Rectangular Elbow Silencers: 22-gauge
 - c. Circular Silencers: 22-gauge
8. Sound-Absorbing Mechanism:
 - a. Pack-less (No-Media Silencers): Shall not contain absorptive media of any kind. Attenuation shall be achieved with controlled impedance membranes and broadly tuned resonators.
 - b. Absorptive (Dissipative) and Film-Lined Silencers: Media shall be of acoustic quality, shot-free glass fiber insulation with long, resilient fibers bonded with a thermosetting resin. Glass fiber density and compression shall be as required to insure conformance with laboratory test data. Glass fiber shall be packed with a minimum of 15% compression during silencer assembly. Media shall be resilient such that it will not crumble or break and conform to irregular surfaces. Media shall not cause or accelerate corrosion of aluminum or steel. Mineral wool is not permitted as a substitute for glass fiber.
9. Media Protection:
 - a. Absorptive (Dissipative) Silencers: Media shall be encapsulated in glass fiber cloth to help prevent shedding, erosion and impregnation of the glass fiber.
 - b. Film-Lined Silencers: The acoustic media shall be completely wrapped and sealed with polymeric film membrane to help prevent shedding, erosion and impregnation. The wrapped acoustic media shall be separated from the perforated metal by a factory installed 1/2" thick acoustically transparent spacer. The spacer shall be flame retardant and erosion resistant. A mesh, screen or corrugated perforated liner will not be acceptable as a substitute for the specified spacer.
10. High Transmission Loss (HTL) Casings: Where indicated on the silencer schedule, silencers shall have high transmission loss (HTL) walls externally applied and completely sealed to the silencer casing by the silencer manufacturer to assure quality-controlled transmission loss. The HTL walls shall consist of media, airspace, mass and outer protective metal skin, as required, to obtain the specified room noise

criteria. Standard acoustical panels will not be accepted as HTL walls. If requested by the project engineer, breakout noise calculations for each air handling and fan system shall be provided with the silencer submittal to ensure compliance with the room noise criteria. Breakout noise calculations shall be based on the sound power levels of the specified equipment.

C. Special Construction:

1. Where noted on the silencer schedule, silencers shall have 16-gauge casing, continuously welded.
2. Where indicated on the silencer schedule, silencers shall have RF filters integral to the silencer. Performance shall be 100 dB at 1 MHz. Pressure drop shall be included in overall silencer pressure drop. RF filter shall be located such that it cannot be bypassed.
3. Where indicated on the silencer schedule, provide a non-conductive section in the silencer casing at the end of the silencer next to the room wall, and provide a minimum of 10" (254 mm) x 10" (254 mm) inspection port in the silencer casing next to the wall. These features shall not compromise the composite HTL casing of the silencer.
4. Where indicated on the silencer schedule, provide security bars running at 6" (150 mm) centers both ways inside the silencer casing to prevent ingress through the silencer.

D. Acoustic Performance:

1. Refer to silencer schedule provided below:

Tag	Dimensions (in)		Velocity (FPM)	P.D. (in. WG)	Minimum Dynamic Insertion Loss (dB)							
					Maximum Generated Noise (dB)							
	Octave Band											
	W x H	L			63	125	250	500	1k	2k	4k	8k
DS-PACU-S	26X26	36	2045	0.25	0	3	0	0	0	0	0	0
	BOD: RM36/7A				65	60	55	50	55	50	45	40
DS-PACU-R	20X45	36	1382	0.25	0	0	0	3	14	12	11	7
	BOD: RL36/4B				60	60	60	55	40	40	40	35
DS-DOAS	20X18	36	822	0.25	3	10	0	0	0	1	3	8
	BOD: RL36/XE				55	50	40	30	40	40	35	35
DS-TD-1	6X6	24	-	0.05	0	0	1	2	1	0	0	0
	BOD: RL24/1B				25	25	20	15	15	15	15	15
DS-TD-2	8X8	24	-	0.05	0	0	1	2	1	0	0	0
	BOD: RL24/2B				25	25	20	15	15	15	15	15

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Ensure all equipment is installed with airflow arrows in direction of airflow.

February 27, 2026

- C. Support duct silencers independent of ducts with flexible duct connections.
- D. Attach ductwork to acoustic louvers with flexible duct connections.

END OF SECTION

SECTION 15910 - DIRECT DIGITAL CONTROL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

- A. This section covers the furnishing, fabrication, delivery and installation of a new direct digital control (DDC) system for the control of the heating, ventilating and air conditioning (HVAC) systems. The DDC system is a multi-loop, stand-alone and distributed digital control system as manufactured by companies specializing in HVAC controls. The DDC system provides all hardware and software to control of all HVAC control functions including input, logic, processing and output functions. Input functions include analog and digital (binary, on/off, open/close) control signals to the microprocessor based digital controllers.
- B. Output is transmitted via interface ports to allow connection to other controllers, terminals, a portable computer or a central site computer. The interface equipment will not provide day to day control of the HVAC system but will allow the operator to enable and disable equipment, changed setpoints, change operating schedules, receive trends and alarms and allows loading and downloading of control programs. The system can communicate with graphic operator work station located in the building (direct connection to a communication LAN) or at a remote site (connected to the digital controller through a LAN or modems and a telephone line).
- C. Related Sections:
 - 1. SECTION 15011 - GENERAL MECHANICAL PROVISIONS.
 - 2. DIVISION 15 - MECHANICAL for air conditioning and ventilation equipment being controlled.
 - 3. DIVISION 16 - ELECTRICAL for material and installation requirements for control wiring.

1.02 DEFINITIONS

- A. BACnet: BACnet is a standard communication protocol under development by the American Society of Heating Refrigeration and Air Conditioning Engineers (ASHRAE). The controller manufacturer shall have a company policy to support the implementation of BACnet.
- B. Digital Controller: A control module which is microprocessor based, programmable by the user, has integral I/O, and performs stand-alone operations.
- C. Direct Digital Control (DDC): A digital controller as defined in this document. The controller directly senses building environment and makes control decisions based on user defined, controller resident programs. The controller outputs control signals that directly operate valves, dampers, and motor controllers. No conventional control devices, pneumatic or electronic, such as receiver-controllers,

thermostats, and logic units are present within or interface with a direct digital control loop. Actuators are electric or pneumatic, and the controller output is converted to the appropriate type of signal.

- D. DDC System: A system made up of one or more digital controllers. Required climate control and energy management functions for complete operation of an HVAC system are provided by DDC from digital controllers. No conventional control devices (pneumatic or electronic) such as receiver-controllers, thermostats, and logic units are used. Digital controllers in a system are linked in a communication network composed of one or more levels of local area networks (LAN).
- E. Distributed Control: The intent of distributed control is to install the controllers near the equipment being controlled, and to distribute the processing to each stand-alone DDC panel. The control system is built up of stand-alone controllers, utilizing sensor inputs and control outputs.
- F. Dynamic Control: A process that optimizes operation of HVAC systems (air handler units, converters, chillers, and boilers) by increasing and decreasing setpoints or starting and stopping equipment in response to heating and cooling needs of downstream equipment. A requirement of dynamic control is knowing the heating/cooling demand status of downstream equipment; therefore dynamic control requires controllers connected in a communications network.
- G. Firmware: Firmware is software programmed into read only memory (ROM) and erasable programmable read only memory (EPROM) chips. Software may not be changed without physically altering the chip.
- H. Graphic Sequence of Operation: A drawing or graphic showing all interlocks and control loop sequences between the input and output points. Graphic sequence of operation is a graphical representation of the sequence of operation. The graphic sequence of operation will show all inputs, outputs, and logic blocks.
- I. Hand-Held Terminal: A hand-held terminal is a portable device, control system manufacturer-specific, which can be connected directly to a communications port on a digital controller and through which the digital controller can be interrogated and, in some cases, programmed.
- J. Input/Output (I/O): I/O refers to analog inputs (AI), digital inputs (DI), analog outputs (AO), and digital outputs (DO) in a digital controller. Inputs are from analog sensors (temperature, pressure, humidity, flow) and digital sensors (motor status, flow switches, switch position, and pulse output devices). Outputs operate modulating and on/off control devices.
- K. I/O Unit: An I/O unit provides additional point capacity to a digital controller and communicates with the stand-alone digital controller on LAN. An I/O unit is not stand-alone because the control program does not reside in the I/O unit's microprocessor.

- L. Integration: The ability of control system components to have interoperability between different manufacturers to connect together and provide coordinated control via real-time data exchange and control functions through a common communications data exchange protocol. Integration shall extend to the operator's workstation software, which shall support user interaction with all control system components. Methods of integration include industry standard protocols such as: BACnet, ARCnet, LonMark/LonTalk, OLE for Process Control (OPC) or integrator interfaces between cooperating manufacturer's systems. New equipment integration shall be Native BACnet.
- M. Local Area Network (LAN):
 - 1. A communications bus that interconnects digital controllers for peer-to-peer communications. Different levels of LANs are possible within a single DDC system. In this case a digital controller on a higher level LAN acts as a network controller to the controllers on the lower level LAN. The network controller, then, has at least two LAN communications ports. One port supports peer-to-peer communications with other digital controllers on the higher level LAN. The other port supports communications with the digital controllers on the lower level LAN.
 - 2. LANs permit sharing global information, make it possible to apply building wide control strategies such as peak demand limiting, permit dynamic control strategies, allow coordinated response to alarm conditions, and permit remote monitoring and programming of digital controllers.
 - 3. Facility-wide LAN refers to a commercially available local area network. These LANs allow the connection to an existing or new facility-wide LAN.
- N. Microprocessor: A microprocessor refers to the central processing unit (CPU) that contains all the registers and logic circuitry that make it possible for digital controllers to do computing.
- O. Native BACnet Device: A device that uses BACnet as its primary, if not only, method of communication with other BACnet devices without intermediary gateways. A system that uses native BACnet devices at all levels is a native BACnet system.
- P. Open Protocol Bus (OPB): A pre-programmed communications integrator that allows devices from one manufacturer to communicate and interact with those of another.
- Q. Open System Port (OSP): A user programmable communications port that provides the ability to develop custom communications processes to integrate other operating systems with the DDC System.
- R. Output Signal Conversion: Output signal conversion refers to the changing of one kind of control output into a proportionally related signal appropriate for direct

actuation of the controlled device. Signals are converted by a transducer which may be external to the digital controller originating the output.

1. Examples in modulating control of pneumatic actuators are conversion of 4-20 ma signals into proportional 3-15 psig signals.
 2. An example of output signal conversion in on/off or open/close control is a contact closure originating in a digital controller which activates a solenoid air valve which passes main air, thereby forcing a damper to open fully.
- S. Optimum Start: Optimum start is a method of starting the HVAC equipment prior to occupancy time in order to have the building at setpoint at occupancy. Optimum start shall be based on the zone temperatures, zone setpoints, and outdoor temperature. Optimum start will bring the zone to setpoint at occupancy time.
- T. Peer-to-Peer - Peer-to-Peer refers to controllers connected on a communications LAN that act independently, as equals and communicate with each other to pass information which facilitates control.
- U. PID - PID refers to proportional, integral, and derivative control; the three types of actions that are used in controlling modulating equipment.
- V. Resolution: Refers to the number of possible states an input value or output value can take and is a function of the digital controller I/O circuitry; the A/D converter for input and the D/A converter for output. Ten bit resolution has 1024 possible states and eight bit resolution has 256 possible states.
- W. Stand-Alone Control: Refers to the digital controller being able to perform required climate control, and energy management functions without connection to another digital controller or central site computer. Digital controller requirements for stand-alone control are a time clock, a microprocessor, microchip resident control programs, PID control, a communications port for interfacing with and programming the controller, firmware for interrogation and programming, and I/O for sensing and effecting control of its control environment.
- X. Terminal Control Unit (TCU): An off-the-shelf, stand-alone digital controller equipped for communication on a lower level local area network. TCUs may deviate from stand-alone only in receiving energy management and time information from a standalone digital controller. A TCU is commonly application specific and is used for distributed control of specific HVAC subsystems. A TCU communicates with the digital controllers. Typically, a TCU communicates on a lower level LAN. Examples where TCUs might be used to control of small air handling units (AHUs), variable air volume (VAV) boxes, fan coil units, and heat pumps.
- Y. Year 2000 Compliant: means computer controlled facility components that accurately process date and time data (including, but not limited to, calculating, comparing, and sequencing) from, into, and between the twentieth and twenty-first centuries, and the years 1999 and 2000 and leap year calculations.

1.03 SUBMITTALS

- A. Submit in accordance with SECTION 01330 – SUBMITTAL PROCEDURES.
- B. Manufacturer's Catalog Data:
 - 1. DDC hardware.
 - 2. DDC capabilities.
 - 3. Workstation software.
 - 4. Input devices.
 - 5. Output devices.
 - 6. Surge and transient protection.
 - 7. Laptop computer.
 - 8. Hand-held terminal.
 - 9. Panel mounted display and keypad.
- C. Equipment and software for which specification compliance data shall be submitted include but not limited to the following:
 - 1. DDC Hardware:
 - a. I/O; capable of supporting platinum RTD, precision thermistor, 4-20 ma, 0-10 VDC.
 - b. Programs will reside in microprocessor; controllers are stand-alone.
 - c. Communications ports; all communications ports as specified.
 - d. Protected memory; minimum hours required by this specification.
 - e. Operating temperature limits.
 - 2. DDC Capabilities:
 - a. Communications; baud rate, communication ports, stand-alone.
 - b. Trending; capable of trending every point.
 - c. Alarming; capable of alarm generation as indicated.

- d. Messages; as indicated.
 - e. Self-diagnostics; identification of a failed module.
 - f. PID control; capable of PID control.
3. Workstation Software:
- a. Mouse and keyboard operation.
 - b. Communications.
 - c. Program upload and download.
 - d. Dynamic point update.
 - e. Program modification.
 - f. Database modification.
 - g. Graphics and graphics modifications.
 - h. Penetration of graphics.
4. Input Devices:
- a. Transmitters; accuracy, 4-20 ma, 0-10 VDC.
 - b. Temperature sensors; accuracy, stability, 100 percent factory screening, platinum RTD or thermistor.
 - c. Humidity sensors; type of sensor, accuracy, range, and stability.
 - d. Pressure sensor; accuracy.
 - e. Flow or motor proof; type.
 - f. Sensor wells; type.
5. Output Devices:
- a. Dampers; types.
 - b. Actuators.
 - c. Control Relays.
6. External Surge and Transient Protection:

- a. Power line.
 - b. Communications links and/or devices (between buildings).
- D. Drawings: Submit the following drawings:
 - 1. Control system schematic.
- E. Design Data: Submit test data demonstrating the following installed components will meet specification requirements.
 - 1. Temperature sensor accuracy: Submit manufacturer specification of temperature sensor accuracy. Literature shall make clear sensor accuracy as specified.
 - 2. Temperature sensor stability: Provide manufacturer specification of five year stability of RTDs and thermistors. Literature shall make clear sensor stability as specified.
- F. Schedules:
 - 1. List of shop drawings.
 - 2. List of symbols and abbreviations used on shop drawings.
 - 3. List of I/O points - For each input and output physically connected to a digital controller provide, on a controller by controller basis, provide the following:
 - a. Point description: for example: mixed air temperature, supply fan start/stop, etc.
 - b. Point type: AO, AI, DO, or DI.
 - c. Point range: 4-20 ma, 3-15 psi, platinum RTD resistance ohm, thermistor.
 - d. Sensor range associated with point range: for example 0-100 degrees F, 0-2 inches of water.
 - e. Software name(s) associated with point, if any.
 - f. Terminal number to which point is connected.
 - 4. Equipment components list: Submit a listing of controllers and connected devices shown on control system schematic. List the following:
 - a. Control system schematic component name.
 - b. Description.

- c. Manufacturer of controller.
 - d. Controller's name.
 - e. Equipment part numbers.
 - f. CV for valves.
 - g. For actuators:
 - (1) Motive force (such as pneumatic, or electric).
 - (2) Normal position.
 - (3) Nominal operating range (such as 3-7 psi, 4-8 ma).
 - 5. AC power table: Submit a table listing each controller and the circuit breaker number, panel box number, and physical location of each controller's source of AC power.
- G. Statements:
- 1. Contractors' Qualifications: Submit statements required in PART 1 - QUALITY ASSURANCE.
 - 2. Training: Submit schedule, syllabus, and training materials in accordance with PART 3 - EXECUTION.
- H. Records: Provide administrative and closeout submittals:
- 1. Training Course Documentation: Training course documentation shall include an electronic copy of the manual for each trainee plus at least one hadrcopy and an electronic copy and at least 1 hardcopy of audiovisual training aids, if used. Documentation shall include an agenda, defined objectives for each lesson and detailed description of the subject matter of each lesson.
 - 2. Service Organization: Qualified service organization list that shall include the names and telephone numbers of organizations qualified to service the HVAC control systems.
 - 3. Contractor Certification: Provide certification that the installation of the control system is complete and the technical requirements of this section have been met.
- I. Operation and Maintenance Manuals:
- 1. Controls and HVAC System Operators Manual: Construct and provide a Control and HVAC Systems Operators Manual. This manual is designed to

document the HVAC and control system. Construct this manual using a 3 ring binder with a minimum of the following 7 sections. Use tabs to divide each section.

- a. Section 1. Description of HVAC Systems: Provide a description of the HVAC system components and control system. Include sequences of operation and a complete points list.
 - b. Section 2. Controls Drawings: Provide drawings as specified.
 - c. Section 3. Control Program Listings: Provide listing of all control programs, including terminal equipment controller setup pages.
 - d. Section 4. Current Operating Parameters: Provide printouts of input and output setup information, database setups. This section is intended to provide information such as point addresses, slopes and offsets for all points, database of points, etc.
 - e. Section 5. Design Information: Provide tab, but leave this section blank.
 - f. Section 6. Control Equipment Cut Sheets: Provide cut sheets of all controller hardware and accessories. Include temperature versus resistance charts for temperature sensors, and calibration charts for pressure transducers.
 - g. Section 7. Control Program: Provide a fully operational control system disk (CD disk format preferred) identical to the original control program as installed. In addition, provide a restore - backup disk of the control program and backup copy of ACAD controls drawings on a CD-ROM. It is understood that the software will be available to the base and used only for the buildings in this contract.
2. Controls and HVAC System Operators Manual:
- a. Section 1. Installation and Technical Manuals for all digital controller hardware.
 - b. Section 2. Installation and Technical Manuals for workstations.
 - c. Section 3. Operators Manuals for all digital controllers.
 - d. Section 4. Operators Manuals for workstations software.
 - e. Section 5. Programming Manuals for all digital controllers.
 - f. Section 6. Programming Manuals for workstation software.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Stored products shall be protected from the weather, humidity and temperature variations, dirt and dust, and other contaminants, within the storage condition limits published by the equipment manufacturer.
- B. Storage and handling of equipment and/or systems for the project, whether it is on site or off site, shall be addressed by the Contractor's IAQ Management Plan. Plan must meet or exceed the recommended control measures of the "Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings Under Construction, 2nd Edition 2007, ANSI/SMACNA 008-2008 (Chapter 3)"

1.05 QUALITY ASSURANCE

A. General:

- 1. The Direct Digital Control (DDC) System herein specified shall be fully integrated and installed as a complete package by the Direct Digital Control System Contractor. The System shall include all wiring, piping, installation supervision, calibration, adjustments, and checkout necessary for a complete and fully operational system.
- 2. The Direct Digital Control System Contractor shall be regularly engaged in the engineering, programming, installation and service of Direct Digital Control systems of similar size and complexity.
- 3. The DDC Contractor shall have a local facility on Oahu. Emergency service shall be available on a 24-hour, 7-day-a-week basis.
- 4. The DDC Contractor shall be responsible for all work fitting into place in a satisfactory and neat workmanlike manner acceptable to the State.

B. Experience Record:

- 1. The DDC Contractor shall have a minimum of five years experience with the complete installation of Direct Digital Control systems of similar size and technical complexity. The DDC Contractor shall provide a list of three comparable projects that have Direct Digital Control Systems with the features as specified for this project. These projects must be on-line and functional.
- 2. The DDC Contractor shall employ specialists in the field of Direct Digital Control Systems including: Programming, Engineering, Field Supervision, and Installation. Specialists shall present factory training certification of the submitted equipment upon request.

C. Governing Code Compliance: The DDC Contractor shall comply with all current governing codes, ordinances and regulations, including UL, NFPA, the local Building Code, NEC, and so forth.

- D. FCC Regulation: All electronic equipment shall conform to the requirements of FCC Regulation, Part 15, Section 15, Governing Radio Frequency Electromagnetic Interference, and be so labeled.
- E. Standard Products:
 - 1. Materials and equipment shall be standard products of manufacturer regularly engaged in the manufacturing of such products, using similar materials, design and workmanship. The standard products shall have been in commercial or industrial use for 2 years prior to bid opening. The 2-year use shall include applications of similarly sized equipment and materials used under similar circumstances. The 2-year experience must be satisfactorily completed by a product which has been sold on the commercial market through advertisements, manufacturer's catalogs, or brochures.
 - 2. The equipment items shall be supported by a service organization.
- F. Drawings: Because of the small scale of the drawings, it is not possible to indicate all offsets, fittings, and accessories that may be required. The Contractor shall carefully investigate the mechanical, electrical, and finish conditions that could affect the work to be performed, and shall finish all work necessary to meet such conditions.
- G. Modification of References: The advisory provision in ASME B31.1 and NFPA 70 shall be considered mandatory. Substitute the word "shall" for "should" wherever it appears and interpret all references to the "authority having jurisdiction" and "owner" to mean the COTR.

1.06 NAMEPLATES

- A. Nameplates bearing legends as shown and tags bearing device unique identifiers as shown shall be engraved or stamped. Nameplates shall be permanently attached to HVAC control panel doors.
- B. For each field-mounted piece of equipment, not in a finished area, a plastic or metal tag with equipment name and point identifier shall be attached.

1.07 VERIFICATION OF DIMENSIONS

- A. The Contractor shall be responsible for the coordination and proper relation of his work to the building structure and to the work of all trades. The Contractor shall visit the premises and thoroughly familiarize himself with all details of the work and working conditions, to verify all dimensions in the field, and to advise the State of any discrepancy before performing any work. Fabrication of ductwork and piping shall be in accordance with field measurements.

1.08 OMISSIONS

- A. It is the intent of the plans and specifications to provide a complete installation. Should there be omissions, the Contractor shall call the attention of the State to such omissions in fifteen (15) days advance of the date of bid openings so that the necessary corrections can be made.

1.09 SUBSTITUTIONS OF EQUIPMENT

- A. Substitutions shall be in accordance with SECTION 00700 - GENERAL CONDITIONS.
- B. The Contractor shall assume full responsibility for proper fit, performance and additional work relating to other sections of the specifications.
- C. Redesign made necessary by the use of approved substitutions shall be the responsibility and at the expense of the Contractor.

1.10 WORK INCLUDED

- A. Installation of Direct Digital Control (DDC) System:
 - 1. The DDC Contractor shall furnish and install a complete Direct Digital Control (DDC) System for all mechanical systems and other facility systems as included in the project documents. The DDC system will provide the functional features as defined in Part 1 - General Requirements, Part 2 - Products, and Part 3 - Execution of these Specifications. The DDC Contractor shall provide a complete and operational system to perform all sequences of operations stated within Part 3 or shown on the control drawings.
 - 2. The work under this Section shall include all materials and labor to perform all work required for the installation of the DDC as specified.
 - 3. The drawings and specifications are complementary to one another - meaning that what is called for on one is to be considered called for in both. Where conflicts exist between the specifications and/or drawings, the more stringent requirement shall apply.
 - 4. The DDC Contractor shall be responsible for field verification of site conditions and for gathering all necessary field data for all items to be provided under this contract prior to submitting his or her bid.
 - 5. Where work specified under other Sections of this Specification connects to equipment or systems that are listed and described in this Section, the DDC Contractor shall provide proper connection(s) to such equipment including trade coordination.

1.11 COORDINATION

- A. Cooperate with other divisions performing work on this project as necessary to achieve a complete and neat installation. The Contractor shall also consult the

drawings and specifications of all trades to determine the nature and extent of others' work.

1.12 MANUALS

- A. All manuals shall be provided in hard copy format or on a single Compact Disk (CD) as part of an on-line documentation system through the operator workstation.

PART 2 – PRODUCTS

2.1 SYSTEM ARCHITECTURE

A. First Tier Network:

1. The first tier network shall be based on a PC industry standard of Ethernet TCP/IP, or ARCnet. PC Workstation LAN controller cards shall be standard "off the shelf" products available through normal PC vendor channels.
2. The DDC system shall network multiple operator workstations, network controllers, system controllers, and application-specific controllers. The first tier network shall provide communications between operator workstations and first tier DDC (Direct Digital Control) controllers.
3. The first tier network shall operate at a minimum communication speed of 2.5 M baud, with full peer-to-peer network communication.
4. Network Controllers shall reside on the first tier.

B. First Tier Network Protocol Integration:

1. The protocol used between two different vendor systems will be BACnet over Ethernet and comply with the ASHRAE BACnet Standard 135-1995.
2. The system installed under this contract shall allow bi-directional communications between the existing host system if applicable or a BACnet system over an Ethernet TCP/IP data link, or ARCnet. Supported media shall include fiber, 10base2, and 10baseT.
3. A complete Protocol Implementation Conformance Statement (PICS) shall be provided for all BACnet system devices.
4. The ability to share data and change of state (COS) between the existing designated host system and the system installed under this contract shall be provided.

C. Second Tier Network:

1. The second tier network is used to communicate between the first tier DDC controllers and field controllers.

2. Second tier networks shall utilize either "Peer-to-Peer," Master-Slave, or Supervised Token Passing communications.

D. Second Tier Controller Protocol Integration:

1. Hardwired:
 - a. Analog and digital signal values shall be passed from one system to another via hardwired connections.
 - b. There will be one separate physical point on each system for each point to be integrated between the systems.
 - c. Analog points will be 4-20 mA signals originating at the "from system" and being received by the "to system".
 - d. Digital points will be "dry contact" signals originating at the "from system" and being received by the "to system".
2. Direct Protocol:
 - a. The DDC system shall include appropriate hardware equipment and software to allow data communications between the DDC system and 3rd party manufacturers control panels. The DDC shall receive, react to, and return information from multiple building systems, variable frequency drives, power monitoring systems, etc.
 - b. All data required by the application shall be mapped into the First Tier Network DDC Controller's database, and shall be transparent to the operator.
 - c. Point inputs and outputs from the third-party controllers shall have real-time interoperability with DDC software features such as: Control Software, Energy Management, Custom Process Programming, Alarm Management, Historical Data and Trend Analysis, Totalization, and Dial-Up and Local Area Network Communications.
 - d. Integration shall be via RS-232 or RS-485 technologies.
 - e. The system operator shall have the ability to verify, and diagnose communication messages and point information between third-party controllers and the DDC system.

2.2 DDC SYSTEM

- A. The DDC control system must be provided and installed by Trane Controls.

- B. Provide a DDC system as a distributed control system. The system shall have stand-alone digital controllers, a communications network, and a separate workstation computer with workstation software.
- C. Provide an operator programmable system, based on the user applications, to perform closed-loop, modulating and/or on-off control of building equipment. Connect all digital controllers through the communication network to share common data and report to workstation computer. The workstation computer is capable of being programmed to supervise the digital controllers. The control system is capable of downloading and up loading of programs between the workstation and the digital controllers.
- D. Provide the quantity of digital controllers indicated on the drawings that will perform required climate control, energy management, and alarm functions. The quantity of controllers shall be no less than the number shown on drawings. All material used shall be currently in production.
 - 1. Direct Digital Controllers: DDC hardware shall be UL 916 rated.
 - a. Distributed Control: Apply digital controllers in a distributed control manner.
 - b. Environmental Operating Limits: Provide digital controllers that operate in environmental conditions between 32 and 120 degrees Fahrenheit.
 - c. Stand-Alone Control: Provide stand-alone digital controllers.
 - d. Internal Clock: Provide clock with each controller on the first tier local area network (LAN) and shall have its clock backed up by a battery or capacitor with sufficient capacity to maintain clock operation for a minimum of 72 hours during a line power outage.
 - e. Memory:
 - (1) Provide sufficient memory for each controller to support required control and communication functions.
 - (2) Memory Protection: Programs residing in memory shall be protected either by using EEPROM or by an uninterruptible power source (battery or uninterruptible power supply (UPS)). The backup power source shall have sufficient capacity to maintain volatile memory in event of an AC power failure. Where the uninterruptible power source is rechargeable (a rechargeable battery), provide sufficient capacity for a minimum of seventy-two hours back up. The rechargeable power source shall be constantly charged by charging circuitry while the controller is operating under normal line power. Where a non-rechargeable power source is used, provide sufficient capacity for a minimum of

two years-accumulated power failure. Batteries shall be designed to allow replacement without soldering.

- f. Inputs: Provide input function integral to the direct digital controller. Provide input type as required by the DDC design.
 - (1) Analog Inputs: Allowable input types are three wire 100 ohm or higher platinum RTD's, stable 10,000 ohm thermistors, 0-10 VDC and 4 to 20 ma. Thermistor and direct RTD inputs must have appropriate conversion curves stored in controller software or firmware. Analog to digital (A/D) conversion shall be a minimum of 10-bit resolution.
 - (2) Digital Inputs: Digital inputs shall sense open/close, on/off, or other two state indications.
- g. Outputs: Provide output function integral to the direct digital controller. Provide output type as required by the DDC design. Insure that outputs of controllers are compatible with controlled devices.
 - (1) Analog Outputs: Provide controllers with a minimum output resolution of 8 bits. Output shall be 4 to 20 ma or 3 to 15 psi or 0-10 VDC. Each pneumatic output shall have feedback for monitoring of the actual pneumatic signal. Feedback shall be integral to the output function.
 - (2) Digital Outputs: Provide contact closure with contacts rated at a minimum of 1 ampere at 24 volts.
- h. PID Control: Provide controllers with proportional, proportional plus integral, and proportional plus integral plus derivative control capability. Terminal controllers are not required to have the derivative component.
- i. Digital Controller Networking Capabilities: The upper level digital controllers shall be capable of being networked with other similar upper level controllers. Upper level controllers shall also be capable of communicating over a network between buildings.
- j. Communications Ports:
 - (1) Controller-to-Controller LAN Communications Ports: Controllers in the building DDC system shall be connected in a communications network. Controllers shall have controller to controller communication ports to both peer controller (lower level controller). Network may consist of more than one level of local area network and one level may have multiple drops. Communications network shall permit sharing between controllers of sensor and control information, thereby allowing execution of dynamic control strategies and coordinated response to alarm conditions.

- (2) On-Site Interface Ports: Provide a RS-232, RS-485, or RJ-11, or RJ-45 communications port for each digital controller that allows direct connection of a computer or hand held terminal and through which the controller may be fully interrogated. Controller access shall not be limited to access through another controller. On-site interface communication ports shall be in addition to the communications port(s) supporting controller to controller communications. Communication rate shall be 56K Baud minimum. Every controller on the highest level LAN shall have a communications port supporting direct connection of a computer; a hand held terminal port is not sufficient. By connecting a computer to this port, every controller in the direct digital control system shall be able to be fully interrogated and programmed. The following operations shall be available: downloading and uploading control programs, modifying programs and program data base, and retrieving or accepting trend reports, status reports, messages, and alarms.
 - (3) Remote Work Station Interface Port: Provide one additional direct connect computer port in each DDC system for permanent connection of a remote operator's workstation, unless the workstation is a node on the LAN. All operations possible by directly connecting a computer to a controller at the highest level LAN shall be available through this port.
 - (4) Telecommunications Interface Port: Provide one additional telecommunications port in each DDC system permitting remote communications via telephone. All operations possible by directly connecting a computer to a controller at the highest level LAN shall be available through the telecommunications port. A telecommunications port provided on a digital controller shall be in addition to the port required for directly connecting a computer to the controller. Telecommunication baud rate shall be 96K minimum.
- k. Modem: Provide one modem per DDC system to communicate between the digital control system and the workstation.
 - l. Digital Controller Cabinet: Each digital controller cabinet shall protect the controller from dust and be rated NEMA 1, unless specified otherwise. Controller cabinets or enclosures that the controllers are mounted in shall be provided with a lock.
 - m. Main Power Switch: Each controller on the highest level LAN shall have a main power switch for isolation of the controller from AC power. The switch shall be protected from tampering within the DDC cabinet.

2. Terminal Control Units:

- a. TCU's shall be manufactured by the same company as the digital controllers.
 - b. TCU's shall automatically start-up on return of power after a failure, and previous operating parameters shall exist or shall be automatically downloaded from a digital controller on a higher level LAN.
 - c. TCU's do not require an internal clock, if they get time information from the digital controller.
3. DDC Software: Software resides in the digital controllers and performs control sequences.
- a. Sequence of Control: Provide, in the digital controllers, software to execute the sequence of control. Provide sequences of control written in both text and graphic format.
 - b. Database Modification: Provide software to modify the control program database. Database modification shall be accomplished through connected computer or hand held terminal or through a keypad integral to the controller. Database modification shall be accomplished without having to make changes directly in line-by-line programming. As a result of this requirement, when the control program is of the line-by-line type, database parameters in the following list that take real number values shall require assignment of variable names so parameters can be changed without modifying the line-by-line programming. Alternatively, block-programming languages shall provide for modification of these database parameters in fill-in-the-blank screens. The following shall be modifiable in this way:
 - (1) Setpoints.
 - (2) Deadband limits and spans.
 - (3) Reset schedules.
 - (4) Switchover points.
 - (5) PID gains and time between control output changes.
 - (6) Time.
 - (7) Timed local override time.
 - (8) Occupancy schedules.
 - (9) Holidays.

- (10) Alarm points, alarm limits, and alarm messages.
 - (11) Point definition database.
 - (12) Point enable, disable, and override.
 - (13) Trend points, trend intervals, trend reports.
 - (14) Analog input default values.
 - (15) Passwords.
 - (16) Communications parameters including network and telephone communications setups.
- c. Differential: Where equipment is started and stopped or opened and closed in response to some analog input such as temperature, pressure, or humidity, include a differential for the control loop to prevent short cycling of equipment.
 - d. Motor and Flow Status Delay: Provide an adjustable delay between when a motor is commanded on or off and when the control program looks to the motor or flow status input for confirmation of successful execution of the command.
 - e. Runtime Accumulation: Provide resettable run time accumulation for each controlled electrical motor.
 - f. Timed Local Override: Provide user definable adjustable run time for each push of a momentary contact timed local override. Pushes shall be cumulative with each push designating the same length of time. Provide a user definable limit on the number of contact closures summed, such as 6, before the contact closures are ignored. Timed local overrides are to be disabled during occupancy periods.
 - g. Time Programs: Provide programs to automatically adjust for leap years and make daylight savings time and standard time adjustments.
 - h. Scheduling:
 - (1) Each control output point shall be schedulable and its operation based on time of day, day of week, and day of year. Output points may be associated into groups. Each group may be associated with a different schedule. Changing the schedule of a group shall change the schedule of each point in the group. Points may be added to and deleted from groups. Groups may be created and deleted by the operator.

- (2) Provide capability that will allow current schedules to be viewed and modified in a seven-day week format. When control program does not automatically compute holidays, provide capability to allow holiday schedules to be entered one full year at a time.
- i. Point Override: I/O and virtual points shall be able to be software overridden in the software and commanded to any possible value from the main building digital controller.
- j. Alarming: I/O points and virtual points shall be alarmable. Alarms may be enabled and disabled for every point. Alarm limits shall be adjustable on analog points. Controllers connected to an external communications device such as a printer, terminal, or computer, shall download alarm and alarm message when alarm occurs. Otherwise alarms will be stored and automatically downloaded when a communications link occurs. The following conditions shall generate alarms:
 - (1) Motor is commanded on or off but the motor status input indicates no change.
 - (2) Room temperature, humidity, or pressure strays outside selectable limits.
 - (3) An analog input takes a value indicating sensor failure.
 - (4) A module is "dead" to the LAN.
 - (5) A power outage occurs.
- k. Messages: Messages shall be operator defined and assigned to alarm points. Messages shall be displayed when a point goes into alarm.
- l. Trending: DDC system shall have the capability to trend I/O and virtual points. Points may be associated into groups. A trend report may be set up for each group. The period between logging consecutive trend values shall range from one minute to 60 minutes at a minimum. Trend data type shall be selectable as either averages over the logging period or instantaneous values at the time of logging. The minimum number of consecutive trend values stored at one time shall be 30 per variable. When trend memory is full, the most recent data shall overwrite the oldest data. Trend data shall be capable of being uploaded to computer. Trend data shall be available on a real time basis; trend data shall appear either numerically or graphically on a connected computer's screen as the data being processed from the DDC system data environment. Trend reports shall be capable of being uploaded to computer disc and archived.

- m. Status Display: Current status of I/O and virtual points shall be displayed on command. Points shall be associated into functional groups, such as all the I/O and virtual points associated with control of a single air handling unit, and displayed as a group, so the status of a single mechanical system can be readily checked. A group shall be selectable from a menu of groups having meaningful names; such as AHU-4, Second Floor, Chiller System, and other such names.
 - n. Diagnostics: Each controller shall perform self-diagnostic routines and provide messages to an operator when errors are detected. DDC system shall be capable of recognizing a nonresponsive module on a LAN. The remaining, responsive modules on a LAN shall not operate in a degraded mode.
 - o. Power Loss: In event of a power outage, each controller shall assume a disabled status and outputs shall go to a user definable state. Upon restoration of power, DDC system shall perform an orderly restart, with sequencing of outputs.
 - p. Program Transfer: Provide software for download of control programs and database from a computer to controllers and upload of same to computer from controllers. Every digital controller in the DDC system shall be capable of being downloaded and uploaded to through a single controller on the highest level LAN.
 - q. Password Protection: Provide at least three levels of password protection to the DDC system permitting different levels of access to the system.
 - r. Energy Data Recording: Provide a resettable signal accumulation for each meter at the main building digital controller.
 - (1) Calculate chilled water thermal energy in BTU/HR using chilled water supply temperature and flow and chilled water return temperature signals.
 - (2) Record electrical energy in KWH and electrical demand in KW.
4. Work Station:
- a. Provide workstation software installed to on-site computer to provide a interface for monitoring, troubleshooting, and making adjustments to the program or operating parameters of the DDC system from a central location. The workstation shall be capable of accessing all controllers, including TCU's, in the DDC system. DDC system shall routinely operate stand-alone on a continuous basis without connection to the workstation. Information at the workstation is not required for day to day operations at the direct digital controllers.

- b. Hardware: All workstation computer hardware equipment and peripherals shall be recommended by the DDC system manufacturer. The workstation shall be configured to operate according to the DDC system manufacturer's specifications. Workstation hardware shall be configured to allow operation of software, uploading and downloading of programs, and creation of graphics. At a minimum the workstation hardware shall consist of:
- Quad Core Processor i5-750, 2.66GHz, 8MB
 - Windows 7 Professional 64BIT
 - 2GB, DDR3 Non-ECC SDRAM Memory, 1066MHz, 1x2GB
 - 256MB NVIDIA Quadro NVS 295, 2MON, 2 DP with 1 DP to DVI Adaptor
 - C1 All SATA Hard Drive Controller
 - 160 GB SATA 3.0, 7200 RPM Hard Drive with 8MB Data Burst Cache
 - 16X DVD+/-RW with Cyberlink Power DVD and Rio Creator
 - 19" HAS Wide Monitor, VGA/DVI, Energy Star Compliant
 - Documentation and resource Disk
 - Integrated 5.1 Channel Audio
 - USB Keyboard
 - Optical USB Mouse
 - Integrated PCIE 10/100/1000 Network
 - Power Cord
 - Video Cable
 - Modem; 56k Baud
 - Three (3) Year Warranty
 - 110-volt terminal strip with surge protection (Minimum 6 Outlets) and UPS-20 Minutes
 - Microsoft Office 2007 Basic
 - Laser printer capable of 30 pages per minute, 8 second first page, 1200x1200 resolution, 600MHz processor, 128MB memory, 250 sheet letter size tray, Automatic 2 side printing, USB-2 port, power cord, USB cable, printer driver, provide two OEM print cartridges
 - OEM or Contractor provide CD-ROM containing software (i.e. operating system/application software) provided on hard drive at time of purchase
 - OEM or Contractor provides user's manual for each type of hardware
 - 56K PCI Data Fax Modem
 - Computer cart or table and chair
- c. Software: Workstation software shall be recommended and supported by the DDC system manufacturer and configured to operate according to the DDC system manufacturer's specifications. Workstation software shall permit monitoring and troubleshooting of the DDC system. Workstation software permits modification of the controller database

and control programs. Operations shall be menu selected. Menu selections shall be made with a mouse.

- (1) Menu System: Menu system shall allow an operator to select a particular function or access a particular screen through successive menu penetration.
 - (2) Controller Database Modification: The workstation software shall be an interface for performing capabilities specified in paragraph entitled "DDC Software" and available through direct connection of a computer to a digital controller. Database modification shall require only that an operator "fill in the blank" for that parameter on a screen requesting the information in plain language. Database modifications shall be automatically downloaded to the appropriate controllers at operator request.
 - (3) Program Modification: For systems using a line-by-line programming language, provide an off-line text editor, similar to BASIC program editor, permitting modification of controller resident control programs. For systems using block programming languages provide a capability for linking blocks together to create new programs or modify existing programs. Program modifications shall be automatically downloaded to the appropriate controllers at operator request.
- d. Graphic-Based Software: The intent of graphic-based software is to provide an ergonomic interface to the DDC system that encourages effective and efficient interaction with the system. Graphic-based software shall provide graphical representation of the building, the buildings mechanical systems, and the DDC system. The current value and point name of every I/O point shall be shown on at least one graphic and in its appropriate physical location relative to building and mechanical systems.
- (1) Graphics shall closely follow the style of the control drawings in representing mechanical systems, sensors, controlled devices, and point names.
 - (2) Graphic Title: Graphics shall have an identifying title visible when the graphic is being viewed.
 - (3) Dynamic Update: When the workstation is on-line with the control system, point data shall update dynamically on the graphic images.
 - (4) Graphic Penetration: Provide graphic penetration when the capability exists. For systems without graphic penetration, provide menu penetration for selection of individual graphics to give the same hierarchical affect provided by graphic penetration.

- (5) Graphic Types: Graphic-based software shall have graphics of the building exterior, building section, floor plans, and mechanical systems. Provide the following graphics:
 - a) Building Exterior Graphic: Show exterior architecture, major landmarks, and building number.
 - b) Building Section Graphic: Show stacked floors in section graphic with appropriate floor name on each floor.
 - c) Floor Plan Graphics: Provide a single graphic for each floor, unless the graphic will contain more information that can reasonably be shown on a single graphic. Each heating or cooling zone within a floor plan shall have a zone name and its -current temperature displayed within the zone outline. Show each controlled variable in the zone. Provide visual indication for each point that is in alarm.
 - d) Mechanical System Graphics: Provide two-dimensional drawings to symbolize mechanical equipment; do not use line drawings. Show controlled or sensed mechanical equipment. Each graphic shall consist of a single mechanical system; examples are a graphic for an air handling unit, a graphic for a VAV box, a graphic for a heating water system, and a graphic for a chiller system. Place sensors and controlled devices associated with mechanical equipment in their appropriate locations. Place point name and point value adjacent to sensor or controlled device. Provide visual indication of each point in alarm. Condition, such as zone temperature, associated with the mechanical system shall be shown on the graphic. Point values shall update dynamically on the graphic.
- (1) Graphic Editing: Full capacity as afforded by a draw software package shall be included for operator editing of graphics. Graphics may be created, deleted, and modified, and text added. Provide capability to store graphic symbols in a symbol directory and incorporate these symbols into graphics. A minimum of sixteen colors shall be available.
- (2) Dynamic Point Editing: Provide full editing capability for deleting, adding, and modifying dynamic points on graphics.
- (3) Trending: Trend data shall be displayed graphically, with control variable and process variable plotted as functions of time one the same chart. Graphic display

of trend data shall be a capability internal to the workstation software and not a capability resulting from download of trend data into a third-party spreadsheet program such as Lotus, unless such transfer is automatic and transparent to the operator, and the third-party software is included with the workstation software package. At the operator's discretion trend data shall be plotted real time.

5. Maintenance Personnel Interface Tools: Provide a notebook computer for field communication with the digital controllers. In addition to changing setpoints, and making operational changes, field personnel shall be able to upload and download programs with the notebook computer.
 - a. Provide laptop computer, necessary software, and direct connection cable to communicate with the digital controllers when directly connected. At a minimum the laptop computer shall have the following features:
 - Intel Duo Core P8600 (2.4GHz, 3M L2 Cache, 1066 MHz FSB)
 - 1.0GM, DDR2-8 SDRAM, 1 DIMM
 - 15.4" WXGA (1280x800) LED Display
 - 80 GB HD, 5400 RPM
 - Windows 7 Professional, 64 Bit
 - NVIDIA Quadro FX 770M, 512MB
 - 8x DVD with Cyberlink Power DVD
 - 6 Cell Battery
 - USB-2 Ports, three minimum
 - AC Adaptor
 - 10/100/1000 Network connection
 - Microsoft Office 2007 Basic
 - Three Year Warranty
 - b. Recommended by the digital controller manufacturer, and a direct connection cable to communicate with the digital controller.

2.3 SENSORS AND INPUT HARDWARE

A. Field Installed Temperature Sensors:

1. Thermistors: Precision thermistors may be used in temperature sensing applications below 200 degrees F. Sensor accuracy over the application range shall be 0.36 degree F or less between the ranges of 32 to 150 degrees F. Sensor manufacturer shall utilize 100 percent screening to verify accuracy. Thermistors shall be pre-aged, and inherently stable. Stability error of the thermistor over five years shall not exceed 0.25 degree F cumulative. Sensor element and leads shall be encapsulated. Bead thermistors are not allowed. A/D conversion resolution error shall be kept to 0.1 degree F. Total error for a thermistor circuit shall not exceed 0.5 degree

F, which includes sensor error and digital controller A/D conversion resolution error.

Provide thermistor and digital controller manufacturer documentation and the Contractor's engineering calculations which support the proposed thermistor input circuit will have a total error of 0.5 degree F or less. Provide 18 gage twisted and shielded cable for thermistors.

2. Resistance Temperature Detectors (RTDs): Provide RTD sensors with 1000 ohm, or higher, platinum element that are compatible with digital controllers. Sensors shall be encapsulated in epoxy, series 300 stainless steel, anodized aluminum, or copper. Temperature sensor accuracy shall be 0.1 percent (1 ohm) of expected ohms (1000 ohms) at 32 degrees F. Temperature sensor stability error over five years shall not exceed 0.25 degree F cumulative. Direct connection of RTDs to digital controllers, without transmitters, is preferred provided controller supports direct connection of RTDs. When RTDs are connected directly to the controller, keep lead resistance error to 0.25 degree F or less. Provide 3 wire-sensing circuits to not exceed the 0.25-degree F lead resistance error. Total error for a RTD circuit shall not exceed 0.5 degree F, which includes sensor error, lead resistance error or 4 to 20 milliamper transmitter error, and A/D conversion resolution error. Provide manufacturer documentation and the Contractor's engineering calculations which support the proposed RTD circuit will have a total error of 0.5 degree F or less for the specified application.
 - a. Wiring: Provide 18 gage twisted and shielded pair cable for direct connected RTDs. Provide 18-gage twisted and shielded pair cable for RTDs using 4 to 20 milliamper transmitters.
 - b. Transmitters: Provide 4 to 20 milliamper transmitters for RTDs where Digital controllers do not support direct connection of RTDs to controllers; Digital controllers do not meet temperature resolution requirement of 0.5 degrees F.
3. Temperature Sensor Details:
 - a. Room: Conceal element behind protective cover matched to the room interior. Room temperature sensor shall have integral pushbutton, digital input to the controller for system override, and a setpoint adjustment, analog input to the controller. Digital sensors that communicate directly with the terminal control unit are acceptable. Provide a connection to allow interrogation of the digital controller.
 - b. Duct Averaging Type: Continuous averaging RTDs for ductwork applications shall be 1 foot in length for each 4 square feet of ductwork cross-sectional area with a minimum length of 6 feet. Probe type duct sensors of one-foot length minimum are acceptable in ducts 12 feet square and less.

- c. Immersion Type: 3 inches and 6 inches where needed total immersion for use with sensor wells, unless otherwise indicated.
 - d. Sensor Wells: Brass materials; provide thermal transmission material compatible with the immersion sensor. Provide heat-sensitive transfer agent between exterior sensor surface and interior well surface.
 - e. Outside Air Type: Provide element on the buildings north side with sunshade to minimize solar effects. Mount element at least 3 inches from building outside wall. Sunshade shall not inhibit the flow of ambient air across the sensing element. Shade shall protect sensing element from rain.
- B. Transmitters: Transmitters shall have 4 to 20 ma, or 0-10 VDC output linearly scaled to the temperature, pressure, humidity, or flow range being sensed. Transmitter shall be matched to the sensor, factory calibrated, and sealed. Total error shall not exceed 0.1 percent of 20 milliampere (0.02 milliampere) at any point across the 4 to 20 ma span. Supply voltage shall be 24 volts ac or dc. Transmitters shall have non-interactive offset and span adjustments. For temperature sensing, transmitter stability shall not exceed 0.05 degree F a year.
- 1. Spans and Ranges: Transmitter spans or ranges shall be the following and shall be suitable for the application:
 - a. Temperature:
 - (1) 50 degree F span: Room, chilled water, cooling coil, discharge air, return air sensors.
 - (2) 100 degree F span: Outside air, hot water, heating coil discharge air, mixed air sensors.
 - (3) 200 degree F span: High temperature hot water, heating hot water, chilled/hot water system sensors.
 - b. Pressure:
 - (1) 0 to 100-psi differential: Water differential range.
 - (2) 0 to 5 inches water differential range: Duct static pressure.
- C. Relative Humidity Transmitters: Provide integral humidity transducer and transmitter. Output of relative humidity instrument shall be a 4 to 20 milliampere or 0 to 10 VDC signal proportional to 0 to 100 percent relative humidity input. Accuracy shall be 2 percent of full scale within the range 20 to 80 percent relative humidity. Sensing element shall be chilled mirror type, polymer, or thin film polymer type. Supply voltage shall be 24 VDC. Transmitter shall meet specified requirements.

- D. Pressure Transmitters: Provide integral pressure transducer and transmitter. Output of pressure instrument shall be a 4 to 20 milliampere or 0 to 10 VDC signal proportional to the pressure span. Span shall be as specified. Accuracy shall be 1.0 percent. Linearity shall be 0.1 percent. Supply voltage shall be 24 VDC. Transmitter shall meet specified requirements.
- E. Current Transducers: Provide current transducers to monitor amperage of motors. Select current transducer range for normal amperage to be above 50 percent of the range. Current transducers shall have an accuracy of 1 percent and a 4 to 20 milliampere output signal.
- F. Input Switches:
 - 1. Differential Static Pressure Switch: Provide diaphragm type differential static pressure switches for binary (two position) operation as specified in sequence of operation. Devices shall withstand pressure surges up to 150 percent of rated pressure. Contacts shall be single pole double throw and switch may be wired for normally open or normally closed operation. Trip set point shall be adjustable. Pressure switch shall be sized so that operating pressure trip point is approximately midpoint of pressure switch adjustable range. Repetitive accuracy shall be 2 percent.
 - 2. Induced Current Operated Solid State Switches: Provide adjustable ranging to monitor continuous loads up to 200 amperes. Switch shall indicate whether it is normally open or normally closed. Limit off-state leakage to 2 milliampere or less.
 - 3. Timed Local Override: Provide momentary contact push button override with override time set in controller software. Provide to override DDC time of day program and activate occupancy program for assigned units. Upon expiration of override time, the control system shall return to time-of-day program. Time interval for the length of operation shall be software adjustable and shall expire unless reset.
- G. Energy Metering:
 - 1. Electric Meters: Provide kilowatt-hour (kWh) meter for building as indicated. Integrate electric meter signal into DDC system.
 - 2. Meter: ANSI C12.10. Provide watt-hour meter and socket corresponding to the ratios of the current transformers and transformer secondary voltage. Meter shall be selected for -volt, three-phase, three four-wire wye delta system, three-element type with three current transformers. Meters shall be complete with a box mounted socket having automatic circuit closing bypass. Provide watt-hour meter with not less than four pointer-type kWh registers, provisions for pulse initiation, and a universal Class 2 indicating maximum kW demand register, sweep pointer indicating type, with a 15 30 60 -minute interval. Meter accuracy shall be within plus or minus one percent. The correct multiplier shall be provided on face of meter.

3. Current Transformer: ANSI C57.13. Provide three current transformers with 600-volt insulation, rated for metering with voltage, BIL, momentary, and burden ratings coordinated with the ratings of the associated meters. Provide a butyl-molded donut or window type transformers mounted on a bracket to allow secondary cables to connect to the transformer bushings. Identify the wiring of the current transformer secondary feeders to permit field current measurements to be taken with hook-on ammeters.

2.4 OUTPUT HARDWARE

A. Damper: Damper shall conform to SMACNA DCS.

1. A single damper section shall have blades no longer than 48 inches and shall be no higher than 72 inches. Maximum damper blade width shall be 8 inches. Larger sized damper shall be made from a combination of sections.
2. Dampers shall be steel, or other materials where shown. Flat blades shall be made rigid by folding the edges. Blades shall be provided with compressible seals at points of contact. The channel frames of the dampers shall be provided with jamb seals to minimize air leakage. Dampers shall not leak in excess of 20 cfm per square foot at 4 inches water gage static pressure when closed. Seals shall be suitable for an operating temperature range of minus 40 degrees F to 200 degrees F. Dampers shall be rated at not less than 2000-fpm air velocity. All blade-connecting devices within the same damper section will not be located directly in the air stream. Damper axles shall be 0.5 inch (minimum) plated steel rods supported in the damper frame by stainless steel or bronze bearings. Blades mounted vertically shall be supported by thrust bearings. Pressure drop through dampers shall not exceed 0.04-inch water gage at 1000 fpm in the wide-open position. Frames shall not be less than 2 inches in width. Dampers shall be tested in accordance with AMCA 500.
3. Operating links external to dampers (such as crank arms, connecting rods, and line shafting for transmitting motion from damper actuators to dampers) shall withstand a load equal to twice the maximum required damper-operating force. Rod lengths shall be stainless steel. Working parts of joints and clevises shall be brass, bronze, or stainless steel. Adjustments of crank arms shall control the open and closed position of dampers.

B. Actuator: Provide electric type with spring return so that, in the event of power failure, actuators shall fail safe in either the normally open or normally closed position as specified. Actuators shall be quiet operating and function properly within the range of 85 to 110 percent of the motive power. Provide a minimum of one actuator for each damper.

1. Electric Actuators: Provide direct drive electric actuators for all damper control applications. When operated at rated voltage, each operator shall be capable of delivering the torque required for continuous uniform movement of the valve or damper and shall have end switch to limit travel or shall

withstand continuous stalling without damage. Operators shall function properly with range of 85 to 110 percent of line voltage. Provide gears of steel or copper alloy. Fiber or reinforced nylon gears may be used for torque's less than 16 inch pounds. Provide hardened steel running shafts in sleeve bearing of copper alloy, hardened steel, nylon, or ball bearing. Provide two-position operators of the single direction, spring return, or reversing type. Provide proportioning operators capable of stopping at all points in the cycle and starting in either direction, from any point. Provide reversing and proportioning operators with limit switches to limit travel in either direction unless operator is stall type. Equip valve operators with a force-limiting device such as spring yield so that, when in a relaxed position, device shall maintain a pressure on valve disc equivalent to system pressure at valve. Provide reversible shaded pole, split capacitor, synchronous, or stepped type electric motors.

C. Output Switches:

1. Control Relays: Shall be double pole, double throw (DPDT), UL listed, with contacts rated to the application, and enclosed in a dustproof enclosure. Equip with a light indicator which is lit when coil is energized and is off when coil is not energized. Relays shall be socket type, plug into a fixed base, and be replaceable without need of tools or removing wiring.

2.5 ELECTRICAL POWER AND DISTRIBUTION

- A. Provide a source 120 volts or less, 60 Hz, two-pole, three wires with ground. Devices shall be UL listed or FM approved.
- B. Transformers: Transformers shall conform to UL 506. Power digital controllers on the highest level LAN from a dedicated circuit breakers. Transformers for digital controllers serving terminal equipment on lower level LANs shall be fed from the fan motor leads or fed from the nearest distribution panel board or motor control center, using circuits provided for the purpose. Provide a fuse cutout on the secondary side of the transformer.
- C. Surge Protection: Surge and transient protection consist of devices installed externally to digital controllers.
 1. Power Line Surge Protection: Surge suppressors external to digital controller, shall be installed on all incoming AC power. Surge suppressor shall be rated by UL 1449, and have clamping voltage ratings below the following levels:
 - a. Normal Mode (Line to Neutral): 350 volts.
 - b. Common Mode (Line to Ground): 350 volts.
 - c. Telephone and Communication Line Surge Protection - Protected from surges. Metal oxide varistor (MOV) protection, rated for the application, shall be installed at the equipment. Additional protection, gas tubes

rated for the application, shall be installed within 3 feet of the building cable entrance or within 3 feet of the telephone company's network interface.

- D. Wiring: Provide complete electric wiring for DDC system, including wiring to transformer primaries. Control circuit conductors which run in the same conduit as power circuit conductors shall have the same insulation level as power circuit conductors. Circuits operating at more than 100 volts shall be in accordance with Section 16402, "Interior Distribution System." Circuits operating at 100 volts or less shall be defined as low voltage and shall be run in rigid or flexible conduit, metallic tubing, metal raceways or wire trays, armored cable, or multi-conductor cable. Use multi-conductor cable for concealed accessible locations only. Provide circuit and wiring protection as required by NFPA 70. Aluminum-sheathed cable or aluminum conduit may be used but shall not be buried in concrete. Wiring in HVAC plenums shall be in conduit. Protect exposed wiring from abuse and damage.
1. AC Control Wiring: Control wiring for 24 volt circuits shall be insulated copper 18 AWG minimum and shall be rated for 300 VAC service. Wiring for 120 volt shall be 14 AWG minimum and shall be rated for 600 VAC service.
 2. Analog Signal Wiring: Analog signal wiring for analog inputs and analog outputs shall be 18 AWG single or multiple twisted pair. Each cable shall be 100 percent shielded, and have 20 AWG drain wire. Exception is direct connect RTD wiring which shall be single 18 AWG minimum twisted pair, 100 percent shielded, and with 20 AWG drain wire. Each wire shall have insulation rated to 300 VAC. Cables shall have an overall aluminum-polyester or tinned-copper (cable-shield tape), overall 20 AWG tinned copper cable drain wire, and overall cable insulation rated to 300 VAC. Install analog signal wiring in conduit separate from AC power circuits.

2.6 FIRE PROTECTION DEVICES

- A. Smoke Detectors: Provide smoke detectors in return and main supply air ducts on downstream side of filters in accordance with NFPA 90A, except as otherwise indicated. Provide UL listed or FM approved detectors for duct installation.
- B. Smoke Dampers and Combination Smoke/Fire Dampers: Smoke damper and actuator assembly as required in accordance with NFPA 90A shall meet the Class II leakage requirements of UL 555S. Dampers shall be factory fabricated, galvanized steel or stainless steel with lubricated bearing, linkage, and seals to withstand temperatures from minus 20 to plus 250 degree F. Provide seals that can easily be replaced. Combination smoke/fire dampers shall have UL 1.5-hour rating and shall be equipped with electric/thermal link which closes damper at 165 degrees F and then automatically resets after normal temperature is restored by cycling damper operator. Equip dampers with pneumatic or electric operators which close smoke dampers tightly when activated.

2.7 INDICATORS

- A. Thermometers: Provide thermometers in locations as indicated. Thermometers shall have either 9-inch scales, or 3.5 inch dials and shall have insertion, immersion or averaging elements as indicated. Provide thermowells for liquid sensing applications. Select thermometer ranges so normal temperatures are approximately equal to midpoint readings on the scale, unless otherwise stated.
- B. Pressure Gages: Provide pressure gages as indicated. Select gage range so normal pressures are approximately equal to the midpoint readings on the scale, unless otherwise specified. Accuracy shall be plus or minus 2 percent of the range. Gages shall conform to ANSI/ASME B40.1.
 - 1. Gages indicating pneumatic outputs shall have 2-inch diameter faces. Scale shall be 0 to 30 psi, with 1-psi graduations.
 - 2. Gages for low differential pressure measurements shall be 4-1/2 (nominal) size with two sets of pressure taps, and shall have a diaphragm actuated pointer, white dial with black figures, and pointer zero adjustment. Gage shall have ranges and graduations as shown. Accuracy shall be plus or minus 2 percent of scale range.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Perform installation under supervision of competent technicians regularly employed in the installation of DDC systems. Provide components for a complete and operational system.
- B. Wiring Criteria:
 - 1. Input/Output identification: Permanently label each field wire, cable, or pneumatic tube at each end with unique identification.
 - 2. Rigid or flexible conduit shall be terminated at all sensors and output devices.
 - 3. Surge Protection: Install surge protection no more than three feet from where communication cable enters building.
 - 4. Grounding: Ground controllers and cabinets to a good earth ground. Ground controller to a ground in accordance with Division 16. Grounding of the green ac ground wire, at the breaker panel, alone is not adequate. Run metal conduit from controller panels to adequate building grounds. Ground sensor drain wire shields at controller end.
 - 5. Contractor is responsible for correcting all associated ground loop problems.
- C. Digital Controllers:

1. Do not divide control of a single mechanical system such as an air handling unit, boiler, chiller, or terminal equipment between two or more controllers. A single controller shall manage control functions for a single mechanical system. It is permissible, however, to manage more than one mechanical system with a single controller.
 2. Provide digital control cabinets that protect digital controller electronics from dust, at locations shown on the drawings.
 3. Provide a main power switch at each highest level LAN digital controller within controller cabinet.
 4. No multiplexing of points is allowed.
- D. Temperature Sensors: Provide temperature sensors in locations to sense the appropriate condition. Provide sensor where they are easy to access and service without special tools. Calibrate sensors to accuracy specified. In no case will sensors designed for one application be installed for another application.
1. Duct Temperature Sensors:
 - a. Provide sensors in ductwork in general locations as indicated. Select specific sensor location within duct to accurately sense appropriate air temperatures. Do not locate sensors in dead air spaces or positions obstructed by ducts or equipment. Install gaskets between the sensor housing and duct wall. Seal duct and insulation penetrations.
 - b. String duct-averaging sensors between two rigid supports in a serpentine position to sense average conditions. Thermally isolate temperature-sensing elements from supports. Provide duct access doors to averaging sensors.
 2. Immersion Temperature Sensors: Provide thermowells for sensors measuring temperature in liquid applications or pressure vessels. Locate wells to sense continuous flow conditions. Do not install wells using extension couplings. Where piping diameters are smaller than the length of the wells, provide wells in piping at elbows to effect proper flow across entire area of well. Wells shall not restrict flow area to less than 70 percent of pipe area. Increase piping size as required to avoid restriction. Provide thermowells with thermal transmission material within the well to speed the response of temperature measurement. Provide wells with sealing nuts to contain the thermal transmission material.
 3. Outside Air Temperature Sensors: Provide outside air temperature sensors on north side of the building, away from exhaust hoods, air intakes and other areas that may affect temperature readings. Provide sunshields to protect outside air sensor from direct sunlight.
- E. Damper Actuators: Actuators shall not be mounted in the air stream.

- F. Thermometers: Provide thermometers at locations indicated. Mount thermometers to allow readability when standing on the floor.
- G. Pressure Sensors:
 - 1. Differential Pressure:
 - a. General: Install pressure sensing tips in locations to sense appropriate pressure conditions.
 - b. Duct Static Pressure Sensing: Locate duct static pressure tip approximately two-thirds of distance from supply fan to end of duct with the greatest pressure drop.
 - c. Pumping Proof with Differential Pressure Switches: Install high-pressure side between pump discharge and check valve.
- H. Control Drawings: Post laminated copies of as-built control system drawings in each mechanical room. Provide electronic copy of as-built drawings to the activity.

3.2 ADJUSTMENTS

- A. Calibrate instrumentation and controls and verify the specified accuracy using test equipment with test equipment accuracy. Adjust controls and equipment to maintain conditions indicated, to perform functions indicated, and to operate in the sequence specified.

3.3 FIELD QUALITY CONTROL

- A. General:
 - 1. Demonstrate compliance of the heating, ventilation, and air conditioning control system with the contract documents. Furnish personnel, equipment, instrumentation, and supplies necessary to perform calibration and site testing. Ensure that tests are performed by competent employees of the DDC system installer or the DDC system manufacturer regularly employed in the testing and calibration of DDC systems.
 - 2. Testing will include the field tests and the performance verification tests. Field tests shall demonstrate proper calibration of input and output devices, and the operation of specific equipment. Performance verification test shall ensure proper execution of the sequence of operation and proper tuning of control loops.
 - 3. Obtain approval of the plan for each phase of testing before beginning that phase of testing. Give to the COTR written notification of planned testing at least 45 days prior to test. Notification shall be accompanied by the proposed test procedures. In no case will the Contractor be allowed to start testing

without written State approval of test procedures. The test procedures shall consist of detailed instructions for complete testing to prove performance of the heating, ventilating and air conditioning system and digital control system.

4. Before scheduling the performance verification test, furnish the field test documentation and written certification to the COTR that the installed system has been calibrated, tested, and is ready for the performance verification test. Do not start the performance verification test prior to receiving written permission from the State.

3.4 TRAINING

A. The controls contractor shall provide the following training services:

1. One (1) day of on-site orientation by a field engineer who is fully knowledgeable of the specific installation details of the project. This orientation shall, at a minimum, consist of a review of the project as-built drawings, the control system software layout and naming conventions, and a walk through of the facility to identify panel and device locations.
2. General: Provide training course schedule, syllabus, and training materials 45 days prior to the start of training. Conduct training courses for designated personnel in the maintenance and operation of the HVAC and DDC system. Orient training to the specific system being installed under this contract. Use operation and maintenance manual as the primary instructional aid. Electronic copy and at least one hardcopy of the Operational and maintenance manuals shall be provided for each trainee with additional electronic copies and at least one hardcopy set provided for: archiving at the project site, for the mechanical contractor, and for the State. Training manuals shall include an agenda, defined objectives and a detailed description of the subject matter for each lesson. Furnish audio-visual equipment and all other training materials and supplies. A training day is defined as 8 hours of classroom or lab instruction, including two 15-minute breaks and excluding lunch time, Monday thru Friday, during the daytime shift in effect at the training facility. For guidance, assume the attendees will have a high school education and are familiar with HVAC systems. The minimum amount of training for this project shall be 24 hours.
3. Operator Training: Operator training shall include the detailed review of the control installation drawings, points list, and equipment list. The instructor shall then walk through the building identifying the location of the control devices installed. For each type of systems, the instructor shall demonstrate how the system accomplishes the sequence of operation.
4. From the workstation, the operator shall demonstrate the software features of the system. As a minimum, the operator demonstrate and explain logging on, setting passwords, setting up a schedule, trend, point history, alarm, and archiving the database.

5. Maintenance Training: The system maintenance course shall be taught at the project site within one month after the completion of the operators training. The course shall last for one 8-hour training day. The course shall include answering questions from the last training session, trouble shooting and diagnostics, repair, instructions, preventive maintenance procedures and schedules, and calibration procedures.

3.5 SEQUENCE OF OPERATION

- A. Sequence of operations shall be as indicated on the drawings.

3.6 COMMISSIONING

- A. The Commissioning Agent shall be responsible for commissioning the DDC system as specified in the commissioning sections of the specification.

3.7 WORKSTATION AND LAPTOP

- A. Computers shall be provided upon project completion.

3.8 SYSTEMS INTEGRATION/DDC SPECIFIC REQUIREMENTS

- A. DDC Remote Access: The Direct Digital Control (DDC) system provided shall include the capability for multiple users to access the DDC simultaneously from remote locations. Interface shall be to the entire DDC and provide the capability to monitor all I/O and adjust parameters.
- B. Open Systems Integrator:
 1. Chiller Integrator Interface:
 - a. The BAS system shall include appropriate hardware equipment and software to allow two way data communications between the BAS system and the chiller manufacturer's chiller control panel.
 - b. It shall be the responsibility of the BAS Contractor to coordinate with the chiller manufacturer to provide a functional data communications connection.
 - c. All data supported by the chiller communication protocol shall be mapped into the supervisory DDC controller's database and shall be displayed on a chiller data screen at the Operator Workstation and shall be transparent to the operator.
 - d. The BAS Contractor shall furnish either the OSP or BACnet communications interface as required by the chiller manufacturer.
 - e. The BAS Contractor shall provide all communications and power wiring and gateway panel installation for the DDC system. The chiller

manufacturer shall provide all hardware for connection of the manufacturer's processor.

- f. The BAS Contractor shall provide all hardware and software required for the chiller manufacturer's gateway interface.

2. VFD Integrator Interface:

- a. The BAS system shall include appropriate hardware equipment and software to allow two way data communications between the BAS system and the VFD manufacturer's control panel.
- b. It shall be the responsibility of the BAS Contractor to coordinate with the VFD manufacturer to provide a functional data communications connection.
- c. All data supported by the VFD communication protocol shall be mapped into the supervisory DDC controller's database and shall be displayed on data screens at the Operator Workstation and shall be transparent to the Operator Workstation and shall be transparent to the operator.
- d. The BAS Contractor shall furnish either the OSP or BACnet communications interface as required by the VFD manufacturer.
- e. The BAS Contractor shall provide all communications and power wiring and gateway panel installation for the DDC system. The VFD manufacturer shall provide all hardware for connection of the manufacturer's processor.
- f. The BAS Contractor shall provide all hardware and software required for the VFD manufacturer's gateway interface.

END OF SECTION.

DIVISION 16 - ELECTRICAL

SECTION 16000 - GENERAL ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. As specified in Section 01001.

1.02 SUMMARY

- A. Electrical Work: Provide all articles, materials, equipment operators, systems and services specified herein, and on the Drawings, and as normally required by accepted industry standard practices, including all labor taxes, fees, insurance, warranties and incidentals required to complete all electrical work.
- B. In general, the following work is included:
 - 1. Provide, complete and in place, electrical, lighting, fire alarm and communication systems as indicated in the Drawings and specified herein. Provide, complete and in place, exterior and interior electrical, communication, and lighting systems.
 - 2. Provide saw cutting (where required), excavation, shoring, bracing, suitable backfill material, concrete encasement, backfilling, compacting, ac patching (where required) and concrete patching (where required) for complete duct system installation.
 - 3. Coordinate work with Kauai Island Utility Cooperative, Hawaiian Telcom, the State of Hawaii, and the County of Kauai electrical inspectors.
 - 4. Provide energy efficient electrical systems and components that will help the project to achieve a minimum LEED rating of Silver. Electrical systems shall include full cutoff exterior light fixtures, energy efficient lights and automated lighting system with occupancy sensors where required.
- C. Furnish required submittals and samples, operations and maintenance manuals, and "As-built" Drawings.
- D. Coordinate work with other trades to avoid omissions and overlapping of responsibilities.
- E. Apply for, obtain and pay for all County fees, permits, licenses, utility fees, assessments and inspections required for this work.
- F. Pay for all temporary construction and testing power.
- G. Pay for all fuel for generator tests.

- H. Provide all electrical systems in accordance with the designer's intent so as to attain the Leadership in Energy and Environmental Design (LEED) certification level being sought. Commission all electrical systems in accordance with LEED requirements and the commissioning specifications. Conduct all commissioning tests to the approval of the commissioning agent and assist the commissioning agent. Provide the necessary power, temporary power, man-power, equipment, and information as necessary to perform the tests and to provide the necessary submittals.
- I. Before bidding, visit project site, carefully review each section of the Specifications and all Drawings of this Contract. Verify details, report any error, conflicts or omissions to the Owner at least 10 calendar days before submission of bids for interpretation or clarification. If errors or omissions are not reported, Contractor shall provide necessary work at no additional cost to Owner to properly complete intent of Specifications and Drawings. By submitting a proposal of the work included in this contract, the Contractor shall be deemed to have made such examination and to be familiar with and accept all conditions of the job site.

1.03 INTENT OF SPECIFICATIONS AND DRAWINGS

- A. 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" and "the" are intentional. Omitted words and phrases shall be provided by inference to form complete sentences.
- B. Specifications and Drawings complement each other and what is specified, scheduled or mentioned on one shall be binding as if called for by both.
- C. Discrepancies and Interpretations:
 - 1. Should the Contractor find any discrepancies in or omissions from any of the documents or be in doubt as to their meaning, he shall advise the Engineer who will issue any necessary clarification within a time period which does not disrupt the progress of the work.
 - 2. All interpretation and supplemental instructions will be in the form of a written addendum to the Contract Documents.
 - 3. Should any discrepancies arise from the failure of the Contractor to notify the Owner, the higher quality or larger quantity of item shall prevail. Owner shall make the final interpretation and judgment.
 - 4. In the event of a discrepancy between small scale drawings and large scale details, or between Drawings and Specifications, of which is in violation of any regulations, ordinances, laws or codes, the discrepancy, if known by the Contractor, shall be immediately brought to the attention of the Owner for a decision before proceeding with the particular work involved. Work carried out disregarding these instructions will be subject to removal and replacement at the Contractor's expense.

1.04 DEFINITIONS

- A. Provide: "Furnish and install, test and deliver to the Owner in operating and ready to use condition."
- B. Wiring: "Provide all raceways, junction boxes, conductors, devices, protection equipment, installation of motor controllers (furnished by others) when required, etc., including testing for a complete, operative and ready to use electrical system."
- C. Equal: "Material, equipment or system, including all necessary labor, modifications and accessories satisfying the requirements of the contract documents, the design intent, and to provide features or have operating characteristics equal or better than that specified."
- D. Complete: "Furnish installation that is operative, tested, and ready to use and which satisfies the intent of the contract documents, including all necessary accessories and modifications."
- E. Contractor: "General Contractor responsible for all work shall assign work to Sub-Contractors. Except where noted, work of this section shall be assigned to the Electrical Sub-Contractor."
- F. KIUC: Kauai Island Utility Cooperative
- G. HTCO: Hawaiian Telcom

1.05 QUALITY ASSURANCE

- A. Government and Utility Requirements: Comply with all requirements of the State of Hawaii, County of Kauai, Disability and Communication Access Board (DCAB), and respective utility company rules and regulations.
- B. Specifications are accompanied by architectural, civil, mechanical, landscape, and audio-visual plans of the buildings, site, and diagrammatic electrical plans showing locations of luminaries, standards, outlets, feeder runs, devices and other electrical equipment. Locations are approximate and before installation, Contractor shall study adjacent construction details and make installation in the most logical manner. Prior to installation and at the direction of the Owner, relocate any device, equipment, feeder, or circuit within 10'-0" of the location presently shown without added cost to the Owner.
- C. Prior to start of the rough-in work, verify all dimensions and equipment sizes with the approved shop drawings including equipment furnished by others. Circuits and raceway routes are diagrammatic and may be altered in any logical manner. However, all changes from the contract documents shall be subject to review and acceptance of the Owner and indicated on the "As-built" Drawings.
- D. Feeders and branch circuits for equipment furnished by others were sized for the anticipate equipment. Verify electrical requirements of all equipment furnished by others prior to rough in and prior to ordering of the electrical distribution

equipment. Re-size affected feeders and branch circuits at no additional cost to the Owner.

- E. Materials and Equipment: Materials and equipment shall conform to requirements of applicable technical specification sections, publications specified therein and shall be as shown on the drawings. Materials and equipment shall be new and shall be the product of manufacturers regularly engaged in the manufacture of such products.

All items shall essentially duplicate materials and equipment which have been in satisfactory use at least two years prior to bid opening and shall be supported by a service organization that is located reasonably close to the site of installation.

F. Substitutions:

1. Where items are specified by manufacturer's name or catalog number, substitutions require written permission by the Engineer prior to bidding. Brand names, manufacturer's names and catalog numbers indicate the standard of design and quality required. List of substitute materials together with qualifying data shall be submitted for review at least twelve (12) working days before bid date. Failure to submit for review substitute materials prior to bidding shall mean that materials, as specified, will be provided. Substitute materials submitted and rejected shall not be resubmitted in any modified form.
2. Samples of proposed substitute items may be required and shall be submitted by the Contractor at his expense as soon as practicable after they are requested.
3. Burden of proof of equality of proposed substitutions will be the responsibility of the Contractor. Submittals shall be sufficiently detailed to permit evaluation of the proposed items. Inadequacy of submittals shall be sufficient cause to reject a proposed substitution.
4. All prospective bidders must submit descriptive information on proposed material for pre-bidding acceptance where an item is detailed but no manufacturer is named.
5. Costs to review any contractor submitted value engineering change proposals shall be paid by the Contractor.

- G. Prevention of Corrosion: All metallic materials shall be protected against corrosion. Exposed metallic parts of equipment, apparatus, devices, mounting hardware, and fasteners that are provided in damp, wet, or corrosive areas shall be constructed from 316 or 316L stainless steel. All such parts as boxes, bodies, fittings, guards and miscellaneous parts shall be constructed of 316 or 316L stainless steel. The Contractor shall not join dissimilar metals that will result in deterioration due to galvanic corrosion.

1.06 DEPARTURES

- A. Departures resulting from the substitution of materials or systems shall be accompanied by appropriate changes in all affected work of every trade and shall include stamped and signed drawings by a licensed engineer for any portion of the project requiring re-design. Such changes shall be done at no increase to the contract amount and shall be the responsibility of the Sub-Contractor or supplier responsible for the departures. Changes proposed by the Contractor shall be based on a system approach and may be allowed if implemented without decrease in quality, performance and operations, increase in utility costs or adverse effect on the available physical space to install the equipment. Such departures shall be submitted and noted in shop drawings for review and acceptance by the Engineer. Departures initiated by other trades, requiring changes in the electrical system as well as other systems, shall be accompanied by appropriate changes to all affected work of every trade, at no increase in contract amount. Submission for departure shall be as follows:

EXAMPLE:

<u>Item</u>	<u>Manufacturer and Catalog Number Specified</u>	<u>Substitute Manufacturer and Catalog Number</u>
Cable	John Doe - No. 3200	King - No. 2200

- B. The General Contractor shall be responsible to coordinate, approve and select systems that do not impose unaccounted for impacts on the electrical work. It shall be understood that after the award of contract, all departures having electrical impact, unless otherwise noted, have been reviewed and approved by the General Contractor.

1.07 SUBMITTALS

- A. Submit in accordance with Section 01330 – SUBMITTAL PROCEDURES. All submittals shall be reviewed and approved by the general contractor and the electrical contractor. Partial submittals or submittals lacking the general contractor's and electrical contractor's approvals will not be acceptable. Submit for approval six (6) complete sets of submittals as described below. Annotate descriptive data to show the specific model, type, option, and size of each item the Contractor proposes to furnish. Do not commence work until each system, including all the various components, have been approved. The Engineer will review and approve all submittals. Before the materials are ordered or the work is commenced the shop drawings must be approved. All submittals shall be submitted to and reviewed by the LEED Administrator as necessary for the LEED documentation process.
- B. List of Materials and Equipment: Submit in accordance with Section 01330 – SUBMITTAL PROCEDURES. These lists shall include manufacturer's names and material or equipment identification such as styles, types, or catalog numbers to permit ready and complete identification. Original catalog cuts or brochures shall be provided. Scanned or photocopied submittals will be rejected without review.

- C. Product Data: Shall be sufficiently comprehensive and detailed to permit evaluations, otherwise the item may be rejected, and shall include, as applicable, the following:
1. Original catalog cuts or brochures shall be provided. Scanned or photocopied submittals will be rejected without review.
 2. Each submittal shall contain an itemized list of each item being submitted. Each item shall be identified with the complete manufacturer's ordering number including all options.
 3. Dimension outlines of all enclosures.
 4. Dimension drawings of components such as panelboards, transformers, enclosed circuit breakers, safety disconnect switches, and inverters.
 5. Scaled drawings showing the layouts and arrangement of equipment in all electrical rooms, telecom rooms, and generator rooms.
 6. Operating and electrical characteristics including interrupting ratings and impedances.
- D. Certificate of Compliance: Where required by the section specifying the equipment, the Contractor shall submit six (6) copies of certificates of compliance in accordance with the requirements of the GENERAL REQUIREMENTS. The certificates shall include but not be limited to factory test reports.
- E. Installation, Operation and Maintenance Data: Six (6) copies of installation, operation and maintenance data shall be submitted for equipment specified to require such data. The data shall be in the form of manuals and shall indicate installer's name, address, and contact information; supplier's name, address, and contact information; instructions for operating, maintaining, repairing, recommended inspection points, periods for inspection, and all related spare parts 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.
- Test, adjustment and calibration information shall be furnished and identified to specific equipment. The installation, operation and maintenance data shall be as required by the General Requirements.
- F. Acceptance Requirements: Acceptance for material and equipment will be based on manufacturer's published data. Where materials or equipment are specified to be constructed and tested, or both, in accordance with the standards of the National Electrical Manufacturers Association (NEMA) or the American National Standards Institute (ANSI), the Contractor shall submit proof that the items furnished under this section of the specifications conform to such requirements. A certification or published catalog specification data statement to the effect that the item is in accordance with the referenced NEMA standard by a company listed as a member company of NEMA for the section whose standards cover the item under construction, will be acceptable as sufficient evidence that the item

conforms to the requirements of the National Electrical Manufacturers Association. A manufacturer's statement indicating complete compliance of each item with the applicable NEMA, ANSI or other commercial standard specified shall be submitted and will be acceptable proof of compliance. Conformance with the agency requirements does not relieve the item from complying with any other requirements of the specifications.

G. Nameplates:

1. General: In addition to standard manufacturer's nameplate, permanent corrosion resistant nameplates shall be provided for each enclosed circuit breaker, safety switch, panelboard, lighting contactor, inverter, telecom junction box, and other major pieces of equipment. Nameplates shall designate the function of the equipment for which they are used. The designation shall be submitted for review and acceptance with the shop drawings.
2. Material and Lettering: 1/16" thick, laminated plastic, black-white-black. Nameplate lettering shall be 1/4" high upper-case.
3. Fastening: Nameplates shall be fastened stainless steel (316) screws.
4. Hand lettering or stick-on embossed marking tape is not acceptable.
5. Provide laminated tape labeling for all new receptacles on coverplates. Identify associated panel name and circuit number.

H. Labels

1. Provide labels as required by the latest version of the National Electrical Code adopted by the County.
2. The labels shall be designed according to the following standards:
 - a. UL969 – Standard for Marking and Labeling Systems.
 - b. ANSI Z535.4 – Product Safety Signs and Labels.
 - c. NFPA 70 (National Electric Code) – Article 110.16.
 - d. NFPA 70E – Section 130.
3. Labels shall be provided for, but not limited to:
 - a. Available fault currents at the service equipment per 2020 NEC 110.24(A).
 - b. Arc Flash warning labels shall be provided per 2020 NEC 110.16 and 2024 NFPA-70E 130.5. The contractor shall obtain all information

required for the calculations, perform the calculations, and provide the labels at no additional cost.

- c. Source and location of feeder serving switchboards and panelboards per NEC 408.4(B).
- d. Method utilized for conductor identification per 2020 NEC 210.5(C).
- e. All telecommunication, telephone, data, and signal cables.

- 4. Label materials shall be provided similar to nameplates except that labels for wires, conductors, and cables shall be of the printed tape type.

I. Factory Tests and Inspection:

- 1. The equipment furnished shall be inspected mechanically and electrically, and all manufacturers' routine factory tests shall be performed to verify conformance with the specified requirements. The test equipment and test methods shall conform to the requirements of standards specified. The contract price shall include cost of performing all tests.
- 2. The Contractor shall furnish, at time of equipment delivery, six (6) certified copies of all test results.

- J. Equipment Guarantees: Installation shall be complete in every detail and ready for use. Any item furnished or provided by the Contractor developing defects within one (1) year after final acceptance by the Owner shall be replaced by materials, apparatus and parts including installation labor costs to make such defective portion of the completed system conform to the true intent and meaning of the drawings and specifications, without additional cost to the Owner. The Contractor shall guarantee all equipment provided from the date such equipment is accepted by the Owner, against defects in materials, design, performance and workmanship. Guarantees shall be supported by manufacturer's written warranties and shall be signed by an official of the manufacturer's organization. Replacement parts shall be delivered and repairs shall be made promptly upon receipt of notice of failure under normal and proper use and maintenance. All costs of replacement and repair shall be borne by the Contractor provided that a report substantiating such defect or failure to conform to specifications is promptly given to the Contractor.

- K. Submit the lighting test report to the Owner within 90 days of the issuance of the certificate of occupancy or the acceptance of the project, whichever comes first.

1.08 CODES, REGULATIONS AND STANDARD SPECIFICATIONS

- A. Work shall conform to the Hawaii Revised Statutes, the Ordinances of the County of Kauai; the International Conference of Building Officials (ICBO) International Building Code (IBC); and the latest edition of National Electrical Code (NEC).

- B. Applicable rules, standards and specifications of following associations shall apply to materials, workmanship, and procedures:

American National Standards Institute (ANSI)
Illuminating Engineering Society of North America (IESNA)
National Electrical Manufacturer's Association (NEMA)
National Fire Protection Association (NFPA)
Underwriters' Laboratories, Inc. (UL)

1.09 ACKNOWLEDGEMENT

- A. By bidding on this project and or by providing this work the Contractor acknowledges that:
1. The Designer is not responsible for the means and methods employed by the Contractor and that the Contractor is responsible for his means and methods.
 2. The Designer is not responsible for job site and worker safety and that the Contractor is responsible for job site and worker safety.

1.10 WARRANTY

- A. Defective materials and workmanship shall be removed and replaced at no cost to the Owner. For period of one year after acceptance of work by Owner, materials and workmanship developing defects and malfunctions shall be repaired and/or replaced, to conform with intent of the specification and drawings, at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 MATERIALS

All materials shall be new, except as specifically noted, and shall bear the label of Underwriter's Laboratories, Inc., wherever standards have been established and label service is normally and regularly furnished by the agency. See the respective technical sections for the electrical material specifications.

PART 3 - EXECUTION

3.01 MATERIALS AND EQUIPMENT PROVIDED BY THE CONTRACTOR

The electrical installation shall be complete and operable and shall conform to the requirements of the contract drawings. The Contractor shall provide all electrical equipment and materials, wiring, supports and such additional parts as are necessary to make the installation complete. All Contractor furnished materials and equipment are subject to review and acceptance by the Owner.

3.02 PROTECTION DURING STORAGE

Store all materials and equipment in a safe manner. Provide weather, dehumidification, and fire protection for all materials. Store all materials above grade to avoid damage by moisture. Cover all materials to avoid damage from sunlight.

3.03 PROTECTION OF WORK IN PROGRESS

All electrical materials and equipment shall be completely protected during installation. Equipment shall be securely protected against physical or chemical damage. In areas exposed to weather, materials unused at the end of each day's work shall be protected by weatherproofed installations. All unprotected conduits shall be sealed to prevent water and foreign debris from entering conduits. Damage to materials and equipment due to Contractor's neglect shall be repaired or replaced by and at the expense of the Contractor.

3.04 PROGRESS OF WORK AND COORDINATION

The Contractor shall prepare a schedule identifying the sequence of electrical work. The electrical work shall be coordinated with the work of other Contractors and other trades. The schedule shall be submitted prior to beginning installation and shall be subject to review and acceptance by the Owner.

3.05 RULES

The entire electrical installation shall conform to the applicable rules and regulations of the State Fire Code and the standards and publications specified in the technical sections.

3.06 COORDINATION

The contract drawings indicate the extent and general location and arrangement of equipment, conduit and wiring. Lighting fixtures, outlets and electrical equipment shall be located so as to avoid interference with architectural, mechanical and structural features. The Owner or Engineer may request any device, equipment, circuit, or feeder to be relocated within 10'-0" of the location shown on the Drawings before installation is initiated and without increase in contract amount.

3.07 WORKMANSHIP

- A. All materials and equipment shall be installed in accordance with printed recommendations of the manufacturer and shall conform to the requirements of the contract drawings. The installation shall be accomplished by workers skilled in this type of work. For actual fabrication, installation and testing of the Electrical Work, use only thoroughly trained and experienced workmen completely familiar with items to be installed and with manufacturers' recommended methods of installation. In acceptance or rejection of installed work no allowance will be made for lack of skill on part of workmen.
- B. Inspection: Skill and competency of workmanship shall be subject to the approval of the Owner, the State, and the County of Kauai. The contractor shall

open all electrical equipment, cabinets, junction boxes, and devices as required by the Engineer or inspector for inspection. All equipment shall be de-energized prior to inspection unless voltage and current measurements are required. The Contractor shall be responsible for all electrical and arc flash safety at the project site.

3.08 FIELD TESTS

- A. After the installation is completed, and at such time the Engineer may direct, the Contractor shall conduct field tests for acceptance by the Engineer. When the tests are specified to be performed under the supervision of the equipment manufacturer, the Contractor shall cooperate with the Engineer during tests and shall place at the manufacturer's disposal, all assistance, materials and services required to perform such tests. The tests shall be performed in the presence and to the satisfaction of the Engineer and Owner. The Contractor shall furnish all necessary electric power, fuel, instruments, equipment, and personnel required for the tests and shall pay for all power and fuel.
- B. Insulation Tests: The insulation of all conductors shall be tested with a megger insulation tester. Submit results of tests to the Engineer.
- C. Operating Tests: The equipment and systems shall be demonstrated to operate in accordance with the requirements of the technical sections in which the equipment or systems are specified.
- D. Lighting Test Report: The lighting system shall be adjusted, calibrated programmed, tested and demonstrated that it operated in accordance with the requirements as indicated in the drawings and as specified in the lighting specifications. Submit the results of the test in a report format to the Engineer.
- E. Ground Resistance Test: Test ground resistance by three-point method. Results of test shall be submitted to the Engineer. Ground Resistance: Ground resistance measurements of each ground rod shall be taken and certified by the Contractor. Upon completion of the project, the Contractor shall submit in writing to the Engineer, the measured ground resistance of each ground rod and grounding system, as well as the resistance and soil conditions at the time the measurements were made. Ground resistance measurements shall be made in normally dry weather, not less than 48 hours after rainfall, and with the ground under test isolated from other grounds.
- F. Test all 600 volt class conductors to verify that no short circuits or accidental grounds exist. Make tests using an instrument which applies a voltage of approximately 500 volts to provide a direct reading in resistance, and measure the insulation resistance from phase to phase and phase to neutral. All test results shall be recorded and submitted to the Engineer.
- G. Wherever test or inspection reveals faulty materials or installation, Contractor shall take corrective action, at his own expense, repairing or replacing materials or installation as directed. The materials or installation shall then be retested.

END OF SECTION

SECTION 16050 – ELECTRICAL BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

As specified in Section 01001.

1.02 SUMMARY

- A. This section provides the specifications for general electrical work. See other specification sections for more detailed specifications related to specific electrical systems.
- B. The Contractor shall furnish all labor, materials, tools, equipment, electricity, fuel, shipping and delivery, and appliances required to provide all Electrical Work, complete, as indicated on the drawings and/or as specified herein. The drawings note various sizes of equipment as determined for basis of design; the electrical work, however, shall be installed to comply with the equipment furnished by the successful supplier and shall be based on the approved shop drawing submittals. The work shall include but not necessarily be limited to, the following:
 - C. Complete power distribution system.
 - D. Complete general use and special power systems.
 - E. Connection and testing of appliances and equipment furnished by others requiring electrical connections.
 - F. Work associated with the Leadership in Energy and Environmental Design (LEED) Certificate level requirements, including, but not limited to shop drawing submittals, commissioning, testing, verification, and reports including but not limited to the exterior lighting, automated lighting controls, and renewable energy systems.
 - G. Before bidding on this work, carefully examine each of the drawings and the site. By submitting a proposal of the work included in this contract, the Contractor shall be deemed to have made such examination and to be familiar with and accept all conditions of the job site.

1.03 SUBMITTALS

- A. Submit in accordance with Section 01330 – SUBMITTAL PROCEDURES.
- B. Shop drawings and catalogue cuts for substitute materials shall clearly specify compliance with and/or deviation from specified material. Certification shall not contain statements to imply that the item does not meet requirements specified, such as "as good as"; and "achieve the same end use and results as materials

HAWAII HEALTH SYSTEMS CORPORATION – KAUAI DIVISION

Samuel Mahelona Memorial Hospital
Behavioral Health New Patient Facility
Project No. 221093-01

Electrical Basic Materials And Methods
16050-1

formulated in accordance with the referenced publications". Certifications shall simply state that the item conforms to the requirements specified. Certificates shall be printed on the manufacturer's letterhead and shall be signed by the manufacturer's official authorized to sign certificates of compliance. Review of shop drawings and catalogue cuts shall not release Contractor from complying with intent of specification and drawings. Partial or incomplete submittals will be returned without review.

- C. Shop Drawings: Submit complete shop drawings and manufacturer's literature for the Engineer's review before any work is ordered or fabricated. All submittals shall bare the approval of the general contractor and the electrical contractor. Partial or incomplete submittals or submittals lacking the general contractor's and electrical contractor's approval will be returned without review. Submit in accordance with Section 01330 – SUBMITTAL PROCEDURES. Submit manufacturer's literature for the following:
1. Raceways
 2. Conductors
 3. Dry-Type Transformer
 4. Panelboards
 5. Uninterruptible Power Supply
 6. Cabinets/Enclosures
 7. Devices (Receptacles, switches, etc.)
 8. Junction Boxes, Enclosures, and Cabinets
 9. Floor Boxes
 10. Special Purpose Receptacles
 11. Disconnect Switches
 12. Nameplates
- D. Ground Resistance Measurements, Conductor Insulation Measurements, and Thermal Scan Results: Submit typewritten and tabulated results of all ground resistance measurements, conductor insulation measurements, and thermal scan results.
- E. As-Built Drawings: Submit as-built drawings as specified under Section 01700 - CONTRACT CLOSEOUT.

1.04 GUARANTEE AND CERTIFICATE

Any item of material, apparatus, equipment furnished and installed, or constructed by the Contractor showing defects in design, construction, quality or workmanship within one year from the date of final acceptance by the Owner shall be replaced by such new material, apparatus or parts as may be found necessary to make such defective portion of the installation conform to the true intent and meaning of the specification and/or the drawings. Exceptions shall be fluorescent and incandescent lamps which shall be guaranteed for one half the manufacturer's listed life time. Such repairs or replacement shall be made by the Contractor, free of all expense to the Owner.

1.05 COORDINATION WITH UTILITY COMPANIES AND OTHER TRADES

During bidding and construction, Contractor shall coordinate his work with utilities, and other trades to avoid omissions and overlapping of responsibilities.

1.06 CODES, REGULATIONS AND STANDARD SPECIFICATIONS

- A. Work shall conform to latest edition of National Electrical Code.
- B. Applicable rules, standards and specifications of following associations shall apply to materials and workmanship:

American National Standards Institute (ANSI)
Illuminating Engineering Society of North America (IESNA)
National Board of Fire Underwriters (NBFU)
National Electrical Manufacturer's Association (NEMA)
National Fire Protection Association (NFPA)
Underwriters' Laboratories, Inc. (UL)

PART 2 - PRODUCTS

2.01 MATERIALS

- A. General: All materials shall be new, except as specifically noted, and shall bear the label of Underwriters' Laboratories whenever standards have been established and label service is normally and regularly furnished by the agency.
- B. Raceways:
 - 1. Conduits: EMT and galvanized rigid steel, 3/4" minimum diameter with compression or threaded fittings, respectively. Aluminum conduits shall not be used.

2. Non-Metallic Conduit: PVC Schedule 40 and sunlight-resistant epoxy resin coated fiberglass, wall thickness as indicated (ISO 9001: 2008 certified), 3/4" minimum diameter.
 3. Reinforced Thermosetting Resin Conduit: NEMA Standard TC 14, UL 2515 IPS above Ground and 2515A Extra Heavy Wall standards, ISO 9001: 2015 Quality Control Management, Type AG, sunlight resistant, wall thickness as required to provide degree of protection suitable for installation location.
 4. Flexible Conduit: 3/4" minimum, zinc-coated inside and outside; for damp, wet, moist, or corrosive areas -- liquid-tight with factory fittings and UV stabilized PVC jacket.
- C. Conductors: Conductors shall be copper, No. 12 AWG minimum; No. 10 AWG and smaller, solid and round; No. 8 AWG and larger, 7 or 19 strands concentric. All conductors No. 6 and smaller shall be types THHN-THWN for interior use or RHW for exterior use. All conductors No. 4 AWG and larger shall be type THWN-2 for interior use; or RHW-2 or USE-2 for exterior use. Conductors used for fire alarm, and control wiring may be sized according to the system manufacturer based on their load and voltage drop calculations and code requirements.
- Conductors used to serve critical operations power systems (power systems for facilities or parts of facilities that require continuous operations for reasons of public safety, emergency management, national security, or business continuity) including but not limited to emergency power, HVAC, fire alarm, security, telecommunications, and signaling shall be a listed 2-hour electrical circuit protective system.
- Conductors installed on roof tops and exposed to sunlight shall be derated per NEC Table 310.15(B)(2)(b) or shall be type XHHW-2. Conduit sizes shall be increased as necessary to accommodate derated and type XHHW-2 conductors.
- Reduce conductor sizes at equipment terminations as required to accommodate maximum allowable conductor size accepted at equipment terminals per manufacturer's recommendations. Provide UL listed in-line reducer splice kit or UL listed cable reducing adapter plugs as required to reduce conductor sizes.
- D. Outlet and Small Junction Boxes: Pressed, zinc-coated steel, minimum nominal size 4", minimum depth 1-1/2", with raised cover- ring for devices in concrete masonry units. Exposed boxes and weather exposed boxes shall be ferrous alloy, prime painted and enamel finished, with threaded hubs for conduit connection. Surface mounted boxes shall be smooth walled with clean 90 degree corners.
- E. Floor Boxes: Cast-iron with corrosion resistant finish, fully adjustable tops, concrete-tight, tile and cover flange with finish color to verified with the Architect,

screw fastened covers, 1" diameter threaded conduit openings. Size as required for number of devices. Wiremold 880CS series or pre-approved equal.

1. Large Combination Outlet: Cast flush mounted floor box with threaded conduit hubs, water-tight, fully adjustable, hinged carpet / tile trim plate with two wire management blocks, two duplex receptacle (NEMA 5-20R) and two comm (RJ45 jacks) brackets. Wiremold RFB series or pre-approved equal.
 2. Duplex Outlet: Brass or brushed aluminum duplex cover plate, flip open lids with hold down screw, NEMA 5-20R duplex receptacle. Walker 828R or pre-approved equal.
- F. Large Junction Boxes: For dry interior locations, the box shall be fabricated from NEC gauge galvanized steel with matching screw-on type cover, field punched knockouts. Flush mounted junction boxes shall have flange type covers. For exterior, damp, wet, or corrosive locations, boxes shall be NEMA 4X stainless steel (316), pad lockable. All screws and hardware shall be stainless steel (316).
- G. Enclosures and Cabinets: Enclosures and cabinets for panelboards, enclosed circuit breakers, and safety disconnect switches shall be NEMA type, fabricated from galvanized steel, or as indicated, prime painted and enamel finished according to NEMA specifications. For dry interior locations, enclosures shall be NEMA 1. For exterior, damp, wet, or corrosive locations, enclosures shall be NEMA 4X stainless steel (316) with stainless steel (316) fasteners and hardware, pad lockable. Provide enclosures made of continuous welds. Enclosures made of bolted panels/parts will not be allowed.
- H. Device and Cover Plates:
1. Plates for interior flush construction shall be smooth reinforced plastic, with suitable hole(s) and color to match device.
 2. Device covers outlets in damp, wet, or corrosive locations shall be weatherproof with lockable stainless steel (316) covers. Covers shall permit plugs to be connected without compromising the integrity of the protective nature of the cover while in use.
 3. Device covers provided in areas exposed to patients shall be tamper-resistant and anti-ligature or ligature resistant.
 4. Light switch plates for areas exposed to the elements, damp, or wet installations shall be neoprene gasketed cast aluminum, gray powder coat finish, with spring loaded neoprene gasketed flip-open lids.
 5. Light switch plates for programmable light switches shall be labeled to describe the function of each switch/button.
 6. Plates for receptacles on emergency circuits shall be red.

7. Plates for receptacles shall be labeled with the name of the panelboard and circuit number serving the receptacle.
- I. Tumbler Switches: Single or double pole, as required, specification grade, non-mercury, quiet, 20 amperes, 120-277 volt, UL labeled AC type, silvered contacts, ivory, tumbler switch with endurance of 10,000 make-breaks. Enclose in outlet box and device plate. Hubbell 1200 series, Bryant No. 4900 series, Arrow Hart No. 1990 series or pre-approved equal.
- J. Convenience Single and Duplex Receptacles:
1. Single and Duplex, 20 ampere, 125-volt, back and side wired, 3 wires, grounding type in ivory plastic body (provide red body for receptacles on emergency circuits), specification grade, tamper-resistant, with parallel and ground U-shaped slots. Enclose in outlet box and device plate. Hubbell SNAP5262, Leviton No. 5362 or pre-approved equal.
 2. Ground Fault Circuit Interrupting (GFCI) receptacles shall be similar to the above except shall have test and reset switches and maximum allowable leakage current shall be 5 milli-amperes. Receptacles in restrooms, bathrooms, crawl spaces, and damp and wet locations shall be of the GFCI type.
 3. Receptacles installed in exterior, damp, or wet locations shall be UL Listed weather resistant per NEC 406.9(A).
 4. All receptacles shall be UL Listed tamper-resistant
- K. Special Receptacles: Contractor shall coordinate receptacle requirement type with contractor furnishing equipment and provide matching plug and cap. Outlet box size shall be commensurate with receptacle dimensions. Special receptacles shall conform to NEMA requirements. Provide specification grade with matching cap and cord, 6' length minimum, coordinate length with equipment being supplied. Provide red bodies (or coverplates when red bodies are not available) for receptacles on emergency circuits.
- L. Panelboard: Surface-mounted as noted, ratings as indicated, 3-phase, 4WSN, ground bus, copper bussing, circuit breaker complement as shown, complete with lockable door, trim, type written directory, and 2-ply nameplate. Short circuit amperes interrupting capacity withstand ratings as indicated. Series rated panelboards not allowed. Full pole circuit breakers (half pole circuit breakers not allowed). Flush mounted panelboards shall be provided with flange type covers. Lockable with all new locks keyed alike. Eaton, Square D, ABB, Siemens or pre-approved equal.
1. Surge Protective Device (SPD): Provide an SPD in panelboards where indicated on the drawings. Each SPD shall be bus connected for parallel

operation, rated for 208Y/120V, 3-phase, 4-wire systems, and have a minimum surge rating of 120kA per phase. The SPD shall be UL 1449 and UL 1283 Listed (latest editions). Each SPD shall have an audible alarm with silence switch, an alarm indicator light, and indicator lights for line-to-neutral, line-to-ground, and neutral-to-ground monitoring.

2. Minimum panelboard enclosure size shall be 20"W by 5-3/4"D unless mounted within switchboards or within power distribution centers.
 3. Provide locking handle devices on all circuit breakers that are used to feed mechanical / HVAC loads.
 4. Dimensions of the panelboard shall be as required to accommodate the required circuit breaker compliments, wiring, and bus ampacity.
 5. Two section panelboards shall have the same enclosure dimensions.
- M. Uninterruptible Power Supply: Continuous-duty, 3-phase, solid-state uninterruptible power supply system (UPS).
1. The UPS system shall consist of the following components:
 - a. Rectifier
 - b. Inverter
 - c. Static Bypass
 - d. Maintenance Bypass
 - e. Battery System
 2. The UPS shall operate as a double-conversion UPS with the following modes:
 - a. Normal: During the Normal or Double-conversion Mode the rectifier shall derive power as needed from the commercial AC utility or generator source and supply filtered and regulated DC power to the online inverter. The inverter shall convert the DC power to highly regulated and filtered AC power for the critical loads.
 - b. Battery: Upon failure of the AC input source, the critical load must continue to be supplied by the inverter without switching. The inverter must obtain its power from the battery. There must be no interruption in power to the critical load upon failure or restoration of the AC input source.

- c. Recharge: Upon restoration of the AC input source, the rectifier/battery charger must recharge the battery. The inverter shall, without interruption of power, regulate the power to the critical load.
 - d. Bypass: The static bypass switch must be used for transferring the critical load to the AC utility supply without interruption. Automatic re-transfer to normal operation must also be accomplished without interruption of power to the critical load. The static bypass switch must be capable of manual operation.
 - e. Maintenance Bypass: A wall-mountable maintenance bypass switch is available; however, in the absence of this feature, the integral maintenance bypass switch should be used. The maintenance bypass is used for supplying the load directly from the AC utility supply, while the UPS is isolated for maintenance or repair.
3. Rectifier: Incoming power shall be filtered and converted to DC by a IGBT-based sine-wave rectifier. The rectifier corrects the input power factor to 0.99 and draws sinusoidal current (with less than 5% THD) from the utility. In the event of utility failure, the DC-DC converter shall be supplied power without interruption from the internal of external batteries.

Overload Capacity: The DC-DC converter shall be capable of supplying up to 150% of rated load for at least five (5) seconds if no bypass is available.

4. Inverter: The inverter converts the DC power to regulated AC power for critical loads.
- a. Output Voltage: 208Y/120-volts, 3-phase, 4-wire
 - b. Voltage Regulation: Voltage Regulation: The inverter steady state voltage regulation is +/- 1% phase to neutral, 2% phase to phase. Dynamic regulation meets Class 1 performance of IEC62040-3.
5. Batteries: The batteries shall be sealed, lead acid, maintenance-free, high-rate discharge cells. They will be kept fully charged by the battery charger and have a three-year float service life @ 25° C.
6. Battery Charger: The battery charger is responsible for charging the battery and maintaining full battery charge when AC is applied to the UPS.
7. Static Bypass: The UPS shall provide an alternate path to the commercial AC or generator source in the event of an overload, load fault or internal UPS failure.
8. User Panel Interface: The UPS shall provide a user-friendly interface panel, which allows the user to: change operating modes, set system parameters, check alarm logs, etc. This LCD display shall be equipped with a backlight.

9. Serial (RS-232) Communication Interface: A 9-pin sub-D connector shall provide capability for communicating with manufacturer-supplied power management software package. The UPS shall also provide signals for indication of UPS general alarms.
10. Rear Mounted Maintenance Bypass Module: Make Before Break Bypass Module can be operated to bypass the UPS for maintenance or service, without interrupting the critical load.
11. SNMP/Web Adaptor: Internal communication card providing network communication via SNMP protocol.
12. Front Panel Display: The UPS shall include a front panel display consisting of a graphical LCD display with backlight, four status LEDs, and a four-key keypad.
 - a. Graphical LCD display: Includes basic language display of unit function and operating parameters. It shall be used to signify the operating state of the UPS, for indicating alarms, for changing operations control parameters and set points.
 - b. Four status LED's, which indicate:
 - (1) Alarms, with a red LED
 - (2) On Battery, with a yellow LED
 - (3) On Bypass, with a yellow LED
 - (4) Power On, with a green LED
 - c. Four-Key Multifunction Keypad: UPS shall have keypad to allow user to adjust UPS parameters, view alarm and inverter logs, change UPS operational modes, and turn the UPS on and off.
13. Power Management Software Package: The UPS shall include serial communications interface that provides the following communication capabilities:
 - a. Monitor and graphically display input and output voltage and other operating characteristic
 - b. Notify end-users in the event of a power anomaly via network, E-mail or page
14. Communication Ports:

- a. (2) Communication Card Slots: The UPS shall provide (2) communication X-slots in the back of the UPS allowing for additional connectivity options, including SNMP/Web, AS/400 relays, Modbus/Jbus capabilities, etc
 - b. Serial communications (via RS-232) with manufacturer-supplied power management software package.
- N. Duct Sealant: Shall not affect physical or electrical properties of wire and cable. Shall meet NEC codes for raceway seals and be UL listed. Shall be capable of holding 15 feet waterhead pressure continuous and block up to 4 psi gas or vapor continuous. Polywater FST, or pre-approved equal.
- O. Enclosed (Individual) Circuit Breakers: Shall consist of molded plastic case circuit breaker with toggle operated mechanism and thermal- magnetic overload trips. Interchangeable trip shall be provided when available. Toggle positions "On" and "Off", engraved or embossed on body. Provide lockable NEMA 1 enclosure for interior locations and NEMA 4X stainless steel (316) enclosure for exterior, damp, wet or corrosive locations.
- P. Manual Motor Starter Switches: Minimum number of poles and ampacity as required to match overcurrent protection device, single throw, UL label AC type, silver alloy contacts, black nylon handle, thermal overloads, horsepower rated, 120/208 volt. Continuous current rating of 16A minimum. Coordinate thermal overload size with the actual equipment provided and re-size the thermal overloads as necessary to avoid nuisance tripping. Enclosed in NEMA 1 enclosure for interior locations and NEMA 4X stainless steel (316) enclosure for exterior, damp, wet, or corrosive locations. Manufacture and install according to NEC Articles 240 and 430. Eaton, Square-D, Cutler Hammer, ABB, Bryant or pre-approved equal.
- Q. Dry Type Transformers: Meets Department of Energy 2016 efficiency requirements kVA and %Z ratings as indicated on Drawings, full capacity copper windings, constant potential, 3-phase and 4-wire unless otherwise indicated in Drawings, class 220 degrees C insulation, 80 degree C temperature rise, average sound level not to exceed 55dB, NEMA ST-20, copper windings, (6) 2.5% full capacity taps, (2) full capacity above normal and (4) full capacity below normal. Impedances and KVA ratings as noted on drawings.
- R. Equipment Disconnect Switches: Heavy duty non-fusible safety switch as indicated, minimum ampacity, poles, and voltage shall match over-current protection device being served from. Horsepower rated when used as motor disconnect. Contacts shall be lever operated, and spring loaded. Enclosed in NEMA 1 enclosure for interior locations and NEMA 4X stainless steel (316) enclosure for exterior, damp, wet, or corrosive locations. Provide provisions for pad locking enclosure door if doors are not bolted closed as with NEMA 4X enclosures. Provide pad lock to secure enclosure door and key all pad locks alike. Manufacture and install according to NEC Article 240 and 430. Siemens, ABB, Eaton, and Square-D or pre-approved equal.

- S. Nameplates: Laminated nameplates shall be provided for each switchboard (section, compartment, and device), panelboard, enclosed circuit breaker, safety disconnect switch, transformers, junction box, and cabinet for identification purposes.
1. Within electrical, inverter, telecommunication, and signal rooms: Laminated plastic shall be 1/8-inch thick Melamine plastic, black with white center core. Letters, numbers, symbols, or pictographs shall be incised a minimum of 1/32-inch into the plastic to expose the white core. Size of nameplate shall be 1-inch by 2-1/2 inches minimum. Lettering shall be minimum 1/4-inch high normal block lettering. Equipment designations shall be as indicated on the Drawings.
 2. Electrical High Voltage Warning Signs: Laminated plastic shall be 1/8-inch thick Melamine plastic, red with white center core. Letters, numbers, symbols, or pictographs shall be incised a minimum of 1/32-inch into the plastic to expose the white core. Warning signs shall be sized to accommodate required wording. Lettering shall be minimum 1/2-inch high normal block lettering. Warning signs shall read as indicated and if not indicated shall read "DANGER HIGH VOLTAGE". Warning signs shall be provided on all electrical room doors, panelboards not located within electrical rooms, free-standing exterior mounted switchboards, and other electrical apparatus not located within spaces with authorized access only.
 3. Electrical Warning Signs for Buildings with Multiple Services: Laminated plastic shall be 1/8-inch thick Melamine plastic, red with white center core. Letters, numbers, symbols, or pictographs shall be incised a minimum of 1/32-inch into the plastic to expose the white core. Warning signs shall be sized to accommodate required wording. Lettering shall be minimum 1/2-inch high normal block lettering. Warning signs shall read as indicated and if not indicated shall read "DANGER BUILDING SERVED BY MULTIPLE SERVICES" and include wording to describe locations of other services. Provide building plan 1/16" scale minimum showing locations of all services and mounted under plexiglass frame or as directed by the authority having jurisdiction. Warning signs and plans shall be provided at each main disconnect location.
 4. Fire alarm, telecom, and signal junction boxes: Laminated plastic shall be 1/8-inch thick Melamine plastic, black with white center core. Letters, numbers, symbols, or pictographs shall be incised a minimum of 1/32-inch into the plastic to expose the white core. Size of nameplate shall be 1-inch by 2-1/2 inches minimum. Lettering shall be minimum 1/4-inch high normal block lettering. Nameplate shall identify system type and include designations as indicated on the Drawings.
 5. Panelboards: Place labels on the front cover above the door.

- 6. Transformers: Identify the name of the transformer, the source of the primary power (switchboard or panelboard name), and the secondary load being fed (panelboard name).
- U. Labels: Thermal transfer or direct thermal labeling; minimum 1/8" high black lettering on white background; self-adhesive backing; sunlight, water and moisture resistant. Kroy or approved equivalent.
- V. Hardware, Supports, Backing, Etc.: All hardware, fasteners, supports, backing and other accessories necessary to install electrical equipment shall be provided. Wood materials shall be "wolmanized" treated against termites, iron or steel materials shall be galvanized for corrosion protection, and non-ferrous materials shall be brass or bronze. Installations in damp, wet, or corrosive locations shall be of stainless steel, 316.

PART 3 - EXECUTION

3.01 GENERAL

- A. Rules and Permit: The entire installation shall be made in strict accordance with the latest rules and regulations of the National Board of Fire Underwriters, the currently adopted edition of the National Electrical Code and the Electrical Branch of the local Building Department. The Contractor shall obtain and pay for the electrical permit as required by local laws and rules. All work shall be inspected by the proper local authorities as it progresses. The Contractor shall pay all inspection fees and shall deliver certificates of completion and inspection to the Owner before final payment will be made. Costs of permits and inspection fees shall be included in the Contractor's bid price.
- B. Construction Methods: Construction shall conform to construction practices as recommended by the American Electricians Handbook by Croft (latest edition), Edison Electric Institute, National Electrical Code, National fire Protection Association, National Electrical Safety Code and applicable instructions of manufacturers of equipment and material supplied for this project.
- C. Materials and Workmanship: All labor and materials of every kind shall be subject to the approval of the Engineer and Owner, who shall be afforded every facility for ascertaining the competence of such labor and examining such materials as they may deem necessary. Concealed work, handholes, and enclosures shall be reopened / opened at random as directed during inspections by the Engineer. Materials shall be new and shall bear the listed label of the Underwriters' Laboratories, Inc. Brand names and catalog numbers used in this specification indicate the standards of design and quality required. Substitution of other brands or catalog numbers shall conform to the requirements in the Bidding Documents. All high voltage work shall be performed by qualified electricians certified to work on high voltage systems.

- D. Record Drawings: The Contractor shall maintain an accurate and adequate record of each change as it occurs, regardless of how ordered.
- E. Drawings and Specification: This specification is intended to cover all labor, materials and standards of workmanship to be employed in the work indicated on the Drawings and called for in the specification or reasonably implied therein. The Drawings and specification supplement one another. Any part of the work mentioned in one and not represented in the other, shall be done the same as if it has been mentioned in both. The Contractor shall not make alterations in the Drawings and specification.
- F. Discrepancies and Interpretations:
1. Should the Contractor find any discrepancies in or omissions from any of the documents or be in doubt as to their meaning, he shall advise the Owner who will issue any necessary clarification within a time period which does not disrupt the progress of the work.
 2. All interpretation and supplemental instructions will be in the form of a written addenda to the Contract Documents.
 3. Should any discrepancy arise from the failure of the Contractor to notify the Owner, the higher quality or larger quantity of item shall prevail. The Owner shall make the final interpretation and judgment.
 4. In the event of a discrepancy between small scale drawings and large scale details, or between the Drawings and specification, on which is in violation of any regulations, ordinances, laws or codes, the discrepancy, if known by the Contractor, shall be immediately brought to the attention of the Owner for a decision before proceeding with the particular work involved. Work carried out disregarding these instructions will be subject to removal and replacement at the Contractor's expense.
- G. Symbols: The standard electrical symbols together with the special symbols, notes and instructions shown on the drawings indicate the work and outlets required and are all to be included as a part of this specification.
- H. Coordination: This specification is accompanied by Drawings which contain floor plans of the buildings, sections and elevations, and site plans indicating locations of all outlets, switch controls, service runs, and other electrical apparatus. These locations are approximate and, before installing, the Contractor shall study the adjacent architectural details and actually make the installation in the most logical manner. Any outlet, equipment, feeder, and circuit may be relocated within ten feet before installation at the direction of the Owner. The circuit routing is typical only and may be varied in any logical manner.

3.02 INSTALLATION

A. Grounding:

1. All services, metallic enclosures, raceways, and electrical equipment shall be grounded according to requirements of NEC Article 250. Ground rods shall be 3/4" x 10' copper clad steel ground rods, and shall be driven with top 12" below finished grade and shall be connected together with bare copper wire buried 12" below finished grade to obtain a ground of 25 ohms or less as measured by three point pot method with an electric ground megger. Connect ground to nearest cold water pipe (located within 10' of entering the building), structural steel, and to building entrance equipment with bare copper. Measure, record, and submit a typewritten report to the Owner for review and approval.
2. All grounding wire runs within building shall be routed together with circuit conductors. Ground and bond per the NEC and local authority having jurisdiction. Final connection to equipment, raceways, grounding type receptacles and other metallic parts directly exposed to ungrounded electric conductors shall be No. 8 AWG minimum, copper, NEC type TW, green insulation. Use approved bonding terminal at panels.
3. Bond and ground all feeder conduits to panelboard enclosures.
4. Provide isolated ground wire from each isolated ground bus, in each panelboard, to the secondary neutral ground of the transformer serving the panelboard.

B. Wiring System:

1. Below grade, within concrete floor slabs or within concrete walls use Schedule 40 PVC. Provide separate ground wire and rise out of ground or concrete slab with PVC and transition to medium walled epoxy resin coated fiberglass conduit within 6" of finished grade. For conduits rising out of walls, transition to EMT and galvanized rigid steel conduit as required below within 6" of emerging from the wall.
2. Above finished ground floor where exposed below 7'- 0" above finished floor use rigid steel conduit; in non-air conditioned locations use rigid steel conduit; exposed on the exterior of the building or beneath the building use rigid steel conduit; where exposed on exterior of the building and exposed to sunlight use regular walled sunlight-resistant epoxy resin coated fiberglass conduit with white finish and threaded fittings. Where exposed to corrosive atmospheres and near shorelines use regular walled sunlight-resistant epoxy resin coated fiberglass conduit. Where exposed to damage use rigid steel conduits or medium walled sunlight-resistant epoxy resin coated fiberglass conduits.

3. Above finished ground floor where concealed in stud walls or above suspended ceilings, and not exposed to damage, use EMT with compression fittings.
4. Where exposed on the roof, in damp, wet, or corrosive locations use sunlight-resistant epoxy resin coated fiberglass.
5. All wiring shall be installed in conduits except as noted.
6. Conduit system shall be continuous from outlet to outlet and fitting to fitting so that electrical continuity is obtained between all conduits of the system.
7. Conduits cut square and inner edges reamed. Butt together evenly within couplings.
8. Make bends and offsets with hickey or conduit-bending machine. Do not use vise or pipe tee. Flattened or crushed conduit not acceptable.
9. Use of running threads not permitted. Where conduits cannot be joined by standard threaded couplings, approved water-tight conduit unions shall be used.
10. Cap conduits during construction with plastic or metal-capped bushings to prevent entrance of dirt and moisture. Swab all conduits and dry before installing wires. Provide removable watertight conduit seals on all conduits entering the building, or pad mounted equipment, where the conduit is connected to manholes, handholes, light poles, or other pad mounted equipment.
11. Pullstrings shall be placed in all empty / spare conduits ten feet in length or longer.
12. Install insulating bushings and two locknuts on each end of every conduit run at enclosures and boxes. Provide grounding bushings as required.
13. Conduits shall not be installed in slabs. Route circuits feeding floor boxes in the ceiling space of the floor below.
14. Conduits passing through floor slabs and fire rated walls and ceilings shall be fire proofed.
15. Provide control conduit and wiring between the building management system and digital multi-function meters and programmable panelboards. Provide control conduit and wiring between all programmable panelboards.
16. Conduit bodies shall not be used on telecom conduits.

C. Conductors:

1. Mechanical means for pulling shall be torque-limiting type and not used for #2 AWG and smaller wires.
2. Pulling tension shall not exceed wire manufacturer's recommendations.
3. Where necessary, powdered soapstone may be used as a lubricant for drawing wires through conduit. No other means of lubricating will be allowed.
4. Form neatly in enclosures for minimum of crossovers. Tag all feeders and label all branch circuits in all enclosures and devices. Identify panel name and branch circuit number.
5. Color code feeder, branch circuit, and grounding conductors. Color for grounding conductors shall be green. Color for neutral conductors shall be white except for where neutrals of more than one branch circuit grouping are installed in the same raceway or enclosure, the other neutral shall be white with a colored stripe (other than green). The color coding for three-phase and single-phase circuits shall be as follows:

208Y/120V, 3-phase, 4-wire:Black (Phase-A)
Red (Phase-B)
Blue (Phase-C)

480Y/277V, 3-phase, 4-wire:Brown (Phase-A)
Orange (Phase-B)
Yellow (Phase-C)

D. Splicing of Wire and Cable:

1. Wires shall be formed neatly in enclosures and boxes.
2. Splices made according to NEC Article 110.
3. Splices shall be reinsulated. Remove all sharp points that can pierce tape. Use Minnesota Mining and Manufacturing Co. "Scotch" #33 tape, or pre-approved equal. Splices in pull boxes shall be water-tight.
4. Below grade splices not allowed for fire alarm circuits.

E. Boxes and Enclosures:

1. Not all boxes are shown on the Drawings. The number of conduit bends between pull points shall not be greater than four quarter bends (360 degrees total) per NEC. For telecommunication conduits the number of conduit bends between pull points shall not be greater than two quarter bends (180 degrees total). Provide additional boxes as necessary.

2. Provide outlet boxes in hollow tiles or concealed in other spaces with extensions or raised rings of such depth that metal will be flush with surrounding surfaces or openings.
 3. Offset boxes, on opposite side of walls, by 6" to minimize noise transmission thru walls.
 4. Boxes installed in 2 and 3 hour fire rated walls shall be fire proofed to maintain the integrity of the fire rated walls.
 5. Boxes to be plumb and exactly flush.
- F. Light Switches: Light switches shall be installed 46" to center above the finished floor and four inches from door casings (six inches from uncased openings) to the center of switch for single gang switches and the same distance to center of switch nearest casing or opening in cases of multi-gang switches unless otherwise indicated. Where more than one switch occurs at one location, they shall be ganged under one plate. Other switches shall be located as shown.
- G. Convenience Outlets: Shall be installed vertically, centers eighteen inches above the finish floor unless otherwise indicated.
- H. Finishing:
1. All cutting that may be required for complete installation of the electrical work shall be carefully performed, and all patching shall be finished in first-class condition by the Contractor.
 2. Close unused knockouts in boxes or enclosures with metal cap that will maintain the rating of the box or enclosure.
 3. Wipe clean all exposed raceways and enclosures with rag and solvent. Unfinished raceways and enclosures shall be primed and painted and finished to blend in with the surface it is mounted on. (Do not cover nameplates.) Factory finished enclosures shall not be painted, touch up where required.
- I. Miscellaneous Details:
1. The drawings indicate connection of electrical loads. After installation, measure the load at each panelboard and re-connect the loads to balance the loads within +/- 10% of each phase. Provide revised typewritten panel directories and update as-built drawings as necessary.
 2. After the final service and feeder connections have been made, check and correct, if necessary, the rotation of all motors. Coordinate the rotation with the contractor responsible for providing the driven equipment.

3. Cut, drill and patch as required to install electrical system. Repair any surface damaged or marred by notching, drilling or any other process necessary for installation of electrical work. Cutting, repairs and refinishing subject to the approval of the Owner. Need for remedial work determined by the Engineer or Owner as attributable to poor coordination and workmanship shall be cause for reconstruction to the satisfaction of the Owner and at no additional cost to the Owner.
4. Attachment of electrical equipment to wood by non-ferrous wood screws. Attachment to concrete by expansion anchors. Powder-charge-driven studs and anchors permitted only with prior approval.
5. Complete all panel circuit directories, using typewriter. Verify "room" and "use" designations before typing.
6. Prime and paint all exposed conduits, hangers, and fasteners.
7. All grounding wire within building run in rigid steel conduit.
8. Furnish necessary test equipment and make all tests necessary to check for unspecified grounding, shorts and wrong connections. Correct faulty conditions, if any.
9. Tag all empty conduits in switchboard, panelboards, cabinets, at backboards, etc. and identify destination.
10. Provide arc flash warning labels on all electrical equipment as required by 2020 NEC Article 110.16 and 2024 NFPA-70E 130.5. The contractor shall obtain all information required for the calculations, perform the calculations, and provide the labels at no additional cost.
11. Provide a power coordination study for the entire building and obtain all information required for the calculations. Adjust all circuit breakers, relays, etc. per the recommendations made in the power coordination study. Label all switchgear, switchboards, motor control centers, and panelboards with the available short circuit current and identify the source of the power (name of the upstream service equipment, switchboard, panelboard, etc.).
12. Anchor all free-standing floor mounted electrical equipment, apparatus, and transformers. Provide additional bracing per the seismic conditions at the site.
13. Provide plastic safety end caps on all c-channel ends. End caps shall be U.V. stabilized where installed exposed to the weather and sunlight.
14. Provide permanent labels on all switchboards, switchgear, motor control centers, and panelboards indicating where the power originates from.

3.03 TESTING AND INSPECTION

HAWAII HEALTH SYSTEMS CORPORATION – KAUAI DIVISION
Samuel Mahelona Memorial Hospital
Behavioral Health New Patient Facility
Project No. 221093-01

Electrical Basic Materials And Methods
16050-18

- A. If the Owner (or its representative) discovers any errors, the Contractor, at his own expense, shall go over all similar portions of the entire job, taking the necessary or directed remedial action.
- B. Installations of feeders to electrical distribution equipment, and large HVAC equipment, including but not limited to panelboards, switchboards, switchgear, motor control centers, and Chillers 600 volts and less shall be tested for insulation resistance after all wiring is completed and ready for connection to fixtures and equipment. Using a 500V megger, measure and record the insulation resistance from phase to phase and phase to neutral. Typewritten records shall be submitted to the Owner for review and approval.
- C. Infrared thermal scans shall be performed on all electrical distribution equipment, and large HVAC equipment, including but not limited to panelboards, switchboards, switchgear, motor control centers, and Chillers. Thermal scans shall be performed on all busses and cable terminations after all wiring has completed and all loads have been energized. Using an infrared thermal graphic camera, measure and record thermal images of each installation to verify there is no evidence of unusual hot spots or overheating. Images shall indicate temperature gradients and temperatures. Typewritten records with color images shall be submitted to the Owner for review and approval.
- D. The Contractor shall provide a temporary load bank(s) and perform a generator load bank test. The generator load bank test shall be performed at 80% power factor for 8 hours with incremental one hour load steps of 50%, 70%, 85%, and 100% for the first four hours and 100% for the remaining 4 hours. The test shall be conducted with all windows and doors in their normally closed positions. The typewritten records shall be submitted to the Owner for review and approval. The contractor shall replenish the fuel supply for the fuel utilized by the test.
- E. The Contractor shall re-tape splices which have been bared for inspection. The Contractor shall test all portions of the electrical system furnished by him for proper operation and freedom from accidental grounds. All tests shall be subject to the approval of the Owner.
- F. Wherever test or inspection reveals faulty equipment or installation, the Contractor shall take corrective action, at his own expense, repairing or replacing equipment or installation as directed.
- G. The Contractor shall de-energize, test (to verify de-energization), open, remove, and replace switchboard and panelboard covers for pre-final and final inspections by the Owner.

END OF SECTION

SECTION 16053 - ARC FLASH HAZARD ANALYSIS AND SHORT
CIRCUIT/COORDINATION STUDY

Part 1 – GENERAL

1.01 SUMMARY

- A. This section includes the specifications for the arc flash hazard analysis and short circuit/coordination study. The work shall include but not necessarily be limited to, the following:
1. The contractor shall gather all information required to conduct the studies.
 2. The contractor shall furnish short-circuit and protective device coordination studies.
 3. The contractor shall furnish an Arc Flash Hazard Analysis Study per the requirements set forth in the current version of NFPA 70E - Standard for Electrical Safety in the Workplace. The arc flash hazard analysis shall be performed according to the IEEE Standard 1584 – 2002, the IEEE Guide for Performing Arc-Flash Calculations.
 4. The scope of the studies shall incorporate equipment and conductors supplied under this contract and existing equipment and conductors, including but not limited to the following:
 - a. New and existing equipment including service equipment, distribution equipment, and safety disconnect switches.
 - b. Existing emergency standby generator system, including existing automatic transfer switch.

1.02 APPLICABLE PUBLICATIONS

- A. The publications listed below and/or listed herein shall form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. Consider the advisory provisions to be mandatory, as though the word “shall” had been substituted for “should” wherever it appears. Equipment, materials, installation, and workmanship shall be in accordance with the mandatory and advisory provisions of NFPA 70, unless more stringent requirements are specified or indicated.
1. Institute of Electrical and Electronics Engineers, Inc. (IEEE):
 - a. IEEE 141 – Recommended Practice for Electric Power Distribution and Coordination of Industrial and Commercial Power Systems.

- b. IEEE 242 – Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems.
 - c. IEEE 399 – Recommended Practice for Industrial and Commercial Power System Analysis.
 - d. IEEE 241 – Recommended Practice for Electric Power Systems in Commercial Buildings.
 - e. IEEE 1015 – Recommended Practice for Applying Low-Voltage Circuit Breakers Used in Industrial and Commercial Power Systems.
 - f. IEEE 1584 -Guide for Performing Arc-Flash Hazard Calculations.
2. American National Standards Institute (ANSI):
- a. ANSI C57.12.00 – Standard General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers.
 - b. ANSI C37.13 – Standard for Low Voltage AC Power Circuit Breakers Used in Enclosures.
 - c. ANSI C37.010 – Standard Application Guide for AC High Voltage Circuit Breakers Rated on a Symmetrical Current Basis.
 - d. ANSI C 37.41 – Standard Design Tests for High Voltage Fuses, Distribution Enclosed Single-Pole Air Switches, Fuse Disconnecting Switches and Accessories.
3. The National Fire Protection Association (NFPA):
- a. NFPA 70 -National Electrical Code, latest edition.
 - b. NFPA 70E – Standard for Electrical Safety in the Workplace.

1.03 SUBMITTALS

- A. Submit a complete arc flash hazard analysis and short circuit/coordination study report, as specified herein.
 - 1. The studies shall be submitted and approved prior to receiving final approval of the new distribution and power equipment shop drawings and/or prior to release of equipment drawings for manufacturing. If formal completion of the study may cause delays in equipment shipments, approval from the Contracting Officer may be obtained for a preliminary submittal of data to ensure that the selection of device ratings and characteristics will be

satisfactory to properly select the distribution and power equipment. The formal study will be provided to verify preliminary findings.

2. The results of the short-circuit, protective device coordination and arc flash hazard analysis studies shall be summarized in a final report.
3. The report shall include the following sections:
 - a. Executive Summary including Introduction, Scope of Work and Results/Recommendations.
 - b. Short-Circuit Methodology Analysis Results and Recommendations.
 - c. Short-Circuit Device Evaluation Table.
 - d. Protective Device Coordination Methodology Analysis Results and Recommendations.
 - e. Protective Device Settings Table.
 - f. Time-Current Coordination Graphs and Recommendations.
 - g. Arc Flash Hazard Methodology Analysis Results and Recommendations including the details of the incident energy and flash protection boundary calculations, along with Arc Flash boundary distances, working distances, Incident Energy levels and Personal Protection Equipment levels.
 - h. Arc Flash Labeling section showing types of labels to be provided. Section will contain descriptive information as well as typical label images.
 - i. One-line system diagram that shall be computer generated and will clearly identify individual equipment buses, bus numbers used in the short-circuit analysis, cable and bus connections between the equipment, calculated maximum short-circuit current at each bus location, device numbers used in the time-current coordination analysis, and other information pertinent to the computer analysis.
4. Submit two (2) bound copies of the final report, with tabbed dividers between each section, and include a CD with an electronic PDF copy of the report with each bound copy.

1.04 QUALIFICATIONS

- A. The short-circuit, protective device coordination and arc flash hazard analysis studies shall be performed by the manufacturer of the distribution and power

equipment or by an electrical testing service that is regularly engaged in power system studies.

1.05 STUDIES

- A. The Contractor shall furnish an Arc Flash Hazard Analysis Study per NFPA 70E - Standard for Electrical Safety in the Workplace, reference Article 130.3 and Annex D. This study shall also include short-circuit and protective device coordination studies.

1.06 DATA

- A. Contractor shall verify, gather, and furnish all data as required for the arc flash and short circuit coordination studies. The Contractor shall expedite collection of the data to assure completion of the studies as required for final approval of the distribution and power equipment shop drawings and/or prior to the release of the equipment for manufacturing.
- B. Source combination may include present and future motors and generators.
- C. Load data utilized may include existing and proposed loads obtained from Contract Documents.
- D. If applicable, include fault contribution of existing motors in the study. The Contractor shall obtain required existing equipment data, if necessary, to satisfy the study requirements.

1.07 SHORT-CIRCUIT ANALYSIS

- A. Transformer design impedances shall be used when test impedances are not available.
- B. Provide the following:
 - 1. Calculation methods and assumptions.
 - 2. Selected base per unit quantities.
 - 3. One-line diagram of the system being evaluated that clearly identifies individual equipment buses, bus numbers used in the short-circuit analysis, cable and bus connections between the equipment, calculated maximum short-circuit current at each bus location and other information pertinent to the computer analysis.
 - 4. The study shall include input circuit data including electric utility system characteristics, source impedance data, conductor lengths, number of conductors per phase, conductor impedance values, insulation types,

transformer impedances and X/R ratios, motor contributions, and other circuit information as related to the short-circuit calculations.

5. Tabulations of calculated quantities including short-circuit currents, X/R ratios, equipment short-circuit interrupting or withstand current ratings and notes regarding adequacy or inadequacy of the equipment rating.
 6. Results, conclusions, and recommendations. A comprehensive discussion section evaluating the adequacy or inadequacy of the equipment must be provided and include recommendations as appropriate for improvements to the system.
- C. For solidly-grounded systems, provide a bolted line-to-ground fault current study for applicable.
- D. Protective Device Evaluation:
1. Evaluate equipment and protective devices and compare to short circuit ratings.
 2. Adequacy of switchboard and panelboard bus bars to withstand short-circuit stresses.
 3. Provide written notification of any circuit protective devices improperly rated for the calculated available fault current.

1.08 PROTECTIVE DEVICE TIME-CURRENT COORDINATION ANALYSIS

- A. Protective device coordination time-current curves (TCC) shall be displayed on log-log scale graphs.
- B. Include on each TCC graph, a complete title with descriptive device names.
- C. Terminate device characteristic curves at a point reflecting maximum symmetrical or asymmetrical fault current to which the device is exposed.
- D. Identify the device associated with each curve by manufacturer type, function, and, if applicable, tap, time delay, and instantaneous settings recommended.
- E. Plot the following characteristics on the TCC graphs, where applicable:
 1. Low voltage equipment circuit breaker trip devices, including manufacturer's tolerance bands.
 2. Ground fault protective devices, as applicable.

3. Pertinent motor starting characteristics and motor damage points, where applicable.
 4. Pertinent generator short-circuit decrement curve and generator damage point.
 5. The largest feeder circuit breaker in each switchboard and applicable panelboard.
- F. Provide adequate time margins between device characteristics such that selective operation is provided, while providing proper protection.
- G. Provide the following:
1. A One-line diagram shall be provided which clearly identifies individual equipment buses, bus numbers, device identification numbers and the maximum available short-circuit current at each bus when known.
 2. A sufficient number of log-log plots shall be provided to indicate the degree of system protection and coordination by displaying the time-current characteristics of series connected overcurrent devices and other pertinent system parameters.
 3. Computer printouts shall accompany the log-log plots and will contain descriptions for each of the devices shown, settings of the adjustable devices, and device identification numbers to aid in locating the devices on the log-log plots and the system one-line diagram.
 4. The study shall include a separate, tabular printout containing the recommended settings of all adjustable overcurrent protective devices, the equipment designation where the device is located, and the device number corresponding to the device on the system one-line diagram.
 5. A discussion section which evaluates the degree of system protection and service continuity with overcurrent devices, along with recommendations as required for addressing system protection or device coordination deficiencies.
 6. Provide written notification of any significant deficiencies in protection and/or coordination. Provide recommendations for improvements.

1.09 ARC FLASH HAZARD ANALYSIS

- A. The arc flash hazard analysis shall be performed according to the IEEE 1584 equations that are presented in NFPA70E-2009, Annex D. The arc flash hazard analysis shall be performed in conjunction with the short-circuit analysis (Section 2.03) and the protective device time-current coordination analysis (Section 2.04).

- B. The flash protection boundary and the incident energy shall be calculated at significant locations in the electrical distribution system (switchboards, switchgear, motor-control centers, panelboards, busway and splitters) where work could be performed on energized parts.
- C. Working distances shall be based on IEEE 1584. The calculated arc flash protection boundary shall be determined using those working distances.
- D. When appropriate, the short circuit calculations and the clearing times of the phase overcurrent devices will be retrieved from the short-circuit and coordination study model. Ground overcurrent relays should not be taken into consideration when determining the clearing time when performing incident energy calculations.
- E. The short-circuit calculations and the corresponding incident energy calculations for multiple system scenarios must be compared and the greatest incident energy must be uniquely reported for each equipment location in a single table. Calculations must be performed to represent the maximum and minimum contributions of fault current magnitude for normal and emergency operating conditions. The minimum calculation will assume that the utility contribution is at a minimum. Conversely, the maximum calculation will assume a maximum contribution from the utility. Calculations shall take into consideration the parallel operation of synchronous generators with the electric utility, where applicable as well as any stand-by generator applications.

The Arc-Flash Hazard Analysis shall be performed utilizing mutually agreed upon facility operational conditions, and the final report shall describe, when applicable, how these conditions differ from worst-case bolted fault conditions.

- F. The incident energy calculations must consider the accumulation of energy over time when performing arc flash calculations on buses with multiple sources. Iterative calculations must take into account the changing current contributions, as the sources are interrupted or decremented with time. Fault contribution from motors should be decremented as follows:

Fault contribution from induction motors should not be considered beyond 5 cycles.

- G. For each piece of ANSI rated equipment with an enclosed main device, two calculations shall be made. A calculation shall be made for the main cubicle, sides, or rear; and shall be based on a device located upstream of the equipment to clear the arcing fault. A second calculation shall be made for the front cubicles and shall be based on the equipment's main device to clear the arcing fault. For all other non-ANSI rated equipment, only one calculation shall be required and it shall be based on a device located upstream of the equipment to clear the arcing fault.

- H. When performing incident energy calculations on the line side of a main breaker (as required per above), the line side and load side contributions must be included in the fault calculation.
- I. Mis-coordination should be checked amongst all devices within the branch containing the immediate protective device upstream of the calculation location and the calculation should utilize the fastest device to compute the incident energy for the corresponding location.
- J. Arc Flash calculations shall be based on actual overcurrent protective device clearing time. A maximum clearing time of 2 seconds will be used based on IEEE 1584-2002 section B.1.2. Where it is not physically possible to move outside of the flash protection boundary in less than 2 seconds during an arc flash event, a maximum clearing time based on the specific location shall be utilized.
- K. Provide the following:
 - 1. Results of the Arc-Flash Hazard Analysis shall be submitted in tabular form, and shall include device or bus name, bolted fault and arcing fault current levels, flash protection boundary distances, working distances, personal-protective equipment classes and AFIE (Arc Flash Incident Energy) levels.
 - 2. The Arc-Flash Hazard Analysis shall report incident energy values based on recommended device settings for equipment within the scope of the study.
 - 3. The Arc-Flash Hazard Analysis may include recommendations to reduce AFIE levels and enhance worker safety.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.01 FIELD ADJUSTMENT

- A. Contractor shall adjust relay and protective device settings according to the recommended settings table provided by the coordination study.
- B. Contractor shall make minor modifications to equipment as required to accomplish conformance with short circuit and protective device coordination studies.
- C. Provide written notification of any required major equipment modifications.

3.02 ARC FLASH LABELS

- A. Provide a 4.0 in. x 4.0 in. Brady thermal transfer type label of high adhesion polyester for each work location analyzed.
- B. The labels shall be designed according to the following standards:
 - 1. UL969 – Standard for Marking and Labeling Systems.
 - 2. ANSI Z535.4 – Product Safety Signs and Labels.
 - 3. NFPA 70 (National Electric Code) – Article 110.16.
 - 4. NFPA 70E – Section 130.
- C. The label shall include the following information:
 - 1. Nominal System Voltage.
 - 2. Flash protection boundary.
 - 3. Personal Protective Equipment category.
 - 4. Limited, restricted, and prohibited Approach Boundaries.
 - 5. Study report number and issue date.
- D. Labels shall be printed by a thermal transfer type printer, with no field markings.
- E. Arc flash labels shall be provided for equipment as identified in the study and the respective equipment access areas per the following:
 - 1. Floor Standing Equipment - Labels shall be provided on the front of each individual section. Equipment requiring rear and/or side access shall have labels provided on each individual section access area. Equipment line-ups containing sections with multiple PPE categories and flash protection boundaries shall be labeled as identified in the Arc Flash Analysis table.
 - 2. Wall Mounted Equipment – Labels shall be provided on the front cover or a nearby adjacent surface, depending upon equipment configuration.
 - 3. General Use Safety labels shall be installed on equipment in coordination with the Arc Flash labels. The General Use Safety labels shall warn of general electrical hazards associated with shock, arc flash, and explosions, and instruct workers to turn off power prior to work.

END OF SECTION

SECTION 16301 - UNDERGROUND ELECTRICAL WORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. In general, provide complete electrical system within project boundaries. The Contractor shall furnish all labor, materials (except as hereinafter noted), tools, equipment and appliances required to provide and install all Exterior Electrical Work, complete, as indicated on the drawings and/or as herein specified. The drawings note various sizes of equipment as determined for basis of design; the electrical work, however, shall be installed to comply with the equipment furnished by the successful supplier.
- B. Related Sections:
 - 1. Section 16050 – BASIC MATERIALS AND METHODS
 - 2. Section 16500 – LIGHTING
 - 3. Section 16700 – TELECOMMUNICATIONS
 - 4. Section 16721 – FIRE ALARM SYSTEM

1.03 SYSTEM DESCRIPTION - DESIGN INTENT

The work shall include but not necessarily be limited to, the following:

- 1. Complete exterior secondary electrical and telecommunications utility systems including trenches, ducts, conductors, cables and enclosures.
- 2. Complete secondary electric, lighting, telecommunications, and fire alarm system including trenches, ducts, conductors, and enclosures.
- 3. Connection and testing of equipment furnished by others requiring electrical connections. Pass test mandrel through all new ducts and conduits, and make corrections as directed by inspectors and the Engineer.
- 4. Pass test mandrel through all new ducts and conduits, and make corrections as directed by inspectors and the Engineer.
- 5. Provide pulling wire, No. 12 AWG galvanized steel or polypropylene cord, in all empty ducts and conduits, unless indicated otherwise.

6. Arrange with utility companies for periodic inspections, acceptance tests, etc. and pay for services and all other work by them pertaining to this contract, except that all nonrecurring service charges shall be paid for by the Owner.
7. Obtain and pay for electrical permits, arrange for periodic inspections by local authorities and the Owner, and deliver certificate of final inspection to the Owner.
8. Contractor shall check and test the installation for completeness and functional operation as described by the drawings and specified herein. Final test shall be in the presence of the Engineer, Owner and representatives of the utility companies. Contractor shall arrange and pay for all testing costs. Should intermediate or final inspections of the duct system reveal crushed, damaged or impassable ducts, the Contractor shall repair those sections of duct system, including repairs to paved surfaces and concrete structures, at no additional cost to the Owner.
9. Immediately report and pay for damages to existing equipment.
10. Contractor shall coordinate his work with utilities and other trades to avoid omissions and overlapping responsibilities. Electrical contractor shall notify other trades and suppliers of project voltages and of existing equipment when new work must be compatible with existing conditions.

1.04 SITE VISITATION

- A. Visit project site, carefully review each section of the Specification and all Drawings of this Contract, and obtain and review the standards, drawings and specifications of the local utility companies. By submitting a proposal of the work included in this contract, the Contractor shall be deemed to have made such examination and to be familiar with and accept all conditions of the job site.
- B. Report any error, conflicts or omissions to the Owner at least one week before submission of bids for interpretation or clarification. If errors or omissions are not reported, Contractor shall provide necessary work at no cost to the Owner to properly complete intent of Specification and Drawings.
- C. Should any discrepancy arise from the failure of the Contractor to notify the Engineer, the higher quality or larger quantity of item shall prevail. The Owner shall make the final interpretation and judgment.

1.05 COORDINATION

During pricing and construction, Contractor shall coordinate his work with utilities and other trades to avoid omissions and overlapping of responsibilities. The Contractor shall include all utility fees/charges in his cost.

1.06 SPECIAL CONDITIONS

- A. Electrical outages (including power and communications) shall be scheduled at the Owner's convenience. Contractor shall obtain the Owner's acceptance for all electrical outages a minimum of 3 weeks prior to work.
- B. The Contractor shall employ flagmen, as necessary, to direct traffic while work is in progress.
- C. Equipment utilizing electricity shall be provided by respective sections of Specification. Furnishing of equipment controllers (motor starters, etc.), unless otherwise specified, and providing complete control and interlock is provided by respective section supplying equipment. Installation of complete feeder or branch circuit system, and power wiring to equipment and controllers shall be part of Electrical Work.
- D. The existing underground electric/communication lines are in-use and must remain in operation during the construction until the new permanent facilities are completed and energized. The Contractor shall schedule the work accordingly and allow the utility companies 24-hour access to their equipment. Costs for any temporary systems or relocations arising during construction shall be borne by the Contractor. Work by the Contractor in areas with energized electrical equipment or conductors shall be performed with extreme caution to prevent accidents and to avoid disturbing or damaging this equipment or conductors or any temporary supports or protective guards that are constructed. The Contractor shall have the sole responsibility for maintaining safe and efficient working conditions and procedures in these areas.

1.07 CODES, REGULATIONS AND STANDARD SPECIFICATIONS

- A. Work shall conform to ordinances of the County of Kauai; latest edition of National Electrical Code; National Electrical Safety Code (NESC); General Order No. 10, Public Utilities Commission, State of Hawaii.
- B. References: Construction shall conform to construction practices as recommended by:

National Electrical Code (NEC)
The American Electricians Handbook by Croft (latest edition)
Edison Electric Institute
General Orders, State of Hawaii (GEO)
National Electrical Safety Code (NESC)
American National Standards Institute (ANSI)
National Board of Fire Underwriters (NBFU)
National Electrical Manufacturer's Association (NEMA)
National Fire Protection Association (NFPA)
Underwriters' Laboratories, Inc. (UL)

Applicable instructions of manufacturers of equipment and material supplied for this project.

1.08 PLANS AND SPECIFICATIONS

HAWAII HEALTH SYSTEMS CORPORATION – KAUAI DIVISION
Samuel Mahelona Memorial Hospital
Behavioral Health New Patient Facility
Project No. 221093-01

Underground Electrical Work
16301-3

- A. This specification is intended to cover all labor, materials and standards of workmanship to be employed in the work indicated on the plans and called for in the specification or reasonably implied therein. The plans and specification supplement one another. Any part of the work mentioned in one and not represented in the other, shall be done the same as if it has been mentioned in both. Specification and Drawings are intended to specify nature, quantity and quality of electrical work. The Contractor shall not make alterations in the drawings and specification.
- B. Specification and Drawings: Specification and Drawings are prepared in abbreviated form and includes incomplete sentences. Omission of words or phrases such as "the Contractor shall", "as shown on the drawings", "a", and "the" are intentional. Omitted words and phrases shall be provided by inference to form complete sentences.
- C. Discrepancies and Interpretations:
1. Should the Contractor find any discrepancies in or omissions from any of the documents or be in doubt as to their meaning, he shall advise the Engineer who will issue any necessary clarification within a time period which does not disrupt the progress of the work.
 2. All interpretation and supplemental instructions will be in the form of a written addenda to the Contract Documents.
 3. Should any discrepancy arise from the failure of the Contractor to notify the Engineer, the higher quality or larger quantity of item shall prevail. The Owner shall make the final interpretation and judgement.
 4. In the event of a discrepancy between small scale drawings and large scale details, or between drawings and specification, on which is in violation of any regulations, ordinances, laws or codes, the discrepancy, if known by the Contractor, shall be immediately brought to the attention of the Engineer for a decision before proceeding with the particular work involved. Work carried out disregarding these instructions will be subject to removal and replacement at the Contractor's expense.
- D. Symbols: The standard electrical symbols together with the special symbols, notes and instructions shown on the drawings indicate the work and outlets required and are all to be included as a part of this specification.
- E. Record Drawings: Work shall be in accordance with the drawings and specification. Exceptions, changes and deviations from the work intended may be made only with the acceptance of the Owner. Submissions for acceptance shall consist of drawings, written explanation and reason for request; six copies. The Contractor shall maintain an accurate and adequate record of each change as it occurs, regardless of how ordered. Changes and additions shall be recorded daily on copy of contract specification and drawings, which shall be maintained at job site. Within two weeks of acceptance of work by the Owner,

Contractor shall transfer changes and additions from job site drawings to a fresh set of prints, and submit them to the Owner.

1.09 SUBMITTALS

- A. Shop Drawings: Submit complete shop drawings and manufacturer's literature for the Engineer's review before any work is fabricated. Comply with all requirements of the Section 01330 – SUBMITTAL PROCEDURES. Submit six sets of manufacturer's literature for the following:

1. Precast Concrete Manholes/Handholes/Pullboxes.
2. Butterfly Diagrams for Existing and New Manholes/Handholes.
3. Wiring Devices.
4. Conductors and Cables.

- B. Brand names, manufacturer's names and catalog numbers indicate standard of design and quality required. Substitute materials may be used if qualified by written permission from the Owner.

Submission shall be as follows:

EXAMPLE:

<u>Item</u>	<u>Manufacturer and Catalog Number Specified</u>	<u>Substitute Manufacturer and Catalog Number</u>
Cable	John Doe - No. 3200	King - No. 2200

- C. Qualifying data to include catalog cuts, shop drawings and/or specifications to show equality with material specified herein.

Shop Drawing and catalog cuts for substitute materials shall clearly specify compliance with and/or deviation from specified material. Certification shall not contain statements to imply that the item does not meet requirements specified, such as "as good as"; and "achieve the same end use and results as materials formulated in accordance with the referenced publications". Certifications shall simply state that the item conforms to the requirements specified. Certificates shall be printed on the manufacturer's letterhead and shall be signed by the manufacturer's official authorized to sign certificates of compliance. Review of shop drawings and catalog cuts shall not release the Contractor from complying with intent of specifications and drawings.

- D. Intent of Shop Drawing and Catalog Cut Review:

1. Shop Drawing and Catalog Cut submittals processed by the Engineer are not Change Orders. The purpose of the submittals by the Contractor is to demonstrate to the Engineer that he understands the design concept, that he demonstrates his understanding by indicating which equipment and material

he intends to furnish and install and by detailing the fabrication and installation methods he intends to use.

2. If deviations, discrepancies or conflicts between Shop Drawings and Specifications are discovered either prior to or after Shop Drawing submittals are processed by the Engineer, the design Drawings and Specifications shall control and shall be followed.
3. The fact that a manufacturer does not offer a specific option or meet a minimum guaranteed performance specification, called for herein or in a formal bid specification, is not deemed proprietary when such is available from one or more manufacturers.
4. Shop Drawing Acceptance: Acceptance rendered on shop drawings shall not be considered as a guarantee of measurements or site conditions. Where drawings are accepted, said acceptance does not relieve the Contractor from his responsibility for furnishing materials or performing work as required by Contract Drawings and Specifications.

1.10 INSPECTION

Skill and competency of workmanship shall be subject to the acceptance of the Engineer, inspectors of the utilities and the County of Kauai. Notification for inspection shall be given the respective companies or agencies three working days in advance of work.

1.11 GUARANTEE AND CERTIFICATE

Any item of material, apparatus, equipment furnished and installed, or constructed by the Contractor showing defects in design, construction, quality or workmanship within one year from the date of final acceptance by the Owner shall be replaced by such new material, apparatus or parts as may be found necessary to make such defective portion of the complete system conform to the true intent and meaning of the specification and/or the drawings. Such repairs or replacement shall be made by the Contractor, at no cost to the Owner.

PART 2 - PRODUCTS

2.01 GENERAL

- A. As specified in Section 16050 – BASIC MATERIALS AND METHODS.
- B. All materials shall be new, and shall bear the label of Underwriters' Laboratories whenever standards have been established and label service is normally and regularly furnished by the agency.
- C. Contractor shall afford every opportunity for the Engineer to ascertain skill and competency of labor. Concealed work shall be reopened at random as directed during formal inspections by the Engineer, County of Kauai Inspector or Utility Company Inspector.

2.02 MATERIALS

- A. As specified in Section 16050 – BASIC MATERIALS AND METHODS.
- B. Raceways:
 - 1. Concrete Encased Ducts: Ducts for electric systems shall be round bore, PVC (polyvinyl chloride) Schedule 40 plastic or equal acceptable to the Engineer.
 - 2. Direct Buried Ducts:
 - a. Direct Buried Under Sidewalk or Protective Concrete Topping: Ducts for electric systems shall be round bore, PVC (polyvinyl chloride) Schedule 40 plastic or equal acceptable to the Engineer.
 - b. Direct Buried Under Road Pavement or in Grassed Areas: Ducts for electric systems shall be round bore, PVC (polyvinyl chloride) Schedule 80 plastic or equal acceptable to the Engineer.
 - 3. Metal Raceways (for above ground use):
 - a. Conduits: Hot dip galvanized, rigid steel, round bore electrical conduit and for use with threaded fittings. $\frac{3}{4}$ " minimum diameter unless otherwise specified on the drawings. Aluminum conduits shall not be used.
 - b. Flexible Conduit: Liquid-tight flexible steel, zinc-coated, jacketed with high density polyethylene and with factory approved fittings. Liquid-tight with factory fittings for wet or moist areas.
 - 4. Conduit and Duct Accessories: Couplings, spacers, bonding agents, plugs, and accessories shall be as recommended by the manufacturer of conduits and ducts.
- C. Concrete: Concrete for ductline jackets shall be 3,000 psi minimum compressive strength in 28 days with aggregates of #3 fine size, provided in accordance with the "Concrete Section".
- D. Backfill Material:
 - 1. Backfill Material, Type "A": Backfill material shall be non-expansive and shall consist of earth and gravel mix with gravel content consisting of 1-inch diameter maximum and not exceeding fifty percent (50%) by volume of the mix. This fill shall be used over concrete encased and direct buried ducts after backfill Type B has been placed.

2. Backfill Material, Type "B": Backfill material shall be non-expansive and shall consist of earth and gravel mix with gravel content consisting of 1/2-inch diameter maximum and not exceeding twenty percent (20%) by volume of the mix. This fill shall be used all around direct buried ducts.
 3. Any existing underground piping or conduit that is encountered shall be properly shored and protected from damage. Any damage to existing utilities resulting from the Contractor's operations shall be repaired by him at his own expense.
- E. Caulking Compound: Compound for the sealing of conduits, ducts, pipes, and sleeves shall conform with Fed. Spec. SS-S-210 and shall be of a putty-like consistency workable with the hands at temperatures as low as 35 degrees F., shall not slump at a temperature of 300 degrees F., and shall not harden materially when exposed to air. The compound shall readily calk or adhere to clean surfaces of the following: asbestos-cement conduit; vitrified clay tile; fiber conduit; fire-clay cement conduit; plastic conduit; concrete; masonry; lead; rubber; polyethylene polychloroprene; or polyvinyl-chloride sheaths of cables; and the common metals. The compound shall form a seal with the foregoing without dissolving, noticeably changing characteristics, or removing any of the ingredients. The compound shall have no injurious effect upon the hands of workmen or upon the materials.
- F. Ground Rods: UL 467. Diameter shall be adequate to permit driving to full length of the rod, but not less than " in diameter unless otherwise indicated. Ground rods shall be 5/8" x 8'-0" copper-cladded steel core unless otherwise indicated.
- G. Wire Mesh: Welded steel wire fabric for reinforcing concrete, galvanized, conforming to ASTM Specification A-185.
- H. Low Voltage Wires and Cables (below 600 volts): Shall be copper unless indicated otherwise. Insulated conductors shall bear the date of manufacture imprinted on the wire insulation with other identification. Wire and cable manufactured more than six months before delivery to the job site shall not be use.
1. Wires and Cables: Shall be copper unless indicated otherwise. Insulated conductors shall bear the date of manufacture imprinted on the wire insulation with other identification. Wire and cable manufactured more than six months before delivery to the job site shall not be use. Wires and cables shall be copper, single conductors, No. 12 AWG minimum. No. 10 AWG and smaller, solid and round; No. 8 AWG and larger, 7 or 19 strands concentric. Insulation type shall be RHW-USE or type THW with neoprene jacket. Ground wire may be type TW. Remote-control and signal circuits shall be type TW, THW or TF.
 2. Bare copper wire for grounding, bonding and other uses when not specified otherwise shall conform to Fed. Spec. QQ-W-343.
 3. Control cables for remote control of power equipment shall be multi-

conductor type having a rating of not less than 600 volts, and shall conform to IPCEA publication No. S-19-81, or S-61-402 or S-66-524. Wires shall be stranded copper conductors.

- I. Identification Tags: Each set of cables in pullboxes, handholes and manholes shall be identified by a noncorrosive metal tag. Letters shall be minimum ¼- inch high identifying the cable as to use and/or voltage. Tags shall be wrapped around the cables and taped. Tags for power cables shall be red.
- J. Low Voltage Connectors and Terminals: Shall be designed and approved for use with the associated conductor material, and shall provide a uniform compression over the entire contact surface. Solderless terminal lugs shall be used on all stranded conductors. Crimp type connectors will be acceptable, however, the type which makes only one indentation will not be acceptable. The crimping tool shall make a minimum of four indentations around the circumference of the cable. In addition, crimp type connectors to be used on 250 MCM and larger conductors shall have adequate length for two sets of indentations on each half of the connector.
- K. Waterproof Connection Kits: Shall be quick disconnect in-line fuse holder (6 ampere fuse link unless indicated otherwise) fused for hot leg. The fuse holder body shall be molded plastic made in two sections where lead side section shall have a captive nut and waterproofing ring. Fuse holder shall be TRON and manufactured by BUSSMANN, or equal acceptable to the Engineer.
- L. Boxes and Cabinets:
 - 1. Outlet and Small Junction Boxes: Boxes shall be cast iron or aluminum, prime painted, enamel finished, threaded hubs for conduit connection. Nominal size shall be 4" square x 1-½" deep minimum or as specified on drawings.
 - 2. Large Junction Boxes: Boxes shall be galvanized cast iron with matching gasketed cover and threaded hubs for conduit connection or NEMA 4X type 316 stainless steel. Screws shall be stainless steel.
 - 3. Enclosures and Cabinets: Enclosures and cabinets for panelboards, breakers, and switches shall be NEMA type, fabricated from stainless steel or as indicated, prime painted and enamel finished according to NEMA specifications.
- M. Device and Cover Plates: Plates for exposed and weather exposed boxes (indicated WP on drawings) shall be cast metal with neoprene gasket for sealing against entry of water and moisture into box.
- N. Weatherproof Ground-Fault Circuit Interrupter (GFCI) Duplex Receptacle: Duplex receptacle, for mounting in a standard outlet box, 20 ampere, 125-volt, 3 wires, grounding type with test and reset buttons mounted on the device face. Device shall be capable of detecting a current leakage of 6 milliamperes or greater and tripping per requirements of UL-943 for Class A GFCI devices. Receptacles shall be UL rated for 20 amperes feed through, suitable for use as

GFCI protection on a 20 ampere circuit. Pass & Seymour 2091-HG series or equal acceptable to the Engineer. Includes cast metal outlet box, cast metal device plate with hinged self-closing lid. UL approved for "wet locations". Bryant Electric Co., Hubbell, Arrow Hart, General Electric, and Pass & Seymour equals.

- O. Nameplates: Laminated nameplates shall be provided for each switchboard, switchboard circuit breaker, panelboard, and cabinet for identification purposes. Laminated plastic shall be 1/8-inch thick Melamine plastic, black with white center core. Size of nameplate shall be 1-inch by 2-½ inches minimum. Lettering shall be minimum ¼-inch high normal block lettering. Equipment designations shall be as indicated on drawings.
- P. Hardware, Supports, Backings, etc.: All hardware, supports, backings, and other equipment shall be provided. Wood materials shall be "wolmanize" treated against termite; iron or steel materials shall be galvanized for corrosion protection and nonferrous materials shall be brass or bronze.
- Q. Fireproofing Tape: Fireproofing tape shall be approximately 30 mils thick by 3 inches wide and shall consist of a flexible, unsupported elastomer that expands in fire to provide a thick char buildup between the flame and the cable. Tape shall be noncorrosive to cable sheath. Tape shall not give off a smoke when subjected to flame or support combustion. Tape shall not deteriorate when subjected to oil, water, gases, salt water, sewage, and fungus.

Tape shall conform to UL 510. Plastic insulating tape shall be capable of performing in a continuous temperature environment of 80 degrees C.

PART 3 - EXECUTION

3.01 GENERAL

- A. Rules and Permit: The entire installation shall be made in strict accordance with the latest rules and regulations of the National Board of Fire Underwriters, the currently adopted edition of the National Electrical Code, National Electrical Safety Code and the local Electrical Bureau. The Contractor shall pay all utility fees/charges and obtain and pay for the electrical permit as required by local laws and rules. All work shall be inspected by the proper local authorities and utilities as it progresses. The Contractor shall pay all inspection fees and shall deliver certificates of completion and inspection to the Owner before final payment will be made. Costs of permits and inspection fees shall be included in the Contractor's bid price.
- B. Materials and Workmanship: All labor and materials of every kind shall be subject to the acceptance of the Owner, who shall be afforded every facility for ascertaining the competence of such labor and examining such materials as he may deem necessary. Concealed work shall be reopened at random as directed during formal inspections by the Engineer, County of Kauai Inspector or Utility Inspector.
- C. Qualification of Installers: For actual fabrication, installation and testing of the work of this Section, use only thoroughly trained and experienced workmen who

are completely familiar with items required and with manufacturers' recommended methods of installation. In acceptance or rejection of installed work no allowance will be made for lack of skill on part of workmen.

- D. Before installation, verify all dimensions, conditions and sizes of equipment at job site. Installation shall be complete in every detail as specified and ready for use.

3.02 INSPECTION

Inspect work of previous trades and verify work as acceptable to receive work as specified herein.

3.03 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the acceptance of the Owner and at no additional cost to the Owner.

3.04 CONSTRUCTION METHODS

- A. Construction shall conform to construction practices as recommended by the American Electricians Handbook by Croft (latest edition); Edison Electrical Institute; National Electric Safety Code; General Order No. 10, Public Utilities Commission, State of Hawaii; and applicable instructions of manufacturers of equipment and material supplied for this project.
- B. Electrical Outages: The Contractor shall schedule his work to minimize electrical outages. All electrical outages including, but not limited to, power and telephone systems shall be scheduled with and accepted by the Owner a minimum of three weeks prior to scheduled occurrence. Electrical outages shall be granted at the convenience of the Owner and the Contractor is encouraged to schedule such outages after normal business hours and on weekends.
- C. Existing Underground Utilities: Underground utilities indicated on plans are approximate in location. It is not the intention of plans to imply that all existing utilities are drawn and located. It shall be the responsibility of Contractor to coordinate locations of existing utilities prior to doing any excavation work. Any damage to existing utilities shall be promptly repaired by Contractor at no cost to the Owner. In any event, the Contractor shall immediately notify the Owner of any such damage.

Prior to penetration of existing and new manholes or handholes, the Contractor shall coordinate proposed penetration locations with the Engineer. Provide butterfly diagrams of proposed penetration locations complete with wall dimensions and conduit location dimensions for acceptance by the Engineer.

D. Trench Excavation:

1. Dimensions and locations of trenches for ductlines shall be as indicated on drawings. Trench width and depths shall be sufficient to accommodate proper installation of conduit banks.
2. Should material at bottom of trench for direct buried conduits not be equal to backfill material Type "B", the trench shall be excavated an additional 3" to permit backfilling with Type "B" backfill.
3. Where a trench is excavated on slope, sides are to be vertical, and depth measured at lowest side. All measurements are to be based on final grades.
4. Bottom of trenches to be flat and smooth.
5. Sheathing and bracing as required shall be provided to support sides of excavations from cave-ins.
6. Provide drainage and pumps to keep trenches dry.
7. Saw cut all edges of existing sidewalks and pavement before trenching.
8. Excavated material may be placed alongside trench; however, it shall not interfere with vehicular or pedestrian traffic.
9. Cover all trenches with suitable bridging material; trenches shall not be left uncovered overnight or over the weekend.

E. Backfill:

1. Duct installations shall be accepted by the Engineer prior to backfilling.
2. Should material below direct buried conduits not be equal to 3" (thickness) of backfill material Type "B", trench shall be deepened by 3", and backfilled with Type "B" backfill.
3. Backfilling shall be to finished grades indicated on accompanying drawings, and matching existing conditions.
4. Backfill material shall be completely free of wood or other debris.
5. Backfill material shall be placed in maximum of 8" layers in loose thickness before compacting. Backfill shall be thoroughly compacted with hand or mechanical tampers to 95% of ASTM D1557 maximum dry density. In no case shall tamping be accomplished by using the wheels or tracks of a vehicle.
6. Backfill over conduit bends at transformer pads shall be Type A or better.
7. Backfill over direct buried conduits shall be 8" thickness of backfill Type "B".

8. Backfill over concrete encased ducts and balance of fill over backfill Type "B" (over direct buried conduits) shall be backfill Type "A".
9. At road crossings, backfill shall be 8" thickness of backfill Type "B" and remaining backfill may be normal road base course.

F. Installation of Conduit and Duct Bank:

1. Bottom of trench shall be clean, smooth, well-graded.
2. Saw cut, ream and taper ducts and conduits with manufacturers' approved tool.
3. Couplings and bells shall be tight to prevent entry of dirt or concrete into ducts and conduits.
4. Apply thin coat of sealing compound on ducts and conduits at couplings and bells.
5. Stagger the joints of the conduits by rows and layers so as to provide a ductline having the maximum strength.
6. Provide spacers to maintain proper separation between ducts.
7. Except at conduit risers, changes in direction of runs exceeding a total of ten degrees, either vertical or horizontal, shall be accomplished by long sweep bends having a minimum radius of curvature of 25 feet, unless indicated otherwise. Sweep bends may be made up of one or more curved or straight sections or combinations thereof.
8. Duct lines shall have a continuous slope downward toward manholes and away from building(s) with a pitch of not less than three inches in 100 feet.
9. Ducts shall be clean and free from debris and rubbish.
10. After each day's work, provide temporary conduit plugs at the end of conduit banks to prevent entry of dirt, rubbish, debris, or concrete.
11. Mandrel Test: Pass a test mandrel conforming to the utility company or the Engineer's requirements, through the entire length of each duct or conduit to test for burrs and obstructions. Unless indicated otherwise, mandrel shall be 14" long and shall have diameter of $\frac{1}{2}$ " less than inside diameter of duct. If burrs or obstructions are encountered, that section shall be replaced at no additional cost to the Owner.
12. Unless indicated otherwise, install #12 AWG galvanized iron pulling wire or polypropylene cord in each conduit after testing.
13. Ducts Ending in Manholes, Handholes and Pullboxes: Shall be terminated with conduit end bells. End bells, terminators or ducts shall be flush to inside wall surfaces; duct extension into boxes is not acceptable.

14. Conduits Stubbed for Future Connections: Shall be plugged and marked with concrete marker.
15. Securely anchor duct banks prior to pouring concrete encasement to prevent ducts from floating.
16. When pouring concrete, prevent heavy masses of concrete from falling directly on ducts. If unavoidable, protect ducts with plank.
17. Direct flow of concrete down sides of duct bank to bottom, allowing concrete to rise between ducts, filling all open spaces uniformly.
18. To insure against voids in concrete, work a long, flat splicing bar or spatula liberally and carefully up and down the vertical rows of ducts. Mechanical vibrators shall be used for stacked duct banks of three ducts or higher.
19. Cure concrete for a minimum of 72 hours before permitting traffic and/or backfilling.
20. Warning Tapes: Provide warning tapes about twelve inches below the top of the trench in the backfill. For electric ducts, provide a 6-inch wide warning tape, red in color with a black imprinted message "CAUTION -- ELECTRIC LINE BURIED BELOW, placed 12" below finish grade over electric ducts or the concrete jacket for electric ducts for the entire length of ductline installation. Warning tape shall be constructed with a metallic core sandwiched between the printed polyethylene tape above and a clear polyethylene tape below.
21. Ducts Entering Existing Manholes, Handholes and Pullboxes: The Contractor shall exercise due care in constructing the new duct openings into the existing manholes/handholes. Existing reinforcing steel in the handhole wall shall be cut and bent so that maximum strength can be obtained in joining the new concrete work to the existing concrete. The new rebars in the new ductlines shall be extended to within two inches of the inside face of the concrete manhole/handhole wall. Suitable patching shall create a waterproof joint between the new and existing concrete.

G. Concrete and Brick Work:

1. Concrete, ready mixed according to ASTM C94.
2. Concrete shall be composed of fine aggregate, coarse aggregate, Portland cement, and water so proportioned and mixed as to produce a plastic, workable mixture. Fine aggregate shall be of hard, dense, durable, clean, and uncoated sand. The coarse aggregate shall be reasonably well graded from 3/16-inch to 1-inch. The fine and coarse aggregates shall be free from dirt, vegetable matter, soft fragments or other deleterious substances.

- a. Water shall be fresh, clean, and free from salts, alkali, organic matter, and other impurities. Concrete shall have compressive strength as indicated. Slump shall not exceed three inches.
 - b. Retampering of concrete will not be permitted. Exposed uniformed concrete surfaces shall be given a smooth, wood float finish.
5. Convey concrete from mixer to forms rapidly to prevent segregation. Free drop shall be limited to five feet, unless authorized by inspector.
6. Placing:
 - a. Clean and remove all debris from inside forms and trenches before placing concrete.
 - b. Place concrete only on clean damp surfaces, free from water.
 - c. Place concrete in forms, in horizontal layers not exceeding 18" thickness.
 - d. Place concrete to avoid segregation of materials and displacement of ducts, inserts and reinforcing.
 - e. Vibrate structural concrete thoroughly during and immediately after placing to insure dense watertight concrete.
7. Forming:
 - a. Forms shall be of good sound lumber with sufficient strength and conforming to shapes and dimensions indicated on drawings.
 - b. Forms shall be treated with non-staining form oil immediately before each use.
8. Patching: Patch all voids, pour joints and holes before concrete is thoroughly dry. Use mortar of same proportions as original concrete.
9. Curing: Curing of concrete shall be accomplished by impervious membrane method with liquid membrane compound. Apply two or more coats to obtain a total of one gallon for each 150 square feet of concrete surface.
10. Reinforcing Steel:
 - a. Clean reinforcing of mill or rust scale and form to dimensions indicated.
 - b. Install reinforcing in proper locations and secure in place to prevent movement during concrete placing or vibrating.
11. Concrete Brick and Hollow Concrete Block Work:
 - a. Concrete brick and hollow block shall be laid in full bed of mortar, both horizontally and vertically.

- b. Mortar shall be one part (by volume) cement and three parts (by volume) fine aggregate, thoroughly mixed and used when fresh. Retampering will not be allowed. Mortar shall have a minimum 28 days strength of 2,500 psi.
 - c. Setting bed shall be of depth required to bring top of blocks flush with finish line.
- G. Core Drilling for New Conduits: Core drilling of existing concrete to facilitate the installation of new conduits shall be accomplished in a good and workmanlike manner to ensure straight, parallel, horizontal or vertical holes, as required. Where two new borings are to accommodate one new conduit run, they shall be in line with each other to ensure ease of installation of the conduit. Diameters of the holes shall be adequate to accommodate the conduits shown. Following installation of the conduits, the holes shall be sealed at both ends to prevent future undue corrosion of the existing reinforcing steel which may be exposed as a result of the core drilling.
- H. Electrical Equipment Pads:
 - 1. Slope of lots/area for concrete equipment pads shall not exceed one-inch rise in one foot run.
 - 2. Grade sufficiently around equipment pad area to prevent future filling of lot/area.
 - 3. Concrete equipment pads shall be installed level. Pad shall be installed as indicated on drawings.
- I. Structural Steel and Miscellaneous Metal Work: Structural steel work including bolts, nuts, anchors, pulling-in irons, etc. shall be galvanized by hot-dipped process after fabrication into largest practical sections.
- J. Boxes and Enclosures: Boxes and special purpose cabinets shall be formed without knockouts and shall be weatherproof zinc-coated cast iron with threaded hubs and mounting lugs. Boxes shall be installed plumb and exactly flush.
- K. Installation of Wiring System:
 - 1. Secondary electrical system materials and installation shall be in accordance with Section 16050 – BASIC MATERIALS AND METHODS, and as specified herein and on the Drawings.
 - 2. Unless otherwise indicated or specified herein, wiring shall consist of single conductor cables installed in conduit/duct in areas where permitted by the NEC and NESC.
 - a. Below or in slab, use Schedule 80 PVC, unless indicated otherwise. For distribution feeder banks, provide Schedule 40 PVC with 3" concrete encasement.

- b. Above grade where exposed to damage, use galvanized rigid steel conduit (GRC). Where transitioning from underground, rise out of ground with PVC and transition to GRC no greater than 6" above finished grade.
 - c. Above grade where concealed in walls, use EMT with UL approved grounding connectors.
 - d. Conduit system shall be continuous from outlet to outlet or fitting to fitting so that electrical continuity is obtained between all conduits of the system.
 - e. Conduits cut square and inner edges reamed. Butt together evenly in couplings.
 - f. Changes in direction shall be made with symmetrical bends or cast metal fittings. Make bends and offsets with hickey or conduit-bending machine. Do not use vise or pipe tee. Flattened crushed or deformed conduit not acceptable. Trapped raceways shall be avoided.
 - g. Use of running threads not permitted. Where conduits cannot be joined by standard threaded couplings, approved water-tight conduit unions shall be used. Threadless fittings for electrical metallic tubing shall be of a type approved for the conditions encountered.
 - h. Cap conduits during construction with plastic or metal- capped bushings to prevent entrance of dirt or moisture. Swab all conduits and dry before installing wires.
 - i. Pull wires shall be placed in all empty conduits for ten feet in length and as indicated.
 - j. Install insulating bushings and two locknuts on each end of every conduit run at enclosures, boxes and conduit stub-outs. Provide grounding bushings as required.
3. Conductors:
- a. Mechanical means for pulling shall be torque-limiting type and not used for #2 AWG and smaller wires.
 - b. Pulling tension shall not exceed wire manufacturer's recommendations.
 - c. Where necessary, powdered soapstone may be used as a lubricant for drawing wires through conduit. No other means of lubricating will be allowed.
 - d. Form neatly in enclosures and boxes for minimum of crossovers. Tag all feeders.
 - e. Thoroughly swab out existing ducts to remove foreign material before the pulling of cable.

4. Splicing of Wire and Cable:
 - a. Splices made according to NEC Article 110.
 - b. Splices for 600 Volt Class Cables: The conductors shall be joined securely both mechanically and electrically by the use of solderless or crimp type connectors with properly sized tools.
 - (1) Splices for cables No. 10 AWG and smaller in underground systems shall be made only in accessible locations using a compression connector on the conductor, taped watertight.
 - (2) Splices for cables No. 8 AWG and larger in underground systems shall be made only in accessible locations using a compression connector on the conductor and by insulating and waterproofing suitable for continuous submersion in water.
 - c. Splices reinsulated according to wire manufacturer's instructions. Splice insulation shall be 150% in thickness of original wire insulation and of the same electrical and mechanical characteristics. Insulating type (600V use) shall be neoprene, Okoprene by Okonite Company or equal acceptable to the Engineer. Jacketing and insulating tape shall be high density cold setting polyethylene adhesive tape, Scotch No. 33 by Minnesota Mining and Manufacturing Company or equal acceptable to the Engineer. Splices in manholes, handholes and pullboxes shall be water-tight.
 - d. Control Cable Splices:
 - (1) Multiconductor control cable splices shall be made using a "kit" which shall be the product of one manufacturer. The "kit" shall be suitable for the number of conductors and conductor size indicated.
 - (2) Compression connector shall be provided for individual conductors and taped or covered with a heat shrinkable tubing suitable for the rated voltage of the conductor.
 - (3) Splice insulation thickness shall be equal to or greater than the conductor insulation. The outer covering of the individual conductor splices shall be re-enterable type forming a watertight connection.
5. Cable Terminations: Protect terminations of insulated power and lighting cables from accidental contact, deterioration of coverings and moisture by the use of terminating devices and materials.
 - a. Install all terminations of insulated power and lighting cables in accordance with the manufacturer's requirements.

- b. Make terminations using materials and methods as indicated or specified herein or as designated by the written instruction of the cable manufacturer and termination kit manufacturer.
- 6. Protection of Wire and Cable Ends: The ends of wire and cables in handholes, pullboxes, and in other wet locations, as defined by the NEC, that are not to be spliced or connected to equipment shall be protected from moisture and other damage.
 - a. The ends of wires and cables shall be protected by applying not less than six half-lapped wraps of electrical insulating tape beginning three inches from the end of the wire or cable and continuing over the exposed conductor to form a watertight seal.
 - b. The ends of wires and cables that are to be left unspliced or unconnected temporarily during construction shall be protected to prevent moisture from getting into the cable.
 - c. Where the ends of wires and cables are to be left unspliced or unconnected temporarily during construction, they shall be protected as specified above to prevent moisture from getting into the cable.
- L. Cable Tags: Cables provided in the manholes, handholes, and pullboxes shall be provided with cable tags to identify the cables. Tags shall be fabricated of lead strips long enough to fit loosely around the cables after the tag ends have been soldered together. Data to be stamped on the tags shall include feeder designation, voltage, quantity of conductors, conductor size and type of insulation. Where two different sizes of cable are spliced together, separate markers shall be provided at each end of the splice.
- M. Finishing:
 - 1. Structural and architectural elements cut or drilled for installation of electrical work shall be patched, repaired, and restored. Drilling, cutting, patching, repairing, and restoring subject to acceptance of the Engineer. Need for remedial work determined by the Engineer as attributable to poor coordination and workmanship shall be cause for reconstruction to the satisfaction of the Engineer and at no cost to the Owner.
 - 2. Attachment of electrical equipment to wood by wood screws. Attachment to concrete by embedded or expansion inserts and bolts. Powder charge driven with prior acceptance only.
 - 3. Close unused knockouts on boxes or expansion with metal cap.

4. Wipe clean all exposed raceways and enclosures with rag and solvent. Unfinished raceways and enclosures prime painted and finished by "Painting Section". Factory finished enclosures shall not be painted. Panelboards identified by stenciling with paint on back of doors the voltage and designation. Voltage ratings stenciled on the front of disconnect switches and junction boxes where wires are terminated for connection to equipment that are not part of this contract.
5. Update panel circuit directories, using typewriter.
6. Furnish necessary test equipment and make all test necessary to check for unspecified grounding, shorts and wrong connections. Correct faulty conditions, if any.
7. Verify continuity of all grounding.
8. Tag all empty conduits in terminal cabinets and boxes, giving destination. Use fiber disc tags in bushing.
9. Provide duct seal in all duct entries into manholes, handholes and pullboxes to prevent moisture from entering boxes.

N. Cleaning and Repairs:

1. During the progress of work, all rubbish, waste lumber, displaced materials, etc. shall be removed as soon as possible. Upon completion of the work, Contractor shall remove from the Owner's property and from all public and private property, at his own expense, all temporary structures, tools, rubbish and waste material, etc., resulting from his operations, and leave the premises in broom clean condition.
2. The Contractor shall restore all removed or damaged pavement, gutters, curbs, sidewalks, walls, sign posts, trees and landscape damaged by his operations to as near their original condition or better.
3. Concrete sidewalks, curbs and gutters shall be repaired using 3,000 psi concrete as specified herein. Sidewalk thickness and curb and gutter cross-sections shall match existing, but shall be at least six inches.
4. Graded aggregate base course shall have maximum aggregate size of 1-½ inches. Thickness of base course shall match existing, but shall be at least six inches. Base course shall be primed with emulsified asphalt prior to paving.
5. Asphalt concrete shall be hot plant mixed and hot laid. Maximum aggregate size shall be ½-inch and match existing. Pavement thickness shall match existing, but shall be at least six inches.
6. Contractor shall begin sodding no more than one week after ground has been compacted. In the areas where seeding is recommended, the process for seed shall begin within the same time frame. The Contractor shall be

responsible for complete restoration of the re-landscaped area until such time as the area has returned to the normal conditions that were present before construction.

O. Grounding:

1. All services, motors, metallic enclosures, raceways, and electrical equipment shall be grounded according to requirements of National Electric Code. At buildings, 3/4" x 8' Copperweld ground rods, Copperweld Steel Company, shall be driven with top 12" below finished grade and shall be connected together with bare No. 3/0 copper wire buried 12" below finished grade to obtain a ground of 25 ohms or less as measured by three point potential method with an electric ground megger. Connect ground to nearest cold water pipe and to electrical service equipment, raceways, equipment, grounding type receptacles, and other metallic parts directly exposed to ungrounded electric conductors. Connection shall be made by continuous metal raceways or with conductors.
2. Make grounding connections which are buried or otherwise normally inaccessible, and excepting specifically those connections for which access for periodic testing is required, by exothermic type process. Make exothermic welds strictly in accordance with the weld manufacturer's written recommendations. Welds which have "puffed up" or which show convex surfaces, indicating improper cleaning, are not acceptable. No mechanical connector is required at exothermic weldments.

In lieu of an exothermic type process, a compression ground grid connector of a type which uses hydraulic compression tool to provide the correct circumferential pressure may be used. Tools and dies shall be as recommended by the manufacturer. An embossing die code or other standard method shall provide visible indication that a connector has been adequately compressed on the ground wire.

3. All grounding wire runs shall be run together with circuit conductors.
4. Resistance to solid earth ground for noncurrent carrying metallic parts associated with electrical equipment shall not exceed the following:

	<u>Ohms</u>
Ground in manholes, handholes and vaults	10
Grounding other metal enclosures for primary voltage electrical and electrically operated equipment	10
Grounding secondary distribution system neutral and noncurrent carrying metal parts associated with distribution systems and grounds not otherwise covered.	25

3.05 TESTING AND INSPECTION

- A. As specified in Section 16050 – BASIC MATERIALS AND METHODS and herein after.
- B. If the Owner (or its representative) discovers any errors, the Contractor, at his own expense, shall go over all similar portions of the entire job, taking the necessary or directed remedial action.
- C. The Contractor shall show by demonstration in service that all circuits and devices are in operating condition. Tests shall be such that each item of control equipment will function not less than five times.
- D. The Contractor shall retape splices which have been bared for inspection. The Contractor shall test all portions of the electrical system furnished by him for proper operation and freedom from accidental grounds. All tests shall be subject to the acceptance of the Owner.
- E. Ground-Resistance Measurements: Ground-resistance measurements for each ground rod shall be made and certified by the Contractor. Upon completion of the project, Contractor shall submit in writing to the Engineer the measured ground resistance of each ground rod and grounding system, as well as the resistance and soil conditions at the time the measurements were made. Ground resistance measurements shall be made in normally dry weather, not less than 48 hours after rainfall, and with the ground under test isolated from other grounds. Ground resistance shall also be measured from each piece of equipment to the ground electrode.
- F. Wherever test or inspection reveals faulty equipment or installation, the Contractor shall take corrective action, at his own expense, repairing or replacing equipment or installation as directed. The materials or installation shall then be retested.
- H. The Contractor shall remove, and reinstall equipment covers for pre-final and final inspections by the Engineer.

END OF SECTION

SECTION 16500 – LIGHTING

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 01001 – GENERAL REQUIREMENTS.

1.02 SUMMARY

- A. Provide complete interior and exterior lighting systems within the project boundaries. The Contractor shall furnish all labor, materials (except as hereinafter noted), tools, equipment and appliances required to provide and install the interior lighting system, complete, as indicated on the drawings and/or as herein specified. The drawings note various sizes of equipment as determined for basis of design; the lighting system however shall be installed to comply with the equipment furnished by the successful supplier.
- B. Related Sections:
 - 1. Section 16050 – BASIC MATERIALS AND METHODS
 - 2. Section 16301 – UNDERGROUND ELECTRICAL WORK

1.03 SYSTEM DESCRIPTION - DESIGN INTENT

The work shall include but not necessarily be limited to, the following:

- 1. Complete interior lighting system including light fixtures, light engines, drivers, raceways, and conductors.
- 2. Complete exterior lighting systems for exterior walkways including light poles, fixtures, light engines, drivers, raceways, and conductors.
- 3. Complete low voltage lighting control system including switches, occupancy sensors, controllers, networking devices, emergency lighting modules, and integration with the building automation system.
- 4. Obtain and pay for electrical permits, arrange for periodic inspections by local authorities and the University, and deliver certificate of final inspection to the University.
- 5. The Contractor shall check and test the installation for completeness and functional operation as described by the drawings and specified herein. Final test shall be in the presence of the University and representatives of the utility companies. The Contractor shall arrange and pay for all testing costs.
- 6. Immediately report and pay for damages to existing facilities or equipment.
- 7. The Contractor shall coordinate his work with utilities and other trades to avoid omissions and overlapping responsibilities. The electrical contractor shall notify other trades and suppliers of project voltages and of existing

equipment when new work must be compatible with existing conditions.

1.04 SITE VISITATION

- A. Visit project site, carefully review each section of the Specification and all drawings of this Contract, and obtain and review the standards, drawings and specifications of the local utility companies. By submitting a proposal of the work included in this contract, the Contractor shall be deemed to have made such examination and to be familiar with and accept all conditions of the job site.
- B. Report any error, conflicts or omissions to the University's representative at least one week before submission of bids for interpretation or clarification. If errors or omissions are not reported, the Contractor shall provide necessary work at no cost to the University to properly complete intent of the Specifications and Drawings.
- C. Should any discrepancy arise from failure of the Contractor to notify the University, the higher quality of larger quantity of item shall prevail. The University shall make the final interpretation and judgment.

1.05 COORDINATION

As specified in Section 16050 – BASIC MATERIALS AND METHODS.

1.06 SPECIAL CONDITIONS

As specified in Section 16050 – BASIC MATERIALS AND METHODS.

1.07 CODES, REGULATIONS AND STANDARD SPECIFICATIONS

As specified in Section 16050 – BASIC MATERIALS AND METHODS.

1.08 SUBMITTALS

- A. As specified in Section 16050 – BASIC MATERIALS AND METHODS and herein after.
- B. Shop Drawings: Submit complete shop drawings and manufacturer's literature for the following for the University's review before any work is fabricated. Comply with all requirements of the Section 01330 – SUBMITTAL PROCEDURES.
 - 1. Light Fixtures
 - 2. Networked Lighting Control Systems
 - 3. Local Lighting Control System
 - 4. Inverter
 - 5. Behavioral Health Lighting Control Keypad
 - 6. Point-to-Point Lighting Control System Diagram: Provide point-to-point

control diagram indicating all control devices, controllers, networking devices and networking controllers and wiring.

- C. Brand Names, manufacturer's names and catalog numbers indicate standard of design and quality required. Substitute materials may be used if qualified by written permission from the University.

Submission shall be as follows:

EXAMPLE:

<u>Item</u>	<u>Manufacturer and Catalog Number Specified</u>	<u>Substitute Manufacturer and Catalog Number</u>
Cable	John Doe - No. 3200	King - No. 2200

- D. Qualifying data to include catalog cuts, shop drawings and/or specifications to show equality with materials specified herein.

Shop drawing and catalog cuts for substitute materials shall clearly specify compliance with and/or deviation from the specified material. Certification shall not contain statements to imply that the item does not meet requirements specified such as "as good as" and "achieve the same end use and results as materials formulated in accordance with the referenced publications". Certifications shall simply state that the item conforms to the requirements specified. Certificates shall be printed on the manufacturer's letterhead and shall be signed by the manufacturer's official authorized to sign certificates of compliance. Review of shop drawings and catalog cuts shall not release the Contractor from complying with the intent of the specifications and drawings.

- E. Intent of Shop Drawing and Catalog Cut Review:

1. Shop drawing and catalog cut submittals processed by the University are not Change Orders. The purpose of the submittals by the Contractor is to demonstrate to the University that he understands the design concept, that he demonstrates his understanding by indicating which equipment and material he intends to furnish and install and by detailing the fabrication and installation methods he intends to use.
2. If deviations, discrepancies or conflicts between shop drawings and the specifications are discovered either prior to or after the shop drawing submittals are processed by the University, the design drawings and specifications shall prevail and shall be followed.
3. The fact that a manufacturer does not offer a specific option or meet a minimum guaranteed performance specification called for herein or in a formal bid specification is not deemed proprietary when such is available from one or more manufacturers.

4. Shop Drawing Acceptance: Acceptance rendered on shop drawings shall not be considered as a guarantee of measurements or site conditions. Where drawings are accepted, said acceptance does not relieve the Contractor from his responsibility for furnishing materials or performing work as required by Contract Drawings and Specifications.

1.09 INSPECTION

As specified in Section 16050 – BASIC MATERIALS AND METHODS.

1.10 GUARANTEE AND CERTIFICATE

As specified in Section 16050 – BASIC MATERIALS AND METHODS.

PART 2 - PRODUCTS

2.01 GENERAL

All materials shall be new, except as specifically noted, and shall bear the label of Underwriters' Laboratories whenever standards have been established and label service is normally and regularly furnished by the agency.

2.02 MATERIALS

- A. Light Fixtures: Provide light fixtures complete with necessary lamps, ballasts, starters, drivers, and accessories, according to the "Light Fixture Schedule". All light fixtures shall be supplied complete with lamps.
 1. LED Drivers: Drivers shall consist of a high frequency inverter, and power control and regulation circuitry. Drivers shall be Class 2 certified and meet safety standard UL 1310.
 - a. Load regulation shall be +/- 5%.
 - b. Driver power factor shall be not less than 88% or more than 100% unless otherwise indicated.
 - c. Frequency range from 47 to 63 Hz.
 - d. Operational temperature range shall not exceed -35 degree Celsius above 65 degree Celsius ambient.
 - e. Driver shall contain an EMI filter.
 - f. Phillips or equal acceptable to the University.
 2. LED Light Fixtures:

- a. Photometric report certified by an approved Department of Energy (DOE) laboratory and in compliance with Illuminating Engineering Society of North America Lumen Maintenance (IESNA LM)-80 and American national Standards Institute (ANSI) C78.377.
 - b. 50,000 hours minimum L70 lifetime.
 - c. Minimum warranty: 5 years.
- B. Caulking Compound: As specified in Section 16301 – UNDERGROUND ELECTRICAL WORK.
- C. Ground Rods: UL 467. Diameter shall be adequate to permit driving to full length of the rod, but not less than 5/8" in diameter unless otherwise indicated. Ground rods for street light standards shall be 5/8" x 10'-0" copper-cladded steel core. All others shall be 5/8" x 8'-0" copper-cladded steel core.
- D. Wire Mesh: Welded steel wire fabric for reinforcing concrete, galvanized, conforming to ASTM A185.
- E. Identification Tags: Each set of cables in handholes and manholes shall be identified by a noncorrosive metal tag. Letters shall be minimum 1/4- inch high identifying the cable as to use and/or voltage. Tags shall be wrapped around the cables and taped. Tags for power cables shall be red.
- F. Connectors and Terminals: As specified in Section 16301 – UNDERGROUND ELECTRICAL WORK.
- G. Waterproof Connection Kits: As specified in Section 16301 – UNDERGROUND ELECTRICAL WORK.
- H. Nameplates: As specified in Section 16301 – UNDERGROUND ELECTRICAL WORK.
- I. Hardware, Supports, Backings, etc.: As specified in Section 16301 – UNDERGROUND ELECTRICAL WORK.
- J. Networked Digital Lighting Control System: Provide a cloud connected, wired and wireless lighting control system. The system shall be capable of full operation regardless of being connected or disconnected to the internet.
 - 1. Light Management Hub: The light management hub shall provide connectivity between the lighting control devices and the light fixtures. The system shall be microprocessor based utilizing both low voltage wiring and PoE wiring to connect to the lighting control devices. Each light management hub shall be capable of managing up to 100 wall controllers, 100 occupancy and daylight sensors and 512 switched legs.
 - 2. Satellite Panel: Feed through power panel with 0-10 VDC DIN power modules with lockable access door to allow access to low voltage equipment. Panel shall have capacity to support up to 10 DIN power modules.

3. Sensor Module: The sensor module shall integrate the wired sensors and control stations through a communication link to the light management hub. 150 foot maximum wiring distance. Modules shall be ceiling mounted to a ceiling tile such that they are visible in the room.
4. Gateway: The gateway allows communication between the fixture mounted wireless control nodes provided by the fixture manufacturer and the lighting control system. The gateway shall be powered by a PoE power supply. The gateway shall be capable of communicating with 100 control nodes.
5. Control Devices:
 - a. Touchscreen: 5-inch wall mounted digital touchscreen interface for controlling the lighting control system, 800 x 480 @ 188 ppi resolution, 5:3 aspect ratio. Can be programmed to provide area, scene, or zone-level control of the lighting loads including intensity, color temperature with the appropriate light engine package within the fixture, and color tuning. Administrator control capabilities utilizing administrator and user PINs.
 - b. Passive Infrared Ceiling Mounted Occupancy Sensor: Ultrasonic and passive infrared sensing, up to 1500 sq ft of coverage with a 360-degree field of view, 24 VDC, sensor timeout manual setting between 8 and 30 minutes or automatic mode continuously adapts to the space usage.
 - c. Wall Control Station: Multi-button low-voltage wall station, 2-contact closures available, rounded buttons with custom engraving to indicate function, feedback LEDs adjacent to each button, master raise/lower buttons for dimming where indicated.
 - d. Contact Closure Interface: Interfaces a contact closure keypad with the light management hub. Accepts momentary or maintained signals. LEDs to provide setup feedback or verification of which contacts are closed.
6. Lutron Athena or approved equal.
- K. Behavioral Health Lighting Control Keypad: Stainless steel switch body and actuator, momentary contacts, solid machined aluminum faceplate, tamper-resistant hardware, Class 2, 24VDC. Visa Lighting Liberty SW7070-1G2S or approved equal.
- L. Localized Lighting Control Systems
 1. Occupancy Sensors:
 - a. Combination Dual Technology Occupancy Sensor / Light Switch: Single pole, 3 or 4 way, as required, dual technology infrared / ultrasonic from 25 kHz to 40 kHz, specification grade, LED positive detection indicator, adjustable delayed off-time range between 30 seconds and 15 minutes, minimum and sensitivity adjustment, 15A, 120/277 volts AC, 60 Hz. Sensors shall have manual override switch and three modes of functioning: OFF, ON and AUTOMATIC. Cover plate shall be white. Locate sensors as indicated and in accordance with the manufacturer's

recommendations to maximize energy savings. Sensors shall be U.L. listed. (Preset time delay for 10 minutes.) Wattstopper DSW-301 or approved equal.

- b. Combination Passive Infrared Occupancy Sensor / Light Switch: Utilizes passive infrared wall mounted, 120/277 volts, user-adjustable time-delay of up to 30 minutes, built-in light level sensor and LED indicator for occupancy detection. Wattstopper PW-301 or approved equal.

M. Inverter: Single-phase, sinusoidal output emergency power inverter for LED light fixtures, 120/277 volts, soft-start circuit, compatible with dimming ballasts and drivers, 1-2 second transfer time, 0.88 lead to 0.88 lag power factor range, output protection circuit breakers, input surge protection. Evenlite EMS750 or approved equal.

N. Wiring: As specified in Section 16050 – BASIC MATERIALS AND METHODS.

PART 3 - EXECUTION

3.01 GENERAL

As specified in Section 16050 – BASIC MATERIALS AND METHODS and Section 16301 – UNDERGROUND ELECTRICAL WORK.

3.02 INSPECTION

As specified in Section 16050 – BASIC MATERIALS AND METHODS and Section 16301 – UNDERGROUND ELECTRICAL WORK.

3.03 PRODUCT HANDLING

As specified in Section 16050 – BASIC MATERIALS AND METHODS and Section 16301 – UNDERGROUND ELECTRICAL WORK.

3.04 INSTALLATION

A. Fixture Supports:

1. Every outlet box or other support for light fixtures shall be of sufficient strength to support at least 4 times the weight of the fixture.
2. Support all fixtures weighing more than 50 lbs. independently of the outlet box.
3. Fixtures shall be securely and safely supported by means of fixture studs in the outlet boxes or other approved means. Ceiling fixtures shall be arranged to hang vertically unless otherwise directed by the University. Provide accessories such as straps, mounting plates, nipples, or brackets for proper installation. Provide additional suspension wires and channels for mounting on suspended ceilings as recommended by fixture manufacturer.

4. Where ceiling construction is such that mounting channels, strongbacks, braces, etc., are required to properly support fixtures, provide these supports at no additional cost to the University. Refer to architectural drawings for type of ceiling construction.

B. Area Light Systems

1. Lighting installation including wiring shall be as specified herein and on the Drawings, and manufacturer's recommendations. Complete light assembly shall be capable of withstanding 105 mph winds with 1.3 gust factor.
2. Lighting systems shall provide illumination along length of project roadway(s), walkways and/or parking areas. System shall be completely tested and ready for use.
 - a. Before trenching or excavating, structural outlines and center lines of ductlines and street light foundations shall be clearly staked, and acceptance received from the University. Staking shall be with steel or wood pegs or paint.
 - b. Base foundations for light standards shall consist of cast-in-place reinforced concrete complete with anchor bolts, sized and placed in accordance with pole manufacturer's requirements and installation template. Length of base shown on drawings shall be considered as minimum and shall be lengthened to suit the soil conditions encountered and to adequately support the pole and lighting fixture assembly. Relocation of any existing irrigation lines, sprinkler heads, valve boxes, control wiring, root trimming, and repair of surrounding area to match existing conditions shall be considered incidental to the construction of the foundation.
 - c. Light standards shall be field adjusted for vertical alignment. Tree trimming shall be considered incidental to the installation of the street light standard and/or luminaire.
 - d. After pole is set, grease (or bituminous coat) ends of all anchor bolts and bottom of pole base plate.
 - e. All tapped holes and stainless steel screws shall be sprayed with "thread-eze" by Chemsearch prior to assembling, shipping or installation. Grease all exposed screws and bolts.
3. Provide duct seal in duct entries into handholes and pullboxes to prevent moisture from entering light fixtures.

C. Wiring: As specified in Section 16050 – BASIC MATERIALS AND METHODS and Section 16301 – UNDERGROUND ELECTRICAL WORK

- D. Light Engines: Burn-in light engines for a minimum of 100 continuous hours prior to turn over.

3.05 TESTING AND INSPECTION:

As specified in Section 16050 – BASIC MATERIALS AND METHODS and
Section 16301 – UNDERGROUND ELECTRICAL WORK.

END OF SECTION

SECTION 16700 - TELECOMMUNICATIONS

PART 1 - GENERAL

1.01 SUMMARY

- A. This specification section provides the requirements for telecommunications systems.
- B. Related sections:
 - 1. Section 16050 – ELECTRICAL BASIC MATERIALS AND METHODS

1.02 SUBMITTALS

- A. General: Submit as specified in Section 16050 - BASIC MATERIALS AND METHODS.
- B. Shop Drawings: Submit complete shop drawings and manufacturer's literature for review before any work is fabricated. Submit in accordance with Section 01330 - SUBMITTAL PROCEDURES. Submit manufacturer's literature for the following:
 - 1. Communication Outlet Faceplates with the following Information inserts:
 - a. Data jacks
 - 2. Data Cables - Category 6
 - 3. Data Patch Panels for Copper Cables
 - 4. Fiber Optic Termination Enclosures
 - 5. Fiber Optic Backbone Cabling – 24-F Single Mode
 - 6. Backboard
 - 7. Equipment Racks
- C. As-Built Drawings: Submit as-built drawings as specified under Section 01770 - CLOSEOUT PROCEDURES.

1.03 GUARANTEE AND CERTIFICATE

- A. Any item of material, apparatus, or equipment, furnished and installed, or construction by the Contractor showing defects in design, construction, quality or

workmanship within one year from the date of final acceptance by the Owner shall be replaced by such new materials, apparatus or parts as may be found necessary to make such defective portion of the complete system conform to the true intent and meaning of the Specifications and Drawings. Contractor shall turn over all manufacturers' warranties to include 10, 15, and 25-year warranty programs for example.

1.04 GENERAL REQUIREMENTS

- A. The Contractor shall furnish all labor, materials (except as hereinafter noted), tools, equipment and appliances required to provide and install all Telecommunication Work, complete, as indicated on the drawings and as specified herein. The drawings note various sizes of equipment as determined for basis of design; the electrical work, however, shall be installed to comply with the equipment manufacturer's installation requirements that are furnished by the successful supplier. The work shall include but not necessarily be limited to the following:
1. Complete horizontal data system including junction boxes, backboards, jacks, conduits, cables, connecting hardware, and racks.
 2. New fiber optic backbone cabling between the existing MDFs and existing and new IDFs.
 3. Connection and testing of equipment furnished by others requiring electrical connections.
 4. Before bidding on this work, carefully examine each of the drawings and the site. By submitting a proposal of the work included in this contract, the Contractor shall be deemed to have made such examination and to be familiar with and accept all conditions of the job site.

1.05 QUALIFICATIONS

- A. Contractor shall have a minimum of 5 years documented experience in telecommunication cabling, in which the last 3 years experience to be submitted for review. All installers shall be required to have at least 3 years experience and have certification by product manufacturer to be installed. Contractor and installer shall be certified by manufacturer and submit certification.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. All materials shall be new, except as specifically noted, and shall bear the label of Underwriters' Laboratories whenever standards have been established and label service is normally and regularly furnished by the agency.
- B. Outlet and Small Junction Boxes: Pressed, zinc-coated steel, minimum nominal size 4-11/16", minimum depth 2-1/8", with raised cover-ring for concealed devices. Exposed boxes and weather exposed boxes shall be cast iron, or ferrous alloy, prime painted and enamel finished, with threaded hubs for conduit connection. Combination outlet boxes shall be as specified in SECTION 16050 - BASIC MATERIALS AND METHODS and as shown on drawings.
- C. Device and Cover Plates: Data and telephone outlet plates shall be plastic, color to be verified with the Architect, with openings as required. Provide blank snap-in covers for unused openings. Leviton or approved manufacturer.
- D. Large Junction Boxes: All boxes shall be as specified in Section 16050 - BASIC MATERIALS AND METHODS.
- E. Backboards: 3/4" thick X 4' X 8' termite treated plywood painted with white fire resistant paint. Size as noted on plans.
- F. Raceways: As specified in Section 16050 – ELECTRICAL BASIC MATERIALS AND METHODS. Raceway design and installation shall conform to EIA/TIA-T569-B.2 Commercial Building Standard for Telecommunications Pathways and Spaces.
- G. Basket Trays:
 - 1. Basket tray or conduit system shall connect the IDF to any telecom outlets and any HDF(s) within a building.
 - 2. If basket tray design is used, standard style is a basket tray with a minimum dimensions of 12 inches wide and 6 inches deep; the actual size of the tray shall be determined during the design phase based on the space, anticipated cables counts and fill capacity.
 - 3. Telecom outlets shall be serviced from the basket tray with 1" conduit; each conduit shall service only one telecom outlet; no daisy-chaining.
 - 4. Horizontal conduit to the basket shall be installed perpendicular to lighting fixtures.
 - 5. The basket tray shall be installed per the electrical code and follow the ANSI/TIA-569 standards.
 - 6. No threaded rods shall be installed within the tray to avoid damaging cabling during installation (center mounting of basket trays is not allowed).

- H. Equipment Racks: 4-post rack floor-mounted rack, 84" high, universal junction hole pattern, #12-24 panel mounting holes, permanently stamped rack mount unit (RMU) markings, double sided universal mounting spacing, 2,000 lbs minimum load rating.
- I. Communication Outlets: Outlet shall include three Category 6 8-pin modular connectors, device plate, outlet box, voice port designation and mounting hardware, ANSI/EIA/TIA T568B wiring standard, ANSI/EIA/TIA-568B compliant.
- J. Wireless Access Point (WAP) conduit/ceiling JB:
 - 1. Cabling to WAP shall be carried to within 2' of WAP location within conduit, basket tray, or using J-hooks.
 - 2. 2 data cables shall be terminated above accessible ceiling within conduit to a 5" square junction.
- K. Data Cables:
 - 1. Interior Wiring (wiring within each building): 2-pair, 23 AWG solid, Category 6 UTP, EIA/TIA-568B.2-1 compliant, UL or ETL verified, blue.
 - 2. Cables shall be plenum rated if not routed in conduit.
 - 3. Connector: Cat6 connector, QuickPort Snap-in Cat6, T568B, gas tight, accepts 26-22 AWG, high-impact fire retardant plastic body, UL listed, orange. Leviton eXtreme 6+ or approved equal.
- L. Data Cable Connecting Hardware:
 - 1. UTP copper cabling shall be terminated on T568B 24 or 48-port, Category 6 patch panels. Panels shall be 19-inch rack mount type with 110-style connectors for cabling terminations and shall utilize a printed circuit board interface. The front and rear of the panels shall have cable strain-relief and routing guides. Patch cords shall be pre-connectorized from the factory. Provide 25% spare port capacity.
 - 2. The panels shall feature individual modular 8P8C ports with connectors included for all ports, mounting standoffs for cable management bars, and front write-on labeling.
 - 3. The panels shall be made of 16 gauge steel, and shall have a black painted finish with white silk- screening.
 - 4. The panel shall be offered in 24- and 48-port configurations. Panel shall have the ability to allow for single port replacement of inoperative ports.

5. Approved Products:

- a. Leviton 6910G-U24, Cat 6A, 24-port QuickPort Flat Panel, 1 RU
- b. Leviton 6910G-U48, Cat 6A, 48-port QuickPort Flat Panel, 2 RU
- c. Leviton 69270-U24, Cat6 Patch Panel, 1RU 24-port QuickPort Flat Panel
- d. Leviton 69270-U48, Cat6 Patch Panel, 2RU 48-port QuickPort Flat Panel

M. Fiber Optic Termination:

1. Fiber termination:

- a. Fusion spliced with Corning Cassette.
- b. MDF rack: Corning CCH series, 4RU, 19" width, 17" depth, 12 adapter panel capacity, CCH-04U;
- c. MDF fiber terminations: Corning pigtailed splice cassettes, for 24 Single-Mode OS2 fibers, terminated with 12 duplex LC connectors, CCH-CS24-A9-P00RE.
- d. IDF backboard: Corning wall-mounted connector housing; holds 6 CCH connector panels, ICH-06P.
- e. CCH-RM12-59-P03RH Cassette 12F SC Duplex UPC.
- f. CCH-CS24-A9-P00RE Cassette 24 LC Duplex UPC.
- g. Splice trays: Corning M67-110.
- h. Fusion splice sleeves: Corning 2806031-01.

N. Fiber Optic Cabling:

- 1. Single Mode 24 F: Corning 024ZU4-T4F22D20, ALTOS loose tube, all dielectric gel-free cable, Single Mode, two 12-F tube Single Mode.
- 2. Fiber termination:
 - a. Fusion spliced with Corning Cassette.
 - b. MDF rack: Corning CCH series, 4RU, 19" width, 17" depth, 12 adapter panel capacity, CCH-04U;

- c. MDF fiber terminations: Corning pigtailed splice cassettes, for 24 Single-Mode OS2 fibers, terminated with 12 duplex LC connectors, CCH-CS24-A9-P00RE.
 - d. IDF backboard: Corning wall-mounted connector housing; holds 6 CCH connector panels, ICH-06P.
 - e. CCH-RM12-59-P03RH Cassette 12F SC Duplex UPC.
 - f. CCH-CS24-A9-P00RE Cassette 24 LC Duplex UPC.
 - g. Splice trays: Corning M67-110.
 - h. Fusion splice sleeves: Corning 2806031-01.
- O. Additional requirements as specified in Section 16050- ELECTRICAL BASIC MATERIALS AND METHODS.

PART 3 - EXECUTION

3.01 GENERAL

As specified in Section 16050 – ELECTRICAL BASIC MATERIALS AND METHODS.

3.02 INSTALLATION

- A. Conduits for the Data and Telecommunications systems shall be complete and continuous from outlet to outlet and between outlets and communication rooms. Conduit risers into the ceiling space are not acceptable. Each conduit run shall have no more than two 90 degree bends. If exceeding more than two bends, then a junction box shall be installed.
- B. Conduit Risers:
 - 1. Secure conduits on exterior walls with two hole “U” clamps at walkway locations.
 - 2. If riser is 3”conduit and cannot make turn into building due to limited wall space, place a JB at turn and size JB to ensure adequate turning radius.
 - 3. Provide nylon pull strings in all conduits except for Verizon conduits which require continuous mule tape.
 - 4. Paint all new work to match the surrounding finish except for stainless steel JBs.
 - 5. Conduit bodies (e.g. LB, LR, etc.) are not permitted in telecommunications raceway systems.

6. Provide insulated bushings at all telecommunications conduit terminations at all boxes and conduit stubs.
7. All Installation of telecommunication infrastructure shall comply with TIA/EIA-569-B unless otherwise noted.

C. Data Outlets:

1. All work area outlet locations will be as indicated on the Drawings. Uniquely label each work area outlet and jack within the outlet according to the numbering convention outlined in the section on labeling.
2. Labeling shall be sequential in order. Do not reuse any number throughout the entire infrastructure.

D. Labeling: The labeling scheme will be provided as follows at all locations within the cable infrastructure:

1. Conduits

- a. All media system conduits shall be identified by sleeves or labels at all terminations of each conduit. The Electrical specifications for the construction contract shall include a complete product description of the sleeve/label system including, styles, types, and accessories furnished by a brand name manufacturer and acceptable brand name substitutions. The Electrical specifications for the construction contract shall include a suitable sleeve/label system which will meet the following requirements.
- b. Conduit identification shall be made by using vinyl sleeves or vinyl adhesive labels applied at the conduit terminations, and junction box interiors. The sleeves and labels shall be stamped or factory printed with information to identify the system and location of the termination and its destination except at room outlets where only the system and destination shall be identified. Handwritten tags or labels will not be accepted. Labeling procedure will meet EIA/TIA 568A, 606-A (Class 2 Administration) and BICSI Standards.
- c. Where above ground metal conduits or raceways are specified they shall be clearly marked with factory printed adhesive labels having 1/4 inch letters on a contrasting background, attached to the conduit or raceway on 10 foot centers, readily visible, and indicating the system cabling contained therein.
- d. Examples of Tags/Labels of Conduit Stubs

Instruction Data	DATA/IDF-2

Data	DATA/IDF
Video Reception	CATV/IDF
Video Origination	CATV/IDF-1
Telephone	TEL/HDF

e. Examples of Tags/Labels at Distribution Frame Conduit Terminations
Where the Other End Termination is at a Room Outlet

IDF to Room B101 Outlet	DATA IDF B101	or	DATA/IDF/B101
HDF to Room B202 Outlet	CATV HDF B202	or	CATV/HDF/B202
IDF to Room B104A Outlet	TEL IDF B104 A	or	TEL/IDF/B104A

f. Examples of Tags/Labels at Distribution Frame Conduit Terminations
Where Other End Termination is at a Distribution Frame

IDF at Bldg "B" to	DAT A IDF- B MDF	or	IDATA/IDF-B/MDF
MDF to IDF at Bldg "C"	DAT A MDF IDC- C	or	ADATA/MDF/IDF-C
IDF TO HDF at Bldg "B"	CATV IDF-B HDF- B	or	CATV/IDF-B/HDF-B

g. Backbone (Inter building) Cables

- 1) Cables shall be labeled using computer generated or typewritten wrap-around stick-on labels at both ends and at each pull point, junction box, hand hole, vault and manhole 6"-12" from conduit entry. Label backbone cables as they exit the conduits in each Entrance Facility in the terminal building.
 - a) Fiber Optic Cables shall be labeled in the following format: X-Y-FIBER where "X" Backbone (Inter building) represents the building number, "Y" represents the destination building number, and "FIBER" represents Fiber Optic cable.

- b) Voice Cables shall be labeled in the following format: X-Y-TEL where “X” represents the building number, “Y” represents the destination building number, and “TEL” represents telephone cable.
 - c) CATV Cables shall be labeled in the following format: X-Y-CATV where “X” represents the building number, “Y” represents the destination building number, and “CATV” represents television cable.
- h. Horizontal (Intrabuilding) Cables
- 1) Cables shall be labeled using computer generated or typewritten wrap-around stick-on labels at both ends.
 - 2) For All buildings, label cables with the following format:
 - a) Data Cables
 - 1. BldgRM-DX where “Bldg” represents the building letter, “RM” represents the Room the jack is located in, “DX” represents the data jack number (e.g. A101-D1, A101-D2, A101-D3 etc.).
 - b) Voice Cables
 - 1. BldgRM-DX where “Bldg” represents the building letter, “RM” represents the Room the jack is located in, “TX” represents the data jack number (e.g. A101-T1, A101-T2, A101-T3 etc.).
 - c) Video (CATV) Cables
 - 1. BldgRM-VX where “Bldg” represents the building letter, “RM” represents the Room the jack is located in, “TX” represents the data jack number (e.g. A101-V1, A101-V2, A101-V3, etc.).
 - d) Labeling shall be sequential in order, do not reuse a number throughout the entire infrastructure.
 - e) Hand-written and embossed type labels are specifically prohibited. In addition, provide the following:
 - 1. Label each outlet with permanent self-adhesive label with minimum 3/16 in. high characters.
 - 2. Label each cable with permanent self-adhesive label with minimum, 1/8 in. high characters, in the following locations:

- a. Inside receptacle box at the work area.
 - b. Behind the communication room patch panel or punch block.
 3. Use labels on face of data patch panels. Provide facility assignment records in a protective cover at each telecommunications room location that is specific to the facilities terminated therein.
 4. Use color-coded labels for each termination field that conforms to ANSI/TIA-606 standard color codes for termination blocks
 5. Mount termination blocks on color-coded backboards wherever possible.
 6. Labels will be machine-printed. Hand-lettered labels will not be acceptable.
 7. Use industry standard EIA/TIA and BICSI color codes as specified herein and maintain consistent color-coding throughout the building.
- E. Installation of 4-11/16" x 4-11/16" x 2-1/8" boxes in fire rated walls shall conform to Section 16050- BASIC MATERIALS AND METHODS.
- F. Installation of telecommunications and data systems shall follow wiring practices as specified in ANSI/EIA/TIA-568B.2 Commercial.
- G. Additional requirements as specified in Section 16050 – ELECTRICAL BASIC MATERIALS AND METHODS.

3.03 TESTING AND INSPECTION

- A. If the Engineer or Owner's representative discovers any errors, the Contractor, at his own expense shall go over all similar portions of the entire job, taking the necessary or directed remedial action.
- B. All terminations shall be tested end-to-end by the Contractor using commonly accepted industry procedures and equipment. The Contractor shall conduct and provide all test equipment required.
 1. Telephone Backbone Wiring and Interior Wiring Cables: All terminations shall be tested for end-to-end for shorts, opens, reversals, crossed pairs and split pairs with a Level II tester calibrated not more than 1 year old. Test results for each cable and pair shall be provided in writing to the Engineer.

2. Data Cables:

- a. Optical Fiber Cables: All optical fiber cables shall be subjected to end-to-end attenuation testing and optical time domain reflectometer (OTDR) testing to measure and document the amount of total loss between two endpoints and to provide a graphical display of loss over a cable's entire length (signature trace). The test results for each cable and fiber shall be provided in writing to the Engineer. Multimode and Single-Mode Fiber Cable: End-to-end testing in accordance with TIA/EIA-14A, Method B. Cable runs which fail to meet the transmission requirements shall be replaced at no cost to the Owner.
- b. Data Interior Wiring Cables: All terminations shall be tested for end-to-end for shorts, opens, reversals, crossed pairs, and split pairs.

In addition, Contractor shall demonstrate that the installed Category 5E cable runs, from each data outlet to the patch panel, meets the transmission requirements as outlined in EIA/TIA-568B "Commercial Building Wiring Standard", TSB-36 and TSB-40, including worst pair Near End Crosstalk Requirements for all pair combinations over all frequencies. Test results for each cable and pair shall be provided in writing to the Engineer.

- C. Wherever tests or inspections reveals faulty equipment or installation, the Contractor shall take corrective action, at his own expense, repairing or replacing equipment or installation as directed.

END OF SECTION

SECTION 16721 - FIRE ALARM SYSTEM

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 01001 – GENERAL REQUIREMENTS.

1.02 GENERAL REQUIREMENTS

The Contractor shall furnish all labor, tools, equipment, materials and accessories required to provide and install a complete, electrically supervised, closed circuit fire alarm system as specified herein and as shown on the drawings.

1.03 RELATED WORK SPECIFIED IN OTHER SECTIONS

- A. Power Wiring: All power wiring including wiring to breakers and wiring to all equipment specified in Section 16050 - BASIC MATERIALS AND METHODS.
- B. Painting: Painting of all conduits, raceways, cabinets, junction boxes, etc. specified in Section 16050 - BASIC MATERIALS AND METHODS.
- C. Underground Work: All underground power and control wiring shall be provided as specified in Section 16301 – UNDERGROUND ELECTRICAL WORK

1.04 PAYMENT PROCEDURES

Permits, Tests and Inspections: Apply, secure and pay for all required permits, fees, licenses, tests, inspections and royalties necessary to accomplish the work.

1.05 SYSTEM DESCRIPTION

- A. Fire Alarm System (General Alarm): The fire alarm control panel (FACP) shall activate all audio and visual devices in the building, annunciate all alarm signals in the building and set the building's fire alarm system in "alarm mode". All fire alarm signals shall be annunciated at the main fire alarm control panel and remote annunciator located within the building. The system shall also send alarm, trouble, and supervisory signals to the hospital campus main fire alarm control panel. The building fire alarm system shall be compatible with the existing hospital campus main fire alarm control panel to allow the existing control panel to receive the necessary signals for monitoring or an interface shall be provided to allow for the panels to communicate with each other to send the necessary signals.
- B. Grounding: The fire alarm system shall be grounded.

1.06 SUBMITTALS

A. Quality of Work/Submittals:

- 1. Drawings: The following applies to all drawings called for herein, such as Modular Systems Wiring and Point-To-Point Wiring Diagrams.

- a. Drawings shall be prepared by the manufacturer or fire alarm equipment supplier's representative.
- b. All work shall be in accordance with acceptable architectural and/or engineering standards. Workmanship shall be neat with all lines clean and sharp and lettering uniform in height and not less than 1/8" high.
2. Manufacturer's Printed Literature: Original published manufacturers' catalog cuts shall be provided. Facsimile or "Xerox" copies are not acceptable.
- B. Submit in accordance with Section 01330 – SUBMITTAL PROCEDURES.
- C. The following drawings, data and/or information, complete in all respects, shall be submitted to the Engineer for approval:
 1. Fire Alarm System Equipment, Devices and Components Data: A complete listing of the equipment proposed along with manufacturer's brochures providing detailed descriptions, technical information, photographs and drawings thereof, showing compliance with these specifications,
 2. Point-To-Point Wiring Diagrams: Drawings shall be job-specific. "Typical" or "generic" drawings are not acceptable. The diagrams shall include but not be limited to the following:
 - a. Locations of All System's Elements: Indicate all devices, wiring gutters, junction boxes, pullboxes and pass-through devices and entities where the cables and conductors can be accessed by personnel. Indicate the room numbers where devices are located and the number of devices provided.

Also indicate the locations of all cable and conductor terminations and intermediate connections showing where they pass through without terminations/connections from and to equipment panels and/or devices.
 - b. Labeling of All Elements: All devices, junction boxes, etc. shall be labeled by functional designations, locations and numbers such as room function and room number.
 - c. Fire Alarm Wiring and Color Codes: All cable and conductor color codes, the wire marking system and marker designation as specified herein shall be shown.
 3. Equipment and/or Modular Systems Wiring Diagram: Wiring diagrams showing all equipment modules, components and key internal cabinet wiring that should be accessed for tests and maintenance. Drawings shall include but not be limited to the following:
 - a. Equipment Modules and Components: The equipment modules and components layout (relative locations in proportion to the modules, components and cabinet/enclosure sizes) including the fire alarm control panel(s), battery cabinets, etc. The drawings shall also show the

arrangement of modules, components, wiring and expansion space within the FACP cabinet.

- b. Input and Output Circuits Labeling: Label the input and output circuits by circuit designations specified herein.
- c. Internal - External Circuits Interface Information: Only information that interfaces with external circuits and internal equipment wiring need be shown. All external wiring and circuits shall be shown in the riser diagram and the Contractor furnished Point-To-Point Wiring Diagrams.

Changes in or deletion of the modular system wiring diagrams shall not require changes to the riser diagrams and the Contractor furnished Point-To-Point Wiring Diagrams and vice versa except for the panel deletion or change.

- 4. Battery Capacity Calculations.
- 5. Voltage Drop Calculations: Provide detailed voltage drop calculations for all notification device circuits and releasing device circuits.
- 6. Remote Power Supply Units or Extender Panels: The use of remote power supplies or extender panels will be based on available space. Remote power supplies shall be installed in dedicated electrical rooms or electrical closets only provided that space is available to install the unit without encroaching on the required clearances of any other electrical equipment. The Contractor shall provide a scaled plan of the electrical room showing the locations of the remote power supplies and all other electrical items in the room to demonstrate that adequate space is available to install the power supply.
- 7. Guaranty.
- 8. Operations and Maintenance Manual: Provide two (2) bound copies of the Operations and Maintenance Manuals in three (3) hole binders with hard covers and one (1) electronic copy in PDF format. The manuals shall be submitted to the Owner a minimum of two (2) weeks prior to the final test.
 - a. The manual may be provided in several volumes if so approved by the Owner.
 - b. All drawings shall be folded to letter size by individual sheets so they can be retained in the manual.
 - c. The manual shall contain the following:
 - (1) Manufacturer's printed equipment/system operations and maintenance manual and device brochures:
 - (a) Start-up, operating, preventative maintenance, adjustment and troubleshooting procedures and parts list.

(b) System control diagrams.

(c) Internal equipment wiring diagrams.

(2) **Manufacturer's Representatives:** The names, addresses and phone numbers of the fire alarm system manufacturer, the nearest manufacturer's representative, and the nearest supplier of the manufacturer's equipment and parts.

(3) **FACP Programming Access Code.**

(4) **Fire Alarm System Test Results:** Provide completed test plan data sheets with the recorded measured results obtained during pre-final testing in the designated spaces and a printout of the equipment program. The test plan shall be developed in accordance with the testing requirements listed in this section. Include the following information on the test plan data sheets:

(a) Test information applicable for the project.

(b) Standard attendance signature sheets.

(5) **Field-Posted As-Built Fire Alarm System Drawings:** Provide a copy of the field-posted as-built information, and other diagrams and drawings prepared by the fire alarm system manufacturer or supplier for the project.

1.07 QUALITY ASSURANCE

A. **Codes, Standards and Regulations:** Perform the entire installation in strict accordance with the requirements, practices and recommendations of the following:

1. American Electricians Handbook by Croft (latest edition), McGraw-Hill.
2. Practical Electrical Wiring by Herbert P. Richter and W. Creighton Schwan, McGraw-Hill.
3. Copper Development, Inc.'s "Copper Building Wire Handbook".
4. National Electrical Code.
5. National Electrical Safety Code.
6. NFPA Codes and Standards for Fire Alarm and Fire Protection Systems.
7. Local ordinances and regulations of the County.
8. International Municipal Signal Association Inc. Specification No. 19-1 1991, polyethylene insulated, polyvinyl chloride jacket signal cable.
9. Applicable instructions of the manufacturer for equipment and materials supplied

for the project.

- B. Underwriters' Laboratories Listing and Cross-Listings: Each and all items of the fire alarm system shall be a standard and listed product of a SINGLE fire alarm system manufacturer under the appropriate category by Underwriters' Laboratories, Inc. (UL) or appropriately cross-listed, and shall bear the "U.L." label. All control equipment shall be listed under UL category UOJZ as a single control unit. Partial listing shall NOT be acceptable.
- C. Underwriters' Laboratories Listing and Marking for Systems Controls: In addition to the UL-UOJZ requirement mentioned above, the system controls shall be UL listed for power limited applications per NEC 760. All circuits shall be marked in accordance with NEC article 760-42, circuit marking.
- D. Duration of Doing Business In State: Prior to the time of bidding, the supplier's office shall have supplied fire alarm systems and provided repair service for those systems in the State of Hawaii for a minimum period of three (3) years.
- E. Acceptable Installers: Installation, adjustments, and testing of the fire alarm system shall be performed under the supervision of a NICET certified technician who is qualified with at least two years' experience in the installation and operation of the fire alarm system of the type specified herein.

1.08 GUARANTY AND CERTIFICATE

- A. The Contractor shall guaranty and certify in writing all work in this section for period of two (2) years. Should any equipment or material fail due to defective equipment, material or workmanship within this period, the Contractor shall replace the item at no cost to the Owner.
- B. The two (2) year guaranty shall start at the end of thirty (30) consecutive days of trouble free operation after certification by the Fire Department and acceptance by the Owner whichever date is the latest.

1.09 MAINTENANCE

- A. During the fire alarm system's two (2) year guaranty period, the Contractor shall supply complete maintenance and testing services for the entire fire alarm system in accordance with the manufacturer's instructions. The system shall be tested and serviced every six (6) months for a minimum of four (4) times during the guaranty period. Reports prepared on Contractor-furnished standardized forms shall be submitted to Owner each time a test and/or maintenance action occurs.
- B. During the two (2) year guaranty period, the Contractor shall, upon the receipt of notice from the Owner's representative, promptly make all repairs arising out of defective material, workmanship or equipment. The Contractor shall respond to such notices within 24 hours after receipt of the notice.

The local representative or supplier shall have direct access to replacement parts and a fire alarm repairman, either on his own staff or in a manufacturer's service

center, to ensure the system can be restored to normal operation within two (2) days of system failure. Costs including air-fare, car rental, travel time, etc. shall be borne by the Contractor.

It is understood that the Owner will undertake repairs if, following two (2) working days after receipt of such notice, the Contractor fails to make or undertake the repairs with due diligence. The expense in connection therewith shall be charged to the Contractor.

PART 2 - PRODUCTS

2.01 FIRE ALARM SYSTEM EQUIPMENT, COMPONENTS AND MATERIALS

- A. Fire Alarm Control Panels (FACP): The FACP shall be modular with solid-state microprocessor based electronics, installed in a single enclosure or group of enclosures mounted at a single location (installed within two feet or less from each other).

The FACP shall be UL listed for NFPA 72 and power limited applications per NEC article 760 and shall also be fully field configurable, programmable, and editable to minimize delay due to last minute operational changes.

1. FACP Initiating and Signaling Device Point Quantities: The FACP shall include one addressable loop with minimum 127 points expandable up to maximum 500 points for initiating and signaling devices with the installation of additional plug-in circuit modules/cards. All circuit modules/cards for signaling device circuits shall be installed within the FACP enclosure. Circuit extender panels shall be used only in remote applications where required due to length of circuit conductors and after all physical capacity of the fire alarm control panel has been utilized.
2. FACP Primary Controls and Displays: The FACP shall contain the following primary controls and displays which shall be visible and accessible through the front access panel:
 - a. Local Alarm/Trouble Audible Device: The device shall sound during alarm, trouble, or supervisory conditions. This audible device shall sound differently during each of the above conditions to distinguish one condition from another without having to view the panel.
 - b. LCD Display: Eight line with twenty-one characters per line liquid crystal alpha-numeric display (Other alternatives to the liquid crystal display that provide the same functional requirements, serve the same purpose and are as readable are acceptable). The characters shall be backlit for easy readability and shall be a minimum height of three-sixteenths of an inch (3/16").

Messages shall be displayed in laymen's terms. Manufacturer's code words will not be allowed. For example, messages shall read "Open circuit trouble." or "Signal circuit #1", not "Code #1".

- c. LED Display Colors For Various Functions: Individual alarm, trouble, supervisory service and "power on" LED's (Other alternatives to the LED's that provide the same functional requirements, serve the same purpose and are as readable are acceptable).

The LEDs shall be colored and differentiated as follows:

- (1) Alarm LED - red.
- (2) Trouble LED - yellow.
- (3) Supervisory service LED - yellow.
- (4) "Power On" LED - green.

- d. Functions Keys (single action controls):

- (1) Alarm, trouble and supervisory service acknowledge keys: When the acknowledge keys are activated the display shall respond/display the location and type of alarm, trouble, or supervisory service.
- (2) Alarm silence key: When activated, the alarm audible device shall silence and the alarm indicators shall remain illuminated until the system is returned to normal conditions.
- (3) System reset key: When activated, the entire system shall return to normal operating mode. If an alarm condition continues to exist, then the system shall remain in an alarmed state. The time period between activation of the reset key and acknowledgement by the system shall not exceed 30 seconds.

3. Panel Modules and Expansion Cards: The following panel modules, expansion cards and/or a combination thereof shall be provided in the FACP:

- a. Master Controller Central Processing Unit: One (1) master controller central processing unit with audio, power supply and charger.
- b. Auxiliary Control Relay Module: Provide One (1) Auxiliary Control Relay Module containing four (4) DPDT, positive feedback auxiliary control relays to determine the operational status of remote devices.

4. FACP Functional and Operational Requirements: The FACP shall provide the following functional and operational requirements:

- a. Date and Time: The FACP shall display the current date and time and provide for the setting and resetting of the date and time.
- b. Alarm Verification: Only a verified alarm shall initiate the alarm sequence operation to eliminate the possibility of false alarms. The activation of any detector (smoke or heat) shall initiate an alarm verification operation whereby the panel will reset the activated detector and wait for a second

alarm activation. If within one (1) minute after resetting, a second alarm is reported from the same or any other detector, the system shall process the condition as an alarm condition. If within one (1) minute no other alarm is reported, then the detector shall return to normal operation mode.

- c. Alarm Verification Tally: The FACP shall have the capability to display the number of times a point has gone into an alarm verification mode. Should the alarm verification tally reach a pre-programmed number, a trouble condition shall occur.
- d. Disable and Enable Control: The FACP shall have the capability to disable/enable a device or a circuit at its point so the system will not alarm during repair and/or maintenance of the device or circuit.
- e. Operational, Alarm and Trouble Relay Status: The FACP shall have the capability to check the operational, alarm and trouble status of the DPDT auxiliary control relays.
- f. Supervision: The incoming power, system battery power, all devices and LED's (or equivalent alternatives as described herein) in the system shall be supervised and accomplished as follows:
 - (1) Incoming power shall be supervised so that any power failure shall be visibly and audibly indicated at the FACP. A "power on" LED shall be displayed continuously while incoming power is present.
 - (2) System batteries shall be supervised so that a low battery condition or disconnection shall be visibly and audibly indicated at the FACP.
 - (3) The alarm initiating and signaling devices specified herein shall be independently supervised so that a fault in the addressable loop shall not affect the subsequent alarm operation of any other devices within the system.
 - (4) All devices shall be supervised and annunciated at the FACP. Annunciation shall include the following conditions for each point:
 - (a) Alarm.
 - (b) Trouble.
 - (c) Open.
 - (d) Short.
 - (e) Device missing/failed.
 - (5) All LED's (or equivalent alternative as described herein) shall be supervised for burnout or disarrangement. A complete and operable circuit for an LED (lamp) test shall be included. For any problem(s) that should occur during testing, the FACP shall display the location of the

problem.

- (6) Exceptions No.'s 10 and 11 of NFPA 72 Section 4-2.1 notwithstanding, all fire alarm system panels and equipment, internal modules, ribbon cables and wires shall be continuously supervised.

Should modules, ribbon cables and wiring become disconnected and/or severed, the fire alarm system trouble LED shall illuminate and the audible trouble device shall sound.

- g. Historical Alarm Log: The log shall record and display chronological information which includes alarm events by date and time and a brief description of the event. The alarm log shall be separate and not combined with the trouble log.

- h. Historical Trouble Log:

- (1) The log shall record and display chronological trouble information which includes trouble events by date and time and a brief description of the event.
- (2) The log shall also record and display walk tests to check for problems that may have occurred during testing.

- i. Walk Test:

- (1) A zone-by-zone test of the fire alarm system that can be done by one (1) person.
- (2) During testing, the system shall pulse the signal for alarm conditions and sound steady for trouble conditions.
- (3) There shall be an option for a silent test (Silent Walk Test).
- (4) After the walk test has been logged into the Historical Trouble Log, the system shall automatically reset itself to normal operation mode.

- j. Primary Operator Interface:

- (1) Interface shall be via a simplified operator's panel with indicators and interaction keys required for operation during both normal and emergency situations.
- (2) Simplified operating instructions shall be imprinted on the panel face in a manner that is durable and readable.

- k. System Operational Functions: System operational functions shall be restricted via categories or access levels with passcodes. The categories or access levels shall deter unauthorized access to various system software procedures.

- (1) The first or lowest category/level (Category 1/Level 1) of access shall be reserved for routine actions for normal operation and shall consist of the following functions:
 - (a) Alarm Silence.
 - (b) System Reset.
 - (c) Use of the acknowledge keys.
 - (d) Access to system data such as: View Historical Logs and View Point Status.
- (2) The highest category or access level shall be reserved for access to sensitive functions by an authorized technician and shall consist of the following functions:
 - (a) The use of the Walk Test function.
 - (b) The clearing of the Alarm Verification Tally.
- (3) Passcodes shall consist of a number with a minimum of three (3) digits. A passcode shall not be required to access Category 1/Level 1 functions.
- (4) If the programs or functions are not used within a category or access level for a period of ten (10) minutes the FACP shall return to normal operation (Category 1/Level 1).
- (5) Other Functions: All other functions shall be placed in their respective categories or access levels as determined by the manufacturer.

I. Operation: The operation of the FACP shall be as follows:

- (1) During normal operation the front panel shall display "SYSTEM IS NORMAL" or an equivalent message stating that the system is in a normal operation mode with no problems.
- (2) The system alarm operation subsequent to alarm activation by any initiating device shall be as follows:
 - (a) All audible alarm devices shall sound a three-pulse temporal pattern signal per NFPA 72 until silenced by the alarm silence switch.
 - (b) All visual alarm indicating appliances shall flash until reset by the alarm silence switch.
 - (c) Appropriate LEDs shall illuminate and the corresponding zone/device information shall be displayed on the FACP display.
 - (d) Alarm conditions shall be immediately displayed by the fire alarm panel.

- (3) Should the alarm silence button be pressed, all alarm signals shall be silenced but the alarm LED's shall remain illuminated until all conditions return to normal.
- (4) Should the "System Reset" button be pressed, the system shall return to its normal state after an alarm condition has been remedied. If an alarm condition remains then the system shall remain in an alarmed state.
- (5) The system trouble operation shall be as follows:
 - (a) An open or ground in the system shall cause a separately mounted trouble signal to sound continuously until the system has been restored to normal or until the signal has been silenced by a cut-off switch.
 - (b) Any open circuit or ground in the system shall not cause a general alarm (false alarm).
 - (c) All trouble conditions shall be immediately displayed by the FACP.
 - (d) When the cut-off switch has silenced the trouble signal, a red pilot light shall be illuminated to indicate such action. Upon restoration of the system to normal working order, should the trouble still exist, the trouble signal shall again sound until the cut-off switch has been restored to its normal position and thereby also extinguishing the pilot light.
 - (e) Should a trouble condition be present within the system and the audible trouble signal is silenced, the trouble signal shall resound at preprogrammed time intervals to act as a reminder that the fire alarm system is not 100% operational.
- 5. Battery Capacity Requirements: The fire alarm panel shall include sufficient battery capacity to operate the entire system upon loss of normal 120 VAC power in a normal supervisory mode for a period of twenty-four (24) hours with five (5) minutes of alarm operation at the end of this period.
 - a. Batteries shall be sealed and be the "maintenance free" type.
 - b. The system shall automatically transfer to the standby batteries upon power failure.
 - c. All battery charging and recharging operations shall be automatic. When required, provide separate enclosure for mounting batteries adjacent to the existing control panel.
 - d. Provide calculations that illustrate new equipment and device loads do not exceed the battery capacity for the period of alarm operation noted above.
 - e. All new circuits requiring system operating power shall be 24 VDC and shall

be individually fused at the new control panel.

- B. Amplifiers, Preamplifiers, and Tone Generators: Any amplifiers, preamplifiers, tone generators, digitalized voice drives and all other hardware necessary for a complete, operational textual audible circuit conforming to NFPA 72 shall be housed in a remote fire alarm control unit, terminal cabinet, or in the fire alarm control panel. The system shall automatically operate and control all building fire alarm speakers except those installed in the stairs and within elevator cabs. The speakers in the stairs and elevator cabs shall operate only when the microphone is used to deliver live messages. Each amplifier shall have two channels; one to broadcast a message and the other for paging.
1. Construction: All amplifiers shall utilize computer grade solid state components and shall be provided with output protection devices sufficient to protect the amplifier against any transient up to ten (10) times the highest rated voltage in the system.
 2. Inputs: Each system shall be equipped with separate inputs from the tone generator, digitalized voice driver and panel mounted microphone. Microphone inputs shall be of the low impedance, balanced line type. Both microphone and tone generator input shall be operational on any amplifier.
 3. Tone Generator: The tone generator shall be of the modular, plug-in type with securely attached labels to identify the component as a tone generator and to identify the specific tone it produces. The tone generator shall produce a temporal three pattern, and be constantly repeated until interrupted by either the digitalized voice message, the microphone input or the alarm silence mode as specified. The tone generator shall be single channel with an automatic backup generator per channel such that failure of the primary tone generator causes the backup generator to automatically take over the functions of the failed unit and also causes transfer of the common trouble relay. All audio circuits shall be synchronized.
 4. Protection Circuits: Each amplifier shall be constantly supervised for any condition which could render the amplifier inoperable at its maximum output. Failure of any component shall cause automatic transfer to a designated backup amplifier, illumination of a visual "amplifier trouble" indicator on the control panel, appropriate logging of the condition on the system printer and other actions for trouble conditions as specified.
- C. Remote Fire Alarm Annunciator: Where shown in the plans, provide and install a fire alarm annunciator. The annunciator shall be microprocessor based, compatible with the FACP and shall provide the following features and functions:
1. Local Alarm/Trouble Audible Alarm Device: The device shall sound differently during alarm, trouble, and supervisory conditions to distinguish one condition from another without having to view the panel.
 2. Displays:
 - a. Eight line with 21 characters per line liquid crystal alpha-numeric display.

- b. Other alternatives to the liquid crystal display that provide the same functional requirements, serve the same purpose and are as readable are acceptable.
 - c. The characters shall be backlit for easy readability and shall be a minimum height of three-sixteenths of an inch (3/16").
- 3. LED Display Colors For Various Functions:
 - a. LED display for individual alarm, trouble, supervisory service and "power on".
 - b. Other alternative to the LEDs that provide the same functional requirements, serve the same purpose and are as readable are acceptable.
 - c. The LEDs shall be colored and differentiated as follows:
 - (1) Alarm LED - red.
 - (2) Trouble LED - yellow.
 - (3) Supervisory service LED - yellow.
 - (4) "Power On" LED - green.
- 4. Function Keys (single action controls):
 - a. Alarm, trouble and supervisory service acknowledge keys: When the acknowledge keys are activated the display shall respond/display the location and type of alarm, trouble, or supervisory service.
 - b. Fire Alarm Annunciator Function Keys:
 - (1) The annunciator shall contain the function keys as specified herein to access system data such as disable/enable status, alarm verification tallies, acknowledge status and relay status.
 - (2) The annunciator shall include the five (5) programmable function keys as specified above for the FACP.
 - (3) Access to the annunciator's system operational function shall be via access levels and codes similar to that as specified for the FACP.
 - c. System Reset Key: Provide a system reset key to acknowledge and reset the main fire alarm control panel. System reset time shall not exceed 30 seconds.
- 5. Fire Alarm Annunciator Supervision: The fire alarm annunciator shall be supervised within the annunciator and by the FACP.

6. The fire alarm annunciator shall be equipped with a microphone for delivery of live messages.

C. FACP, Annunciator and Other Panel Cabinets:

1. General Requirements:

- a. Type: Surface mounted wall cabinets with a hinged door and cylinder lock.
- b. Construction: Sixteen (16) gauge steel.
- c. Finish: Factory paint fire alarm panels and cabinets with a primer coat and not less than two coats of a hard, durable weatherproof enamel.
- d. Color: Beige.
- e. Keying: Cabinets shall be keyed-alike.

2. FACP Cabinet:

- a. Equipped with an auxiliary door for access to normally used switches and meters without exposing wire terminals.
- b. Size:
 - (1) Provide a minimum of four inches (4") of top and side gutters and a minimum of six inches (6") of bottom gutter for wiring.
 - (2) Sufficient to provide space reserved for additional modules and cards for system expansion.
 - (3) The enclosure shall be no smaller than two feet (2') by three feet (3').

3. Annunciator Cabinet: Equipped with a hinged door, full-sized plexiglass window and cylinder lock. Cabinets for annunciators located in exterior locations shall be NEMA 4X stainless steel with matching gasketed hinged door, full-sized plexiglass window and cylinder lock.

D. Peripheral Devices:

1. Manual Stations:

- a. Addressable single-action type initiating stations with cast-in operating directions. Switch shall be normally open.
- b. Wall mounted over outlet boxes.
 - (1) For surface mounted manual stations provide factory manufactured surface back box with same base size as the manual station or to suit enclosure.

- (2) When mounted in exterior locations, pull station shall be weatherproof and outlet box shall be of cast metal with watertight gasket between box and station.
 - c. Keys to reset stations and the fire alarm control panel shall be keyed alike.
 - d. The fire alarm pull stations shall not utilize break-glass windows or glass rods. When the station is operated, the handle shall lock in a protruding manner to facilitate quick visual identification of the activated station.
 - e. Stations which utilize screw drivers, Allen wrenches or other commonly available tools to reset them will not be permitted.
 - f. Screw type terminals for separate wire leads to in/out wiring for each leg of the associated signal circuit.
 - g. Pull station guard covers shall be equipped with tamper-proof latch which may be opened for testing or resetting after station has been operated for fire drills.
2. Speakers:
- a. Provide fire alarm speakers conforming to UL 464 having a minimum of three (3) tap settings and separate terminations for each "in" and "out" connection. Tap settings shall include taps of 1/4, 1/2 and 1 watt. Speakers shall have an output rating of 84 dBA at 10 feet as determined by the reverberant room test; data on peak output as determined in an anechoic chamber is not suitable. All speakers shall be capable of installation on standard 4-inch square electrical boxes. Where speakers and strobes are provided in the same location, they may be combined into a single wall mounted unit.
 - b. Provide speaker mounting plates constructed of cold rolled steel having a minimum thickness of 16 gauge and equipped with mounting holes and other openings as needed for a complete installation. All fabrication marks and holes shall be ground and finished to provide a smooth and neat appearance for each plate. Each plate shall be primed and painted.
 - c. Wall mounted over outlet boxes
 - (1) Provide factory manufactured back box with same size base as the horn or to suit enclosure.
 - (2) When mounted in exterior locations, device shall be weatherproof and outlet box shall be of cast metal with watertight gasket between box and station.
3. Strobes:
- a. 24 VDC.

- b. The lamp shall be LED strobe type or equal.
- c. The color shall be clear or nominal white (i.e. unfiltered or clear filtered white light).
- d. The maximum pulse duration shall be two-tenths of one second (0.2 sec) with a maximum duty cycle of 40 percent. The pulse duration is defined as the time interval between initial and final points of 10 percent of maximum signal.
- e. The intensity shall be minimum of 75 candela.
- f. The flash rate shall be a minimum of 1 Hz and a maximum of 3 Hz. Fire alarm strobes shall be synchronized with other strobes when in the same room or in view of other strobes.
- g. Tamper resistant lens and polarized in/out wiring.
- h. Screw type terminals for separate in/out wiring for each leg of the associated signal circuit.
- i. Combination type devices (i.e. horn-strobe combination devices) are as indicated on the drawings.
- j. Wall mounted over outlet boxes.
 - (1) For surface mounted horns provide factory manufactured surface back box with same size base as the horn or to suit enclosure.
 - (2) When mounted in exterior locations, device shall be weatherproof and outlet box shall be of cast metal with watertight gasket between box and station.

4. Photoelectric Smoke Detectors:

- a. Addressable detectors.
- b. UL listed to Standard 268.
- c. Either two (2) or four (4) wire, 24 VDC operation.
- d. Min. rated area of coverage: 150 s.f.
- e. Low profile.
- f. Ceiling or wall mounted.
- g. Totally shielded electronics to protect against false alarms from EMI and RFI.
- h. Containing both a pulsing and alarm LED indicator.

- i. Locking screw to discourage unauthorized removal of the head from the base.
 - j. Completely closed back to restrict entry of dust and air turbulence.
 - k. Magnetically operated test switch that will test the electronics of the unit and put it into alarm.
 - l. Screw type terminals for separate in/out wiring for each leg of the associated signal circuit.
- E. Addressable Interface Devices: The addressable interface devices shall provide an addressable input interface to the FACP for monitoring normally-open or normally-closed contact devices.
- F. Above Grade Cables And Conductors: Cables and conductors shall be as specified in Section 16050 – BASIC MATERIALS AND METHODS.
- G. Raceways: Raceways shall be installed as specified in Section 16050 – BASIC MATERIALS AND METHODS. Conceal all raceways where possible.
- H. Conductor Markers:
 - 1. Taped-band type of permanent material, machine printed with proper identification. Hand written labels are not acceptable.
 - 2. The marker shall be white and the markings black in color so that the identification can be easily read.
- I. Cable Markers:
 - 1. Rectangular, commercially available polyethylene cable tags with pre-punched holes at each corner for the attachment with self-locking ties.
 - 2. Minimum 0.035-inch thick.
 - 3. Average tensile strength: 4500 P.S.I.
 - 4. Non-corrosive, non-conductive, resistant to acids, alkalis, organic solvents, salt water and distortion-resistant in temperatures up to 300 degrees F.
 - 5. White or yellow and machine printed with the phrase "Fire Alarm Cable – (Insert Circuit Type) Circuit No. ____ " or similar in black block letters 1/8" or larger in vertical height. Handwritten markers are not acceptable.
 - a. The preprinting shall be permanent and shall not fade or dissolve.
 - b. The tags shall be suitable for marking with black permanent markers. There shall also be space available for additional notes (for maintenance/service contractor use only).

- J. Cable and Conductor Ties: One-piece, self-locking nylon ties having a minimum loop tensile strength of 175 pounds and resistance to the same conditions as cable marker.
- K. Nameplates: Provide metallic and/or phenolic, noncorrosive and non-heat sensitive nameplates for:
 - 1. Fire Alarm Control Panel: The nameplates shall be factory installed, securely mounted inside the fire alarm panel with machine screws or glue, and shall also be accessible and visible. Information on the nameplates shall be 1/8" or larger lettering stamped or engraved with the following:
 - a. Manufacturer's name and address.
 - b. Model Number.
 - c. Serial Number.
 - d. Date of Manufacture.
 - e. Manufacturer's drawing number (if available).
 - 2. Modules: The nameplates shall be securely mounted on the module with machine screws or glue and include the following information:
 - a. Module model and/or type number.
 - b. Catalog number.
- L. Panel Layout And Circuit Connections Diagram: The diagram shall be printed on bond paper no smaller than 8-1/2 inches by 11 inches. Securely mount the diagram inside the fire alarm control panel and support equipment.
- M. Corrosion And Fungus Protection: Metallic equipment shall be coated with a rust inhibiting treatment and standard finish per the manufacturer's standard. Components shall be protected against corrosion and fungus (e.g. circuit boards shall be epoxy coated).
- N. Surge Protection: All electrical circuits (120V and 24 VDC) supplying power to the system components shall be equipped with surge protectors.

PART 3 - EXECUTION

3.01 EXAMINATION OF THE DRAWINGS AND SPECIFICATIONS

Confirm and coordinate voltages and requirements of equipment furnished by other trades which will be connected to the fire alarm system. Include the above information on the field-post as-built drawings.

3.02 EXAMINATION OF EXISTING SITE CONDITIONS

- A. Cabinets, annunciators, panels, manual pullstations, strobes, horn-strobe combinations, smoke detectors, heat detectors and other equipment and devices shall be installed in the locations and heights shown on the drawings and/or as specified herein.
 - 1. The location of the equipment and devices shown on the plans are approximate. Before installing, the Contractor shall study adjacent construction, verify all dimensions and sizes of equipment at the job site and perform installation in what he considers the most logical manner.
 - 2. Any changes from the locations shown on the drawings must be approved by the Engineer and shown on the "field-posted as-built" drawings.
 - 3. Any device may be relocated within 10'-0" before installation at the direction of Engineer or Owner without additional charge to Owner.
- B. The Contractor shall determine the location of existing cables and record their route on the field-posted as-built drawings.

3.03 INSTALLATION

- A. Protect dissimilar metals with approved fittings and treatment.
- B. All metallic conduits and boxes shall be grounded.
- C. Panel Mounting Height: The FACP and all additional panels shall be mounted such that the top of the cabinet does not exceed six feet (6') above the finished floor.
- D. Cables and Conductors:
 - 1. Above Grade Conductor Installation:
 - a. Conductors shall not be installed in the same conduits, junction boxes, etc. with non-fire alarm circuits. 120-volt AC fire alarm circuit conductors shall not be in the same cable nor installed with cables and other conductors in the same conduits, enclosures, junction boxes, etc. with 24-volt DC fire alarm circuits.
 - b. Conductors shall be installed in continuous lengths. Splices shall be made in above ground junction boxes by terminating wires with wirenut connections.
 - c. Cable pulling tensions shall not exceed manufacturer's recommended pulling tensions.
 - d. Wire-nut connectors: Permitted for connections in above grade locations only, in junction boxes and equipment and to devices that are not available or manufactured with screw-type connections.

2. Conductor Color Code: Conductors shall be provided with insulation color coded as follows:
 - a. Power Branch Circuit Conductors: Red (+), White (-) for 120 VAC.
 - b. Initiating Device Circuit: Red (+), Black (-).
 - c. Notification Device Circuit: Brown (+), Yellow (-).
 - d. Detector Power Supply: Violet (+), Black (-).
- E. Cable and Conductor Terminations And Dress: The following requirements shall apply to terminal cabinets, wiring gutters, junction and outlet boxes larger than 6" x 6":
 1. Electric equipment shall be installed in a neat and workmanlike manner.
 2. Cable conductors or individual conductors shall be bundled, dressed and held together with cable straps, ties or lace and fanned in a manner that equipment terminals are visible and accessible, and allow the connections to be removed and reconnected without moving a large number of wires.
 - a. Conductors to screw type connectors shall be terminated with wire lugs or with approved cable termination connectors compatible with the specific termination.
 - b. A minimum of 6-inch excess length shall be provided for conductors from the bundles to the connectors using a vibration loop as described by NEC 300-14.
 - c. Conductors shall be labeled as specified herein.
 3. Cross-connected conductor pairs in junction and device outlet boxes or cabinets will not require bundling and cable straps, ties or lace but shall be neatly installed with a minimum of 6 inches of excess length so conductors can be easily traced between terminals. Label all conductors as specified herein.
 4. Cabinets, gutters, junction boxes, outlet boxes, other boxes, shall have sufficient space to accommodate all conductors installed in them without crowding.
 5. Completed work shall be uncrowded and uncluttered and shall allow accessibility without cutting and/or removing of any straps, ties, laces, cables, components, devices, brackets, modules, equipment and like items.
 6. Cables shall be secured to junction boxes, equipment cabinet backboards, console members or to other system components using cable clamps and wraps. Provide cable support posts as required to facilitate system installation.

F. Cable and Conductor Identification System:

1. Conductor Markers:

- a. Provide markers at both ends of each conductor connected to the panels or other terminations (e.g. cabinets, equipment terminal outlet/junction boxes, devices, etc.) and at all accessible locations that conductors pass through.
- b. Attach markers a minimum of four (4) inches from the ends of conductors in a manner that will not permit accidental detachment.

2. Initiating Devices: Initiating devices shall be labeled by device number as shown on the manufacturer's installation drawings. Conductors shall be labeled in the fire alarm panel(s), the building's main fire alarm wiring gutter or termination cabinet and at all devices.

3. Alarm Notification Devices: Notification devices shall be labeled by device number as shown on the manufacturer's installation drawings. Conductors shall be labeled in the fire alarm panel(s), in the building's main fire alarm wiring gutter or termination cabinet and at all devices.

4. Annunciator Cables or Conductors: Annunciator cables or conductors and miscellaneous items and functions peculiar to manufacturer's panes shall be labeled by annunciator or function number and cable, conductor function or zone number as shown on the drawings.

G. Framed Building Map: A framed map of the building drawn at a minimum scale of 1/16"=1'-0", showing the locations of each manual pull station, audio and visual signaling devices, and smoke detectors shall be printed on a white background, and permanently mounted adjacent to the fire alarm control panel for the building.

H. Framed Operating Instructions: A framed set of operating instruction printed on a white background or engraved Fire Alarm Panel Operating Instructions shall be provided. The framed instructions shall be permanently mounted adjacent to the fire alarm control panel for each building.

I. Field Touch-up Painting: Touch-up painted surfaces and fire alarm system components damaged during installation to match the existing or specified paint and color.

J. Framed Operation Matrix: A framed set of system functional operations matrix printed on a white background or engraved Fire Alarm System Matrix shall be provided. The framed Matrix shall be permanently mounted adjacent to the fire alarm control panel.

3.04 TESTING

A. Testing Of The New Fire Alarm Systems:

1. After completion of the fire alarm system's installation, turn on and leave the system on for a minimum of three (3) consecutive weeks to demonstrate that

contract work meets the requirements of the specifications and drawings.

2. Upon successful completion of the three (3) week operational period, the Contractor shall administer a prefinal fire alarm system test and inspection. The test and inspection shall be arranged with the Owner and demonstrate that all the Contractor installed fire alarm system equipment, devices, cables and conductors are operating properly and have been installed in accordance with the specifications and drawings.

Accordingly, the test demonstrates that the system is ready for a final test of the overall fire alarm system.

Representatives at the prefinal test shall include the Contractor, fire alarm system manufacturer's representative, Owner's representative, and the fire alarm system design consultant. Representatives at the final test shall include all the foregoing representatives and the County Fire Department Inspector.

3. Fire Alarm Panel and Equipment Tests: Test all equipment by disconnecting modules, ribbon cables and wiring to verify that the system/equipment are supervised. Demonstrate both normal and abnormal modes of operation and the required responses of each mode.
4. Power Supply: Conduct a complete test of the power supply including rectifier, charging rates, and automatic controls in accordance with the manufacturer's instructions and recommendations.

Record operating input and output AC and DC voltages and currents (load) at the time of the tests and provide the data as part of the test and maintenance documentation submission requirements as specified herein.

5. Detailed Circuit Tests: Make detailed tests of supervisory features and trouble alarm circuits and relays. Tests shall be performed in accordance with the manufacturer's instructions and recommendations. Record operating amps per signal circuit and voltage at the last signal device.
6. Trouble Line Operations Test: Simulate line trouble by removing circuit wires from terminals or applying grounds to these terminals in the fire alarm panel.
7. Audio Tests:
 - a. Provide test equipment and conduct audio test for the fire alarm system in and around the building and in areas where new audio alarm devices have been installed.
 - b. Audio measurements shall be made in classrooms, offices and other rooms (e.g. equipment and storage rooms) and buildings with the doors in the open and closed positions.
 - c. The audio test plan and proposed test equipment shall be submitted for review and approval with the test plans submittal specified herein.

- d. The measured data shall be recorded on data sheets provided by the Contractor and shall be part of the test plan submission and records.
 - e. At the request of the Owner, the Contractor shall provide proof of instrument calibration and date of calibration.
- B. Concealed Work: Concealed work re-opened and re-closed at random during the formal inspection as requested by the Engineer or County Inspector shall be done at no additional cost to the Owner.
- C. Testing Tools and Equipment: The Contractor shall provide the tools and equipment, including walkie-talkies, etc. necessary to accomplish the testing.

3.05 TRAINING:

- A. Conduct training and instruction for the operating and maintenance staff, as designated by the Owner, on the operation of the fire alarm panels and system.
- B. The training session shall be conducted during normal business hours, and shall last as long as necessary to properly instruct the staff, but not less than 1-hour.
- C. Instruction shall include hands-on training in routine operations and queries (reading of normal status and trouble status) of the fire alarm system.
- D. If the control panels are of the central processing unit (CPU) type system, instruction shall include operations and query of system status, etc.; and hands-on training in the procedures and process for operations and obtaining system status, trouble and other functional information to determine when to call for repairs and how to report the type of trouble encountered.
- E. All necessary software, in compact disc format, site specific security keys and cable required for troubleshooting, programming, and maintaining the fire alarm system shall be submitted to the Owner upon completion of the final test.

END OF SECTION

SECTION 16810 – AUDIO VIDEO SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes Audio-Video Systems.
- B. The term “provide” used throughout this specification and drawings means “furnish, install, test, and certify”.
- C. Within two weeks after award of contract, the AV Contractor shall arrange a “CA kickoff” meeting and/or conference call with the General Contractor, Construction Manager, Architect, Consultant, and Owner (when applicable) to discuss general project expectations.
- D. Coordinate project schedule, installation schedule, phasing and any other requirements deemed necessary with Construction Manager and all necessary trades to ensure successful completion of work.
- E. Phasing, temporary distribution/equipment, cutover and implementation where applicable, shall be coordinated with the Construction Manager.
- F. Extent of Audio-Video Systems infrastructure work is indicated by Division 16 “Electrical” sections, drawings and schedules and is hereby defined to include, but not by way of limitation, the provisions of:
 - 1. Raceway systems including but not limited to conduits, cable trays, sleeves, surface raceways, pull-boxes, junction boxes, back-boxes, etc.
 - 2. Power distribution within equipment racks including programable power sequencing of AC circuits.
 - 3. All AV system related infrastructure shall be provided as part of the Base Building Project including but not limited to raceway, cable, cable terminals, and AV equipment rack room fit-out where applicable.
- G. Extent of Audio Video Systems Infrastructure as indicated by Division 16 “Communications” and those associated specification sections that address Ethernet and IT requirements shall include but not be limited to:
 - 1. Patch cords, jumper cables, and cross-connect cables to interconnect wiring terminals as well as electronic equipment.
 - 2. Network connectivity: a channel is defined as the connection from one active device to another, including any patch cords and equipment cords and shall not exceed 100 meters total length.
 - 3. Testing of all category type cable infrastructure and grounding systems as noted by specification, drawings, and applicable industry standards.

H. General requirements also include but are not limited to:

1. Grounding and bonding of all metallic hardware components back to the nearest grounding bus including, but not limited to equipment racks, cabinets, cable trays, ladder rack, metallic cable sheaths, wall mounted wiring terminals, conduits, sleeves, metallic ductwork, and frames.
2. All physical cable management hardware including, but not limited to: "J-hooks" in accessible ceiling areas where conduit has not been provided for, "D-rings" on backboards, vertical and horizontal managers on racks and cabinets, vertical and horizontal ladder-type or wire basket cable tray within AV head-end equipment rooms.
3. The use of Velcro type cable ties are required; the use of plastic zip ties shall not be permitted. No exceptions.
4. Fire stopping as required. Contractor shall provide fire stopping for all low-voltage openings (including empty low voltage raceway) once cable installation is complete. Confirm specific fire stopping scope requirements with Construction Manager.
5. Seismic bracing of all equipment racks, ladder-type or wire basket cable trays, ceiling recessed equipment such as loudspeakers, plenum boxes et cetera as required by code and by local governing jurisdiction.
6. Preparation and submission of product data, shop drawings, testing reports, as-built drawings, and cabling documentation as required in this specification.
7. Construction and Installation warranties.
8. Manufacturer components, channel and solutions warranties.
9. Installation and testing of all system and components shall be documented.
10. Onsite administrative and user training.

1.02 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Division 16 Electrical Sections pertaining to basic materials and installation methods, raceways, boxes, supports, grounding and bonding, and wiring.
- C. Division 16 Telecommunication Sections pertaining to structured UTP/STP cabling, fiber optic cabling, low voltage coaxial signal distribution and installation methods.
- D. Section 16813 "Audio Video Control Systems".
- E. Section 16819 "Audio Video Systems Performance Verification".
- F. Audio-Video Systems (AV) Construction Drawings for equipment locations, system layouts, one-line diagrams, and details.

1.03 REFERENCES

A. Audiovisual and Integrated Experience Association (AVIXA):

1. ANSI / INFOCOMM 2M – Standard Guide for Audiovisual Design and Coordination Processes
2. ANSI / INFOCOMM 10 – Audiovisual Systems Performance Verification
3. ANSI / INFOCOMM A102.01 – Audio Coverage Uniformity in Listener Areas
4. AVIXA F502.01 – Rack Building for Audiovisual Systems
5. AVIXA F502.02 – Rack Design for Audiovisual Systems
6. INFOCOMM F501.01 – Cable Labeling for Audiovisual Systems

B. Building Industry Consulting Service International (BICSI):

1. ANSI / BICSI 001 – Information and Communication Technology Systems Design and Implementation Best Practices for Educational Institutions and Facilities
2. ANSI / BICSI N1 – Installation Practices for Telecommunications and ICT Cabling and Related Cabling Infrastructure
3. ANSI / BICSI N3 – Planning and Installation Methods for the Bonding and Grounding of Telecommunication and ICT Systems and Infrastructure

C. Code of Federal Regulations (CFR):

1. 29 CFR 1910.268 – Occupation Safety and Health Standards (OSHA) – Telecommunications
2. 36 CFR 1191 – Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines

D. Electronic Components Industry Association (ECIA):

1. ECIA EIA/ECA 310-E – Cabinets, Racks, Panels, and Associated Equipment

E. National Fire Protection Association (NFPA):

1. NFPA 70 – National Electrical Code
2. NFPA 72 – National Fire Alarm and Signaling Code
3. NFPA 90A – Standard for the Installation of Air-Conditioning and Ventilating Systems

F. Telecommunications Industry Association (TIA):

1. TIA-568.0 – Generic Telecommunications Cabling for Customer Premises

2. TIA-568.1 – Commercial Building Telecommunications Infrastructure Standard
 3. TIA-568.2 – Balanced Twisted-Pair Telecommunications Cabling and Components Standards
 4. TIA-568.3 – Optical Fiber Cabling Components Standard
 5. TIA-568.4 – Broadband Coaxial Cabling and Components Standard
 6. TIA-569 – Telecommunications Pathways and Spaces
 7. TIA-606 – Administration Standard for Telecommunications Infrastructure
 8. TIA-607 – Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises
 9. TIA-862 – Structured Cabling Infrastructure Standard for Intelligent Building Systems
 10. TIA-1152 – Requirements for Field Test Instruments and Measurements for Balanced Twisted-Pair Cabling
- G. Underwriters Laboratories (UL):
1. UL 263 – Fire Tests of Building Construction and Materials
 2. UL 1480 – Speakers for Fire Alarm and Signaling Systems, Including Accessories
 3. UL 2043 – Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces
 4. UL 62368-1 – Audio/Video, Information and Communication Technology Equipment – Part 1: Safety Requirements

1.04 DEFINITIONS

- A. The term “Owner” shall refer to the facility’s owner or primary operator.
- B. The term “Architect” shall refer to the Architect of Record (AOR).
- C. The terms “Consultant”, “Designer of Record”, and “DOR” shall refer to CENSEO AV+Acoustics LLC, being responsible for the design and specification of the audio-video systems.
- D. The terms “AV Contractor”, “AVC”, and “Contractor” shall refer to the Audio-Video Systems Contractor who has been awarded the contract for this scope and who has responsibility for the performance of the work specified in this specification.
- E. The term “EC” shall refer to the electrical contractor.
- F. The term “GC” shall refer to the general contractor.
- G. The term “SCC” shall refer to the structured cabling contractor.

- H. The terms “not in contract” and “NIC” shall refer to work or equipment that is not in the contract covered in this specification.
- I. The terms “owner furnished equipment” and “OFE” shall refer to equipment which shall be furnished by the Owner or user to the Contractor. The Contractor shall be responsible for installing the equipment at the project site in good functional order as detailed herein. Where the equipment is existing or is used, the AV Contractor shall verify the operation and functionality of these devices prior to installation. Any deficiencies shall be brought to the Owner and Consultant’s attention immediately via written documentation.
- J. The term “procure” shall indicate the responsibility to acquire materials, equipment, or services needed to complete the project scope.
- K. The term “furnish” shall indicate the responsibility to ship or deliver the item to the job site for receipt, staging and installation by others.
- L. The term “install” or “installation” shall indicate the responsibility of receiving the item at the job site, providing adequate storage, unpacking or uncrating the item, physically securing the item or otherwise making ready the item for its intended use by following the instruction and approved methods of the manufacturer and those contained herein.
- M. The term “provide” shall refer to the responsibility to both procure, furnish, install, test and certify equipment.
- N. The term “shall” is mandatory; the term “will” is informative; the term “should” is advisory.

1.05 SCOPE OF WORK

- A. The completion of the work described within this specification section shall be the sole responsibility of one (1) firm, hereafter referred to as the AV Contractor or AVC. The AVC shall be responsible for providing all equipment, cabling, programming, testing, training and commissioning as described in this specification section.
- B. The AV Contractor shall provide all equipment, cabling, programming and materials, whether specifically mentioned herein or not, to ensure a turn-key and fully operational system.
- C. The specifications and drawings shall be read and used together. System features which are mentioned in the one are not necessarily shown in the other. In case of conflict between the drawings and specifications, request clarification via the pre-bid RFI proves. These pre-bid RFIs are due one (1) week before the bids are due. All pre-bid RFI responses shall be distributed to each Bidder.

1.06 System descriptions and functions

- A. Lobby
 - 1. A local digital signage display for wayfinding or announcements with a digital signage player mounted behind the display.
- B. CR Observation, Day Room, and Large Therapy

1. A local display protected by an anti-ligature shroud. The display will have the ability to show digital signage, and wireless screen sharing from laptops or mobile devices.
2. Devices include a digital signage player, wireless presentation, and network equipment to send audio to ceiling PoE+ speakers. Devices must be mounted in the recessed display backbox.
3. Each display will be connected to two (2) ceiling recessed PoE+ speakers for improved audio quality.
4. Displays are controlled by a local passkey protected control panel to change display sources, volume, and power.

C. Visit/Tele

1. A local display protected by an anti-ligature shroud. The display will have the ability to show digital signage, wireless screen sharing and wireless conferencing.
2. Devices include a digital signage player, wireless presentation, and VTC equipment. Devices must be mounted in the recessed display backbox.
3. Display will be connected to a VTC bar rigidly connected to the protective shroud.
4. Displays are controlled by a local passkey protected control panel to change display sources, volume, and to power up and power down the display.

D. Conference

1. The display will have the ability to show digital signage, wireless screen sharing, wireless conferencing, and local HDMI plate.
2. Devices include a digital signage player, wireless presentation, and VTC equipment. Devices must be mounted in the recessed display backbox.
3. Display will be connected to a VTC bar rigidly connected to the protective shroud.
4. Displays are controlled by a local passkey protected control panel to change display sources, volume, and to power up and power down the display.

1.07 RELATED WORK BY OTHER TRADE CONTRACTORS

- A. General Contractor: It is the responsibility of the GC to furnish and install all steel not shown on the Structural drawings but required for the Audio-Video equipment rigging and support. Additionally, the GC shall provide plywood backing to support video flat panel monitors, video walls, etc.
- B. Electrical: It is the responsibility of the EC to furnish and install the work described in the Electrical documentation. All high-voltage work shall be done by the EC only.

1. It is anticipated that the AV equipment rack grounding bar shall be provided and installed by the EC / Tele-Data Contractors. See drawing detail sheets for additional information.
 - C. Tele-data: It is the responsibility of the Tele-Data / IT Contractor to furnish and install network data drops (including those designated as Dante signal types) and wireless LAN access point equipment that shall be utilized by the AV Systems and one-line diagrams. AVC shall closely coordinate their requirements with the Tele-Data Contractor.
- 1.08 MILESTONES
- A. CA Kick-Off Meeting: Upon the contract award, and within twenty (20) working days, the AV Contractor shall initiate / set-up a meeting to discuss the project scope of the work, general project expectations and, but not limited to the following agenda items:
 1. AV System Functionality
 - a. Audio DSP programming, presets and operations
 - b. Control system functionality / preliminary discussions
 2. Shop Documentation and Submittal Schedule
 3. Installation Schedule / Timetable
 - a. Equipment delivery issues / lead times (if any)
 - b. Substantial Completion
 - c. Final Acceptance Testing
 4. As-built Documentation
 5. Owner Training
 - B. Electrical Infrastructure Site Survey: The AVC shall coordinate an electrical infrastructure & box site survey (box walk) with the GC & EC prior to the installation of drywall and ceiling and /or hard lid ceilings. AVC shall issue a report as to their findings to the OAC team so that identified issues can be resolved in a timely manner prior to the installation of the drywall or wall finishes.
- 1.09 BID SUBMITTALS
- A. AV Contractor's Qualifications: Bidders shall submit a qualification package demonstrating compliance with all the requirements specified herein. Refer to 1.11 QUALITY ASSURANCE. At a minimum, the qualification package shall include the following:
 1. A list of AV systems of comparable size and scope to that described herein, completed by the AV Contractor in that last five (5) years. Provide the project name, address, year of completion, and the name and telephone number of a person to contact who is a representative of the facility.

2. A personal resume of formal education, experience, and certifications of the identified team members. Including Project Manager, Project Engineer, and Software Programmer.
3. A description of the AV Installer's capabilities and facilities for rack assembly, shop fabrication software programming, repair, and servicing of AV systems.
4. A letter from the control system manufacturer(s) certifying that the AV Installer's software programmers have been factory trained and are qualified to provide the proposed installation.
5. All certifications and licenses shall be current must be held by the AVC for no less than one (1) year prior to this bid submittal

1.010 SUBMITTALS

- A. Long Lead-Time Items: Prior to submittal of Shop Documentation, and within one (1) month of contract award, the AVC shall submit a list of anticipated long lead-time items (i.e., items with a lead time of 8 weeks or longer) for early approval. It is expected that all items listed in this submittal be furnished immediately upon approval.
- B. Shop Documentation: The Shop Documentation submittal shall include the following items to be submitted simultaneously, no exceptions.
 1. Bill of Materials: A complete list with quantities of equipment to be provided for the systems, including that required for items which are to be fabricated by the AV Contractor (i.e., a bill of materials). Products shall be listed in the same order as found herein. No exceptions.
 2. Product Data: A complete set of manufacturer's equipment specifications with detailed technical information describing and illustrating all components and materials to be used in the installation of the AV systems. This would include those items listed by manufacturer and model number herein and any other components needed to provide complete functional systems.
 3. Cabling Schedule: A complete materials list containing cable type, cable marker identifier, connector type, and origin and destination location for each cable.
 4. Shop Drawings: The shop drawings shall be submitted after the award of contract and be of a scale suitable for use for fabrication. The AVC shall maintain on-site a hardcopy of their shop drawings detailing the latest as-built conditions. AV Contractor shall make the following shop drawings submittals:
 - a. A one-line signal flow block diagram showing exactly the manner in which the AV Contractor proposes to install the system. Show all switches, modifications to equipment, relay and control circuits. Show all equipment/apparatus items which are required for realization of the functions described herein.
 - b. Detail diagrams of items which are to be fabricated by the AV Contractor and/or which the AVC intends to fabricate or has fabricated, including, but not limited to,

the custom panels and receptacle plates. They shall show materials, finishes, panel/control markings, and complete dimensions when applicable.

- c. Detailed diagrams showing equipment rack layouts.
- d. Detailed diagrams showing loudspeaker mounting details with all hardware identified by manufacturer and model number.
- e. A signal loss diagram for the coaxial distribution of video signals with calculations to verify that the signal strength at each endpoint is within industry specifications.
- f. Any wireless microphone or monitor system shall indicate its proposed frequency band (such as G50 or J50A) on the one-line signal flow interconnect diagram.

C. Field Reports:

1. Electrical Infrastructure Site Survey required in Part 1 article "Milestones" of this Section.
2. System Start-Up Report specified in Part 3 article "Initial System Start-Up" of this Section.

D. Closeout Documents: Prior to Final Acceptance, AV Contractor shall submit the following:

1. System test reports, as specified in Part 3 of this Section. These documents are required twenty-one (21) calendar days before the anticipated final acceptance testing, else the appointment shall be rescheduled.
2. Updated control system and DSP source code and executable files, with all tunings and adjustments incorporated.
3. Updated frequency coordination, including specific "real world" frequency selection, showing no intermodulation distortion or channel conflicts.
4. Complete and accurate Final As-Built Drawings prior to final acceptance testing.
5. O & M manuals / documentation, programmable software files and executables as specified herein.
6. Written warranty, as specified herein, to take effect after the Consultant Final Acceptance Testing has occurred and any punch list-items have been completed.

1.011 QUALITY ASSURANCE

A. Manufacturer's Qualifications:

1. All electronic products shall be designed and marketed by the manufacturer for application in professional sound amplifying, reproduction and recording systems.
2. Obtain common materials and equipment through one source from a single manufacturer as much as practical.

B. Installer Qualifications:

1. Project Manager: At least one (1) person involved in the daily installation of these systems shall hold an AVIXA CTS-I certification.
 2. Project Engineer: A qualified staff engineer shall have five (5) years minimum experience and be certified as an AVIXA CTS-I. In place of a qualified staff engineer, the AV Contractor may retain a consulting engineer to direct the project. The staff or consulting engineer shall:
 - a. Provide all technical liaison between the AV Contractor and the Construction Manager.
 - b. Represent the AV Installer at meetings and conferences and be present at the job site for final inspection.
 - c. Be responsible for the supervision of all technical and engineering work required to execute the contract and approve and sign the shop drawings.
 - d. The staff engineer shall remain on the project (at a minimum) in a supervisory role until the completion of all AV-related work.
 3. Software Programmer: A manufacturer-certified software programmer shall be required to author the control system programming component of this project.
- C. Once site installation begins, written field updates, including photos, shall be required every two (2) weeks.
- D. Final Acceptance: Final Acceptance will be contingent upon issuance by the AV Consultant of a letter of acceptance stating that the work has been completed and is in accordance with the contract documents. This is when the warranty period shall begin and not at "Substantial Completion".

1.012 DELIVERY, STORAGE, HANDLING

- A. AV systems, infrastructure, raceways and equipment are sensitive to environmental conditions such as temperature, dirt, dust, and water. The AV contractor shall ensure the storage and installation of all AV Systems components are sequenced and scheduled accordingly to prevent any damage, loss of performance, and warranty void of such systems. All miss-installed components shall be replaced with new parts and re-installed at the AV Contractor's expense.
- B. The AV Contractor shall ensure the storage and installation of all AV Systems components are sequenced and scheduled accordingly to prevent any damage, loss of performance, and warranty void of such systems.
- C. All incorrectly installed components shall be replaced with new parts and re-installed at the AV Contractor's expense.

1.013 WARRANTY

- A. Manufacturer Warranties:
- B. Provide a written warranty, signed by the AV Contractor, due when the AVC issues the As-Built Documentation. The warranty period shall equal the requirements described the Division 00 sections.

- C. Include the following provisions:
1. Warranty all equipment and the installation to be free of faulty workmanship.
 2. Warranty all components, including solid state devices, to be free of defects.
 3. Paint and exterior finishes, fuses and lamps are excluded from above warranty, except when damage or failure results from defective materials or workmanship covered by the warranty.
- D. If, within the warranty period of the installation or within a longer period of time as may be prescribed by law or by the terms of any applicable special warranty required by the Contract Documents or provided by a manufacturer, any of the work or equipment is found to be defective or not in accordance with the Contract Documents, the AV Contractor shall correct it promptly including all parts and labor after receipt of notice from the Owner to do so unless the Owner has previously given the AV Contractor a written acceptance of such condition. This obligation shall survive termination of the contract. The Owner shall give such notice promptly after discovery of the condition. Such notice shall be provided by Owner representatives, to be identified, either verbally or in writing.
- E. Nothing contained in the Contract Documents shall be construed to establish a shorter period of limitation with respect to any other obligation which the AV Contractor might have under the Contract Documents or any manufacturer's warranty. The establishment of the time period noted above, after the date of Final Acceptance or such longer period of time as may be prescribed by law or by the terms of any warranty required by the Contract Documents, relates only to the specific obligation of the Contractor to correct the work or equipment, and has no relationship to the time within which their obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to their obligations other than specifically to correct the work or equipment.
- F. The Owner reserves the right to expand or add to the system during the warranty period using firm(s) other than the AV Contractor for such expansion without affecting the Contractor's responsibilities, provided that the expansion is done by a firm which is an authorized dealer or agent for the equipment of system being expanded.
- G. Structured Cable:
1. The manufacturer shall provide a warranty with a minimum term of twenty-five (25) years for structured cabling and all communications cable infrastructure components. This warranty shall cover all components including cables, jacks, patch panels, and wiring panels, etc. to maintain the specified performance, physical criteria, and applications assurance.
 2. Any such components, link, or channel shall be replaced by the manufacturer at no cost to Owner during this period.
 3. The Contractor and Manufacturer shall submit all information and documentation on Warranty
- H. Service Warranty:

1. Replace defective materials and repair faulty workmanship within 72 hours of discovery at no cost to the Owner during the period of the Warranty.
2. If during the warranty period, system operation is not fully restored, or a working temporary solution is not deemed acceptable by the Owner, within four (4) business days, the Owner reserves the right to require the Contractor to provide on-site manufacturer's service technicians at no additional cost.
3. At no additional charge, provide maintenance service for a period of one (1) year after the AV Consultant's Final Acceptance of installation. This service shall consist of at least one (1) visit six (6) months and one (1) visit eleven (11) months after Final Acceptance for regular maintenance responsibilities, checking equipment and systems operations / functionality, and rigging safety. The AVC shall make all necessary adjustments in a timely manner.
4. If, during the warranty period, any component is out of service for more than four (4) days due to unavailability of parts or service, supply and install an identical new component. If an identical component is not available, temporarily substitute equivalent equipment, but only with the written approval of the Owner.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Unless otherwise indicated, equipment in this Section shall be the standard products of a manufacturer regularly engaged in the manufacture of such products. All components used in the system shall be commercial designs that comply with the Specifications.
- B. All materials, equipment and apparatuses shall be new and of the latest design or model offered for sale by the manufacturer.
- C. Each major component of equipment shall identify the manufacturer's name, model and serial number. Items of the same classification shall be identical. This includes equipment, modules / cards, parts, and components.
- D. Principal items of equipment and apparatuses are identified herein by part number and manufacturer. Alternate part numbers and manufacturers are identified in instances in which equivalence has been determined.
- E. Acceptability for use in the systems shall be determined by the AV Systems Consultant. Such items shall be installed only after receipt of written approval. The Consultant retains the right to reject products which reflect, in the Consultant's opinion, sub-standard design practices, manufacturing procedures, support services, or warranty policies.

2.02 SUBSTITUTE EQUIPMENT

- A. AV Contractors who wish to provide substitution options to the base bid may do so by providing a completely separate and discrete bid document in addition to the original bid documentation.

- B. All substitution devices shall provide equal or better electronic or acoustical performance than the originally specified devices. This submittal would require a new EASE model for any proposed loudspeaker(s) to verify compliance with the Construction Documents where necessary.
- C. The AV Consultant shall be the final judge regarding the validity of substitution bid data submitted. Acceptance of any / all substitutions shall be under the direction of the consultant only, who may or may not accept the substitution with or without explanations. The consultant approvals or rejections shall be noted as final. No exceptions.

2.03 MANUFACTURERS QUOTES

- A. Though manufacturers may provide quotes for equipment intended for use in this scope of work, it is the responsibility of the AVC to verify the completeness of any such quotes / documentation as they are solely responsible for any discrepancies that arise during the shop drawing process and installation. No additional requests for payment after the bid award with regards to manufacturer quote discrepancies will be accepted.

2.04 DEVICE QUANTITIES

- A. Every attempt has been made to provide an accurate and detailed equipment schedule. However, when a discrepancy is found, the quantities found on the one-lines shall take precedence over the equipment schedule specified herein. AVC shall issue a pre-bid RFI requesting clarification no later than five (5) working days prior to the bid due date. Responses shall be provided to all bidders prior to the bid due date.

2.05 EQUIPMENT SCHEDULE

- A. Refer to Appendix A for the Audio-Video Systems equipment schedule. Appendix A to follow in a separate document.

2.06 EQUIPMENT PERFORMANCE SPECIFICATIONS

- A. For all items which are identified by part number and manufacturer, performance specifications which are published in the most recent manufacturer's data sheets available at the time of bidding this contract shall be applicable to the present work as though fully written out herein.
- B. For those items which are not identified by part number and manufacturer, the AV Contractor may select items which conform to the functional and/or technical specifications. For all such items, the AV Contractor shall submit for approval all technical data which is available from the supplier or manufacturer.
- C. All terminated and bulk cable types shall be submitted in the shop documentation prior to purchase and installation.

2.07 CABLING, WIRING AND CONDUCTORS

A. General Notes:

1. Any specific cable AWG gauge detailed in the drawing package supersedes this document. These cable types are cited to illustrate the type and quality of cable required. Plenum cable must be utilized as required. Unless otherwise noted, cables from other reputable manufacturers will be considered acceptable only if data sheets are submitted and approved by the AV Consultant prior to installation. The AV Contractor must verify cable lengths and confirm the suitability of the cables listed above but may change based on field conditions. Where signal loss is beyond anticipated norms, the AVC shall coordinate with manufacturers and the AV Consultant to select a cable that will meet or exceed the requirements. No exceptions.
2. Cables running in plenum areas without conduit shall be plenum rated cable and match the specified cable below. It is the responsibility of the bidder to inspect the electrical drawings and verify in what spaces plenum cable shall be used. No claims for additional monies, based on the use of plenum cable, will be allowed.
3. All cables (except video and pulse cables which must be cut to an electrical length) shall be cut to the length dictated by the run. No splices shall be permitted in any pull boxes without prior permission of the AV Consultant. For equipment mounted in drawers or on slides, the interconnecting cables shall be provided with a service loop of appropriate length based on the bend radius of the cable.
4. All cable that shall be used in outdoor applications shall be tactical / outdoor rated weather block cable and all connectors shall also be outdoor rated Neutrik "True Outdoor Protection" terminations where applicable.
5. All category cable channels, including patch cords, and patch bays must not exceed the 100-meter length. If it is determined in the field that a run will exceed this distance, immediately contact the AV Consultant for consultation and direction. No exceptions.
6. All USB-C cables must comply with the following:
 - a. EMCA Certification for electromagnetic compatibility (EMC) and electromagnetic interference (EMI).
 - b. Be rated as a Billboard Device to announce its capabilities to connected components.
 - c. Be rated to USB 3.2 [Gen 1 (5 Gbps) or Gen 2 (10 Gbps)] as indicated.
 - d. Be rated to support Power Delivery (PD) at the Profile/wattage level as required to fully power the connected device.

B. Approved Bulk Cabling

Approved Bulk Cabling for Audio-Video Systems					
Type / ID	Signal Type / Application	Cable Type	OSP / Plenum	Manuf.	Model
Analog Audio					
AA01		22 AWG STP	-	Belden	9451

	Mic / Line Audio (Mono Signal)		Plenum	Belden	9451P
			OSP	Belden	9451WB
RF Distribution					
RF01	50-Ohm Antenna (Low-Loss)	10 AWG Coax (RG-8 Type)	-	Belden	9913
			-	ECORE	EMR-400
			Plenum	Belden	89913
			OSP	Belden	9914
UTP					
U01	Control / Network Applications (Not audio or video streaming)		Plenum	Belden	2433
			OSP	Belden	OPS6AU
STP					
S01	4k / 8k HDBaseT Video Applications	4pr 23 AWG STP	-	Belden	2183R
			Plenum	Belden	2183P
			OSP	Belden	2141A
S02	Dante, AES67, NDI, and other audio or video over IP applications	4pr 23 AWG Cat6A STP	-	Belden	10GXS12
			Plenum	Belden	10GXS13
Control					
C01	IR & Serial Control (RS-232/-422)	4pr 22 AWG STP	Plenum	Belden	1502P
C02	Serial Control (RS-485) or DMX-512 (4-cond)	2pr 24 AWG STP	-	Belden	9842
			Plenum	Belden	82842
C03	Dry Contact & Signal Input / Output	1pr 22 AWG STP	-	Belden	8761
			Plenum	Belden	82761

C. Pre-Terminated Cables

Type / ID	Signal Type / Application	Cable Type	Manuf.	Series
	HDMI 2.1 8k60 4:4:4		Crestron	CBL-8K-HD
	Balanced XLR		Mogami	Gold Studio

2.08 FABRICATED MATERIALS

A. Designation / Engraving

1. All equipment controls, receptacles and all indicators shall have, unless otherwise noted, etched, permanently engraved, or silk-screened fully descriptive identification labels. The resolution of silk-screened labels shall not be less than 90,000 dots/sq. in.
2. The word "engraved" shall mean that the identification shall be engraved into the indicated panel, plate or control surface.
3. All engraving shall be with 5/32-inch high characters, unless otherwise noted, and shall be filled with engraver's enamel of a contrasting color.

B. Receptacle Plates:

1. Receptacles shall be screwed, bolted or flush-riveted to the plate.
2. Plates shall be marked to indicate function and circuit of the receptacle, for example: MICROPHONE. Each receptacle shall have a discrete and unique identifier, for example: MIC 1, MIC 2, etc. All identifiers shown on the Contract drawings are for reference only.
3. All wall plates shall be powder coated rather than having an adonized finish.
4. Color and finish of blank panels and custom assembly panels shall match adjacent equipment panels to the extent possible. The finish of wall mounted receptacle panels shall be coordinated with the Architect.

C. Terminals and Terminations:

1. Microphone cables shall not be spliced or otherwise interrupted from termination to termination. All cables shall have visible adhesive identifying markers on each end.
2. Wiring in terminal cabinets shall be tied and clamped neatly to backboards or cable-forms.
3. Terminals shall, unless otherwise specified, be one of the following types:
 - a. Wire-wrap type terminal block.
 - b. Barrier strips with screw terminals.
4. Each terminal strip shall have a legibly marked identification strip.

D. Structural Assemblies:

1. Provide holes required for securing other components or assemblies to structural steel framing and for passage of other components through steel framing members as shown on final shop drawings. Cut, drill or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning.
2. In fabricating mounting brackets and other steel components requiring bends, the radii of the bends shall not be less than three times the thickness of the steel being bent.
3. All bolts and nuts used in the fabrication of mounting hardware shall be Grade 5 or better, i.e. rated five (5) times the anticipated load.

2.09 PAINTED ASSEMBLIES

- A. Where the drawings or equipment list call for devices to be field-painted, the AV contractor shall be ultimately responsible for directing/supervising, and/or performing, any painting required. This responsibility shall not be delegated to a paint subcontractor without prior approval obtained through submission of a formal Request for Information (RFI) addressed to the attention of the AV consultant.
- B. Loudspeakers and other acoustically transparent surfaces that are to be field-painted shall be painted with non-bridging paint. Product must be able to match any color of existing ceiling or desired look.
 - 1. Basis of Design product: ProCoat ProCooustic
ProCoat Products, Inc.
260 Centre Street, Suite D
Holbrook, MA 02343
P: (781) 767-2270
F: (781) 767-2271
E: info@procoat.com
- C. Detach loudspeaker grilles, remove acoustically transparent backing foam (if present), and paint grilles separately. Do not paint grilles while still attached to the loudspeakers.
- D. Paint loudspeaker cabinets only after performing the following:
 - 1. Temporarily remove grilles (for painting separately per the requirement listed above); manufacturer logos; and any other detachable parts such as brackets, cable covers, etc.
 - 2. Mask all non-paintable surfaces or sub-components such as acoustic transducers, port holes, and wiring terminal areas.
- E. Non-acoustically transparent surfaces, such as back boxes, cover plates, and other devices, shall be hand-painted by the AVC, or under the direct supervision of the AVC, to ensure that access panels, covers, and trim pieces remain accessible after being painted. Grounding/bonding holes, embosses or lugs shall be masked to prevent being painted.

PART 3 - EXECUTION

3.01 INSTALLATION PRACTICES

- A. The AV Contractor shall coordinate with EC on conduit/junction box locations for audio equipment and routing of audio, control, and power cables/conduits from terminals, poke-thru /floor and pull boxes, wall plates, and stub-ups to system equipment racks. This shall be done prior to the installation of wall or ceiling finishes.
- B. Installation shall include the delivery, unloading, setting in place, fastening to walls, floors, ceilings, counters, or other structures where required, interconnecting wiring of the system components, equipment alignment and adjustment, and all other work whether or not expressly required herein which is necessary to result in complete operational systems.

- C. Contractor shall construct AV equipment racks and sub-assemblies, including all equipment to be installed therein off-site. All wiring work, labeling of wiring, cable dressing, hardware supports, and connection panels, cable wiring documentation, socket installation, ventilation and power supply regulation and filtering component installation shall be performed in AV Contractor's own premises.
- D. The Contractor shall not deliver equipment in original packaging to the site for installation. All such equipment will be unpacked and checked thoroughly in AV Contractor's premises. Contractor shall test such equipment as it is received to ensure that it conforms to the manufacturer's specifications. On no account shall the Owner be liable for any delays of completion of the installed system due to defective equipment being received by Contractor.
- E. Keep the job adequately staffed at all times. Designate a field supervisor to be present on the job site and in responsible charge during all phases of installation and check out. Maintain the same supervisor throughout the execution of the work unless circumstances beyond the control of the AV Contractor intervene. Install the system in cooperation with other trades in order to achieve coordinated progress and satisfactory final results. Watch for conflicts with work of other trades on the job. Execute without claim for extra payment, moderate moves or changes as are necessary to accommodate other equipment or preserve symmetry and pleasing appearance.
- F. In the installation of equipment and cable, consideration shall be given not only to operational efficiency, but also to overall aesthetic factors. Any issue regarding a visual aesthetic shall be brought to the attention of the GC and Architect immediately so that all parties can coordinate and provide an adequate solution in a timely manner.
- G. For the purposes of coordination with Architects specified furniture, the AV Contractor will ensure that such equipment or mounting hardware is compatible with and suitable for installation in that furniture. It shall be the AV Contractor's responsibility to ensure they coordinate with the furniture and / or millwork contractor and that parties shall exchange and follow their Shop Drawings to ensure that dimensions and structural supports are adequate for the AV equipment installation. It is the AV Contractor's responsibility that the request and delivery of such critical coordination information is satisfactorily executed and in as much as the Contractor has control over the delivery of such information, the AV Contractor shall deliver it as requested by the Architect.
- H. The equipment specified herein must be capable of operation in environments of normal humidity, dust and temperature. AV Contractor should avoid installing equipment where extreme environmental conditions can occur and shall be responsible for protection of equipment and related wiring from such conditions.
- I. The AV Contractor shall take precautions to prevent electromagnetic and electrostatic hum. Install the equipment to provide safe operation. Provide ventilation as required to maintain equipment within the manufacturer's specified temperature limits.
- J. The AV Contractor shall do all cutting and patching necessary for proper installation of the system and shall repair any damage done by themselves or their workers. Any required penetration of slabs or CMU walls shall be made by a cutting method rather than by a concussive method.
- K. All installation practices shall be in accordance with, but not limited to, the general design and construction requirements of the Architect, and these specifications and drawings.

Installation shall be performed in accordance with the applicable standards, requirements and recommendations of local authorities having jurisdiction (AHJ). Before commencing work, the Contractor shall familiarize all project team members with all of these requirements.

- L. If, in the opinion of the AV Contractor, an installation practice is desired or required, which is contrary to these specifications or drawings, a written request for modification shall be made to the AV Consultant and / or Architect. Modifications shall not commence without written approval.
- M. During the installation, and up to the date of issuance of the Final Acceptance Memorandum, the AV Contractor shall be under obligation to protect their finished and unfinished work against damage and loss. In the event of such damage or loss, they shall replace or repair such work at no cost to the Owner.

3.02 GENERAL INSTALLATION PROCEDURES

- A. Locate all apparatuses requiring adjustments, cleaning or similar attention so that they will be accessible.
- B. All boxes, equipment, wall plates, loudspeakers, antennas, and cabling shall be secured plumb and square.
- C. All supporting structures and enclosures supplied by the AV Contractor, not having a standard factory paint finish, shall be painted. Paint specifications and color shall be supplied by the Architect.
- D. Clearly, logically and permanently mark switches, connectors, jacks, relays, receptacles, cables and cable terminations.
- E. Etch, engrave, silk screen or apply in a similar permanent manner all legends and markings on all custom panels and receptacle plates. Embossed tape, press type, etc., are not acceptable.
- F. Provide all cables necessary for interconnection of permanently mounted equipment. Use terminations required to achieve full function of equipment as specified herein.
- G. Exercise care in wiring, to avoid damage to the cables and to the equipment. Make all joints and connections with rosin-core solder or with mechanical connectors approved for Class I wiring. Execute all wiring in strict adherence to standard broadcast and BICSI procedures. AVC shall adhere to the cable manufacturers' recommended cable bend radius, no exceptions.
- H. Run lines in separate metallic conduits for line level circuits (up to +30.0 dBm), loudspeaker circuits (above +30.0 dBm) and power circuits. Non-metallic or PVC conduits for AV system wiring are not acceptable. Confirm with EC that all metallic raceways have been properly bonded. Use only cables which are insulated from the conduit and from each other for the entire conduit length.
- I. All shielded audio cable shall be bonded at both ends. Do not ground audio cable shields only at the source end. Preserve continuity of microphone shields at both connecting points. Connect all audio grounds in this system to a common point.

- J. All equipment shall be firmly secured in place unless the equipment has been documented to be portable in nature, either within this Specification or as shown in the Construction Documents.
- K. All fastenings and supports shall be adequate to support their loads with a safety factor of five (5) times the load weight or as required by ESTA , whichever is greater. Wind shear must be taken into account when installing all outdoor pole mounted devices.
- L. All loudspeakers shall be installed according to the manufacturer's instructions. All loudspeakers shall be installed with a secondary seismic safety harness assembly in addition to the specified loudspeaker mount. No exceptions.
- M. It is the responsibility of the AVC to test all loudspeakers and/or loudspeaker line arrays for sound pressure levels to verify that the full frequency spectrum coverage area is uniform throughout the listening area. AVC shall reposition and or adjust aiming angles as necessary until uniform full frequency coverage is reached per the specification. This work shall be done as part of this contract and no additional funds shall be provided to the AVC to accomplish this requirement. No exceptions.

3.03 COORDINATION

- A. All work shall be reviewed and coordinated with the GC prior to commencing work.
- B. The AV Contractor shall coordinate all AV equipment connections, panels and control locations with the Architect prior to installation.
- C. Coordinate installation with Structural, Electrical, Mechanical, Plumbing, Fire Protection, and other trades to eliminate disruption and/or conflict with other systems.
- D. Sequence installation of the AV Systems and infrastructure with other work to minimize possibility of damage and soiling during remainder of construction.

3.04 STRUCTURAL INSTALLATION REQUIREMENTS

- A. It is the GC's responsibility to provide structural support elements for the mounting of audio-video equipment. AVC shall closely coordinate with the GC regarding structural support required to safely install the AV equipment as needed.
- B. Structural support elements are defined as those materials added to the structure for the reinforcement of general construction methods to meet a designed minimum load factor of five (5). These include but are not limited to:
 - 1. Backing boards / plywood required for the support of audio-video equipment or cabling.
 - 2. Strut supports hung from structural beams or concrete slab.
- C. The AV Contractor shall provide all audio-video mounting and rigging equipment that fasten to the structural support elements.
- D. All support elements and fastenings shall be able to support a minimum load factor of five (5) times the total assembled weight.

- E. The AV Contractor shall be responsible for the complete and correct installation of all the audio-video equipment.
- F. Hard Ceiling Lid Loudspeaker Locations: Hard lid ceiling loudspeaker locations requiring trim rings, rough-in brackets, and back boxes shall be installed during conduit installation where possible.
 - 1. The Contractor shall install the trim rings, rough-in brackets, and back boxes for hard ceiling locations in a timely manner, not to conflict with scheduled work of other trades. In the event that this equipment is not installed in a timely manner, the Contractor shall be responsible for all retrofit work and materials to provide a fully functioning speaker assembly.
- G. Trim and Escutcheon Components:
 - 1. To ensure a proper finished appearance, the AV Contractor shall furnish and install trim / escutcheon components in all conditions where AV components pass through the finished walls, floors and ceilings. This would include but not be limited to video projector supports, video flat panel monitors, and control panels for supports which are not specifically supplied with integral flanges / trim components.
 - 2. The visible component of any trim shall be as small as possible, preferably no wider than 1/2-inch. All trim components at the ceiling plane shall be finished to match the approved ACT ceiling grid system components. The AVC shall obtain a sample from the GC, including any custom color information, or standard color numbers. All trim components shall be submitted to the Architect for review and approval prior to fabrication.

3.05 CABLE INSTALLATION

- A. All cables for this project must conform to the latest version of NFPA 70 as well as local code requirements.
- B. Where existing cabling is to be abandoned, it shall be completely removed as directed in the NFPA 70 / NFPA 72. No exceptions.
- C. All cables, regardless of length, shall be marked with permanent wrap-around number letter cable markers at both ends. There shall be no unmarked cables at any place in the system. Wire labels done by hand in the field must be replaced with computer-generated labels for legibility. Marking codes used on cables shall match the codes / labels shown on the AVC shop drawings and on run sheets.
- D. CAT6A / 4k cable runs shall not exceed the most current BICSI telecommunications cabling standards, i.e. 100 meters inclusive of all cross-connects and patches. When the distances are longer, the AVC must coordinate with the cable manufacturer to verify performance is still within the acceptable range of performance for this scope of work. No exceptions.
- E. Internal and inter-rack cabling shall be neatly strapped, dressed, labeled, and adequately supported without pinching the cable bundle.

- F. Use only Velcro-type cable straps to mount and bundle all cables. The use of plastic wire ties is prohibited. No exceptions.
- G. Terminal blocks, boards, strips, or connectors shall be furnished for all cables that interface with racks, cabinets, consoles, or equipment modules. The use of "wire nuts" to terminate or connect cabling is strictly prohibited.
- H. All cables and bundles shall be grouped according to the signals being carried. In order to reduce signal intermodulation distortion, separate groups shall be formed for the following cables:
 - 1. Power loudspeaker cables
 - 2. Low voltage system cables
 - 3. Video cables / Category cables
 - 4. Audio cables carrying signal levels less than -20.0 dBm
 - 5. Audio cables carrying signal levels between -20.0 dBm and +20.0 dBm
 - 6. Audio cables carrying signal levels greater than +20.0 dBm
- I. All cables shall be continuous lengths without splices. All system wire, after being cut and stripped, shall have the wire strands twisted back to their original lay and be terminated by approved soldered or mechanical means. No bare wire terminations shall be allowed, unless specified on the drawings. No exceptions. Heat-shrink tubing shall be used to insulate the ground or drain wire.
- J. All solder connections shall be made with rosin-core solder using temperature-controlled solder stations. No cold or cracked solder joints are acceptable. Any connections, which do not appear to be clean and shiny, or which show signs of cracking, shall be re-soldered by the AV Contractor before Final Acceptance testing of the system.
- K. Mechanical connections using insulations, crimp-type connectors shall be bonded to the connector by soldering the wire to the metal part of the connector.
- L. Connections made with screw actuated pressure type terminal strips shall be made by stripping approximately 1/4-inch of insulation from the stranded connector. The un-tinned wire shall be inserted into the terminal and tightened.
- M. All wire bundles are to be neat and combed free of cable crossovers.
- N. No cable shall be installed with a bend radius less than that recommended by the cable manufacturer.
- O. All wire markers / labels shall face a common direction.
- P. All cables shall have proper connector housing.
- Q. All cables located in the ceiling areas, excluding corridors, where conduit as not been provided for are to be J-hooked and kept separate from data cables with crossovers at ninety (90) degrees. Large conduit sleeves shall be required for all inaccessible ceiling areas or hard lid ceilings.

- R. All cable passing through penetrations in fire rated walls must be fire blocked after cable installation by the AV Contractor.

3.06 FIELD QUALITY CONTROL

- A. During the installation, the Contractor shall be expected to maintain a clean and safe working environment.
- B. Upon completion of the work the Contractor shall remove all their waste material from the site and shall leave the relevant areas and equipment clean and in an operational state. The Contractor shall be responsible for repairing any damage caused to the premises by the AV Contractor's installation activities, at no cost to the Owner.

3.07 PROTECTION

- A. Protect Work, stored products, and construction equipment from theft and vandalism.
- B. Protect Owner's operations at site from theft, vandalism or damage from AV Contractor's work or employees.
- C. Maintain security program throughout construction period, until Owner occupancy or Owner acceptance precludes the need for AV Contractor security.

3.08 INITIAL SYSTEM START-UP

- A. Immediately after installing and energizing products and ensuring normal temperature/humidity operating conditions will be maintained, Contractor shall burn-in all mains-powered electronics for a period of not less than 48 hours continuously, to detect any possible "dead on arrival" (DOA) and/or early-life product manufacturing defects.
- B. During the system burn-in period, Contractor shall monitor for any failures, degradation, or other anomalies.
- C. Upon discovery of any product defects or failures, Contractor must immediately contact the manufacturer support team to begin expedited product replacement.
- D. Upon completion of the system burn-in period, Contractor shall submit a written System Start-Up Report, listing which components were burned-in, the duration of burn-in, any abnormal occurrences, and steps taken (or being taken) to resolve any defects, degradation, or failures.

3.09 DEMONSTRATION AND FINAL ACCEPTANCE TESTING

- A. General:
 - 1. Final Acceptance Testing shall not be performed until the AV Contractor's system checkout has been completed, documented, and results submitted to the AV Consultant for approval.

2. Upon approval of the AVC test reports by the AV Consultant, and at a time established by the Consultant, demonstrate the operation of each major component of the system and the completed installation. Typically ten (10) working days after the AVC test documentation / As-Built Drawings have been submitted for approval.
- B. Site Testing: To be conducted in the presence of the Architect / Construction Manager / Owner (or representative) and the AV Consultant and shall consist of the following:
1. Final As-Built Drawings, run sheets, O & M Manuals, submitted test results, and other required documents, as detailed in the Construction Documents shall be on hand. One (1) complete set of these documents shall be delivered to the Owner at this time (one complete set shall have been delivered to the Architect prior to the scheduling of Final Acceptance Testing in PDF format).
 2. A physical inventory will be taken of all equipment on site and will be compared to equipment lists in the contract documents.
 3. The AVC shall demonstrate the operation of all system equipment installed.
 4. Both subjective and objective tests shall be required by the AV Consultant to determine compliance with the specifications. The AVC shall be responsible for providing test equipment for this exercise. Therefore, be prepared to repeat and verify test results previously submitted to the AV Consultant. It is anticipated that final loudspeaker tuning / equalization adjustments shall be made at the direction of the AV Consultant.
- C. After demonstration, assist as required in the following acceptance tests:
1. Listening tests: These tests may include speech intelligibility survey and subjective aural evaluations by observers at various positions under various operating conditions, using live speech and/or recorded music material.
 2. Equipment tests: Any measurements of frequency response, distortion, noise or other characteristics and any operational tests deemed necessary may be performed on any item or group of items to determine conformity with these requirements.
- D. Control System Operation: AVC shall coordinate with the Owner to review the operation of the AV system prior to and during installation. During the second training session, the Owner can request additional changes and updates to the GUI and system functionality if they so choose without additional cost to the project.
- E. If the need for adjustment or modification becomes fully evident during demonstration and testing, continue working until the installation operates fully in accordance with the requirement of this specification.
- F. In the event significant adjustments are required during the Final Acceptance Testing phase, or defective equipment must be repaired or replaced, tests may be suspended or continued at the option of the AV Consultant, Architect, and/or the Owner. The AVC can and shall be responsible for the AV Consultant's expenses such as, but not limited to, lodging, travel, airfare, and the AV Consultant's billable time.

3.010 DOCUMENTATION

- A. Project Record: The AV Contractor shall supply one (1) clean full-size print of the system drawings which show all changes which were made during fabrication and installation to the Architect / Owner.
- B. Maintenance Information:
 - 1. The AV Contractor shall provide technical information for all electronic apparatuses, including but not limited to schematic diagrams and parts lists, manufacturer's installation instructions, operating instructions, and technical specifications.
 - 2. The AV Contractor submittal shall include all shop drawings prepared and used by the AVC, as well as those which were not required to be submitted for approval. This shall include, but not be limited to, wiring diagrams, schedules for identification of building wiring and installation details useful to a maintenance technician.
- C. Operation and Maintenance (O & M) Manuals: Provide one (1) hard copy of an instruction manual to the Owner containing the following:
 - 1. Table of Contents
 - 2. Bill of Materials
 - 3. Instructions for operating the system in all modes of operation and for fulfilling all functional requirements.
 - 4. List of settings and adjustments for semi-fixes controls.
 - 5. Manufacturer's sheets of specifications, operating instructions, and service information arranged alphabetically by manufacturer and then by model number.
 - 6. Detailed wiring diagrams and the simplified one-line diagram.
 - 7. All system and device software files, executables, and GUIs.
- D. Quick Reference Guides:
 - 1. AVC to provide the Owner with two (2) laminated "Quick-Reference Guides" detailing the operation of each standalone AV system.
 - 2. This shall include both touch-panel layouts and general system "how-to" quick-referenced.
 - 3. This guide should be no longer than two (2) pages where both sides of a standard letter sized sheet are used.

3.011 TRAINING AND INSTRUCTION

- A. A minimum of eight (8) hours of training shall be provided by the AV Contractor, at a time mutually agreed upon between the Owner and AV Contractor.

1. Four (4) hours prior to Final Acceptance Testing.
 2. Four (4) hours one (1) month following the initial training. This will allow the Owner to acquaint themselves with the system so that they can provide follow up questions as to the systems operation.
- B. During the training, the participants shall be given opportunities for “hands-on” experience with operating the controls. There shall be visual and audible demonstrations using the systems themselves as aids. Personnel for instruction and training for the AV systems shall be designated by the Owner.
 - C. In the event the AVC does not have qualified instructors on staff for projects with sophisticated or complex equipment, the Contractor will provide a manufacturer’s representative for such instruction at no additional cost to the Owner.
 - D. Training and instruction shall be provided in the presence of the AV Consultant. This condition may be waived at the discretion of the Consultant.
 - E. Training will be video recorded by the AVC on a DVD / Blu-ray disc or flash drive as designated by the Owner. AVC will supply the equipment necessary to record the training sessions. The AV Contractor shall provide two (2) electronic copies to the Owner and one (1) full-size set of documentation.

END OF SECTION 16810

SECTION 16813 – AUDIO VIDEO CONTROL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes audio video control systems.

1.02 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Section 16810 “Audio Video Systems”.

1.03 CONTROL SYSTEMS DESCRIPTION AND FUNCTIONS

- A. The control system will be local to each display system. It will be set up to control simple display functionality. This simple control will be; input, volume, and power. Each input will be labeled to the device being shown.
- B. The control system shall be password or passkey protected and auto lock after a predetermined amount of time of inactivity.

1.04 MILESTONES

- A. Control System Functionality Meeting:
 - 1. The AV Contractor shall initiate / set-up a meeting with the Owner and AV Consultant prior to submitting the GUI for approval.
 - 2. It shall be noted that the Owner can request a one (1) time set of changes to the touch panel GUI layout, operation and functionality of the controls system once the system is operational and the Owner has access to verify their anticipated functionality requirements. Typically, this would occur during the second training event and after the Owner and staff have had the opportunity to use the fully operational system.

1.05 SUBMITTALS

- A. Control & DSP System Shop Submittal:
 - 1. GUI layouts that demonstrate page flips and system operation.
 - 2. Any AVoIP routing maps.

1.06 PRODUCTS (NOT USED)

1.07 EXECUTION

1.08 GENERAL

- A. A "Quit" or "System Shutdown" button shall be available from the main menu. When the User has selected this button, a confirmation screen will be displayed indicating that the shutdown sequence has been selected. A second button press shall be required to initiate the power down sequence.
- B. If so requested by the Owner, all or some of the control system processors shall be programmed with an Auto Shutdown feature. Auto Shutdown will automatically power down a system at a given time unless overridden by the local User or System Administrator.

1.09 CONTROLLED DEVICES

- A. Wherever possible, the Control System shall provide positive feedback of individual component control-state conditions to the touch panel.
- B. Each media playback device shall have its transport controls duplicated on the touch panel with a dedicated control page. The control functionality for each device shall closely mimic the control functions on the device itself.
- C. If a device can play multiple types of media and has bi-directional communication with the control system, the system shall read the media type and adjust the screen options as appropriate for the playback option selected. For example, a Blu-ray player which is able to play Blu-ray discs, DVDs, and CDs and has RS-232 control, the system shall display different options when a Blu-ray disc is detected by the unit versus when a DVD or CD is detected by the unit (such as the ability to route the signal to a display device versus just audio playback transport controls). In this example, "graying out" the inappropriate buttons for options is acceptable.
- D. For a video projector or other display device with an automatic set-up, auto image adjust or similar button, control of this feature should be provided on every logical page, such as PC input pages.
- E. Control the power to video projectors and other display devices separately from the rest of the AV system. Depending on the devices required for the initially selected "Room Mode", Users should be able to operate audio only playback devices, or control lighting or room dimming systems without automatically powering on the displays. A 'projector control' or 'display control' button should be available at the main menu where a user can choose to power up or power down the display devices. Additionally, if the "Room Mode" selected by the User, such as video conferencing, is expected to require the use of the main display device(s) then it/they should be automatically powered on.

END OF SECTION 16813

SECTION 16819 – AUDIO VIDEO SYSTEMS PERFORMANCE VERIFICATION

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes audio video systems performance verification items.

1.02 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Section 16810 “Audio Video Systems”.

1.03 REFERENCES

- A. Acoustical Society of America (ASA):
 - 1. ANSI / ASA S1.4 – American National Standard Electroacoustics – Sound Level Meters
 - 2. ANSI / ASA S1.11 – Electroacoustics – Octave-Band and Fractional-Octave-Band Filters
- B. Telecommunications Industry Association (TIA):
 - 1. ANSI / TIA-862-A – Building Automation Systems Cabling
 - 2. ANSI / TIA-1152-A – Requirements for Field Test Instruments and Measurements for Balanced Twisted-Pair Cabling
 - 3. ANSI / TIA 568.2-D – Balanced Twisted-Pair Telecommunications Cabling and Components Standards
 - 4. ANSI / TIA 568-C.2 – Balanced Twisted-Pair Telecommunications Cabling and Components
- C. International Code Council (ICC):
 - 1. IBC – International Building Code
- D. American Society of Testing and Materials (ASTM)
- E. Americans with Disabilities Act (ADA)
- F. Audiovisual and Integrated Experience Association (AVIXA)
 - 1. A102.01:2017 Audio Coverage Uniformity in Listener Areas
- G. Electrical Testing Laboratories (ETL)

HAWAII HEALTH SYSTEMS CORPORATION – KAUAI DIVISION

Samuel Mahelona Memorial Hospital
Behavioral Health New Patient Facility
Project No. 221093-01

Audio Video System Performance Verification
16819-1

H. Building Industry Consulting Service International (BISCI):

1. Category Cable & Infrastructure Installation and Testing Standards

1.04 SUBMITTALS

- A. Test reports, as specified herein. These documents are required ten (10) working days before the anticipated final acceptance testing, else the appointment shall be rescheduled.

1.05 QUALITY ASSURANCE

- A. The AV Contractor's commissioning team members shall be certified as an AVIXA CTS-I.

1.06 PRODUCTS (NOT USED)

1.07 EXECUTION

1.08 GENERAL

- A. Before Final Acceptance tests are scheduled, the Contractor shall perform a complete system checkout. The Contractor shall furnish all required test equipment and shall perform all work necessary to determine and/or modify performance of the system to meet the requirements of this specification.
- B. For system components requiring special rigging procedures and onsite equipment installation, perform acceptance tests specific to those components prior to removal of onsite rigging/equipment. Examples of onsite rigging/equipment include, but is not limited to, scaffolding and platforms, manual/motorized lifts, hoists and winches, and cranes.
- C. For any audio or video system tests performed which yield results indicating failure to meet the performance requirements of this specification, the Contractor shall be held responsible for all costs related to adjustments and aiming of components required to rectify the failed conditions.
- D. Maintain onsite documentation of all field related changes / as-builts as well as performance tests for reference by the AV Consultant during the site surveys and Final Acceptance testing.
- E. Adjust, balance, and align all equipment for optimum quality and to meet the manufacturer's published specifications. Establish and note normal settings for all device controls and record these settings in the Operation and Maintenance (O & M) Manual.
- F. Check all low voltage control system functions and presets, from all controlling devices to all controlled devices, for proper operation.

1.09 AUDIO-VIDEO SYSTEMS TESTING EQUIPMENT

- A. The AV Contractor shall provide the following test equipment for use during their initial tests and adjustments and, if necessary, during Final Acceptance testing of the system by the AV Consultant.
1. Data Cable Analyzer: Hardware and software requirements include but are not limited to:
 - a. Level III accuracy in accordance with ANSI/TIA-1152
 - b. Permanent Link Adapters: RJ45 Adapter must meet requirements for NEXT, FEXT and Return Loss in accordance with ANSI/TIA-568-C.2 Annex C. Twisted pair Category 6A, 7 or 7A cords are not permitted as their performance degrades with use and can cause false Return Loss failures.
 - c. Results Storage: Must be capable of storing and reporting results
 - d. Fluke DSX-602 or equivalent
 2. True RMS Voltmeter: Measurements in decibels, linear to 100 kHz
 - a. Fluke 175 or equivalent
 3. 250 MHz Dual Trace Oscilloscope: With external video trigger capabilities
 4. Audio Analyzer: Hardware and software requirements include but are not limited to:
 - a. Class 1 device which shall be calibrated in the field. Shall meet ANSI S1.4 specifications for Type I sound level meters.
 - b. 1/12-octave real time FFT spectrum analyzer, with a minimum of six (6) curve integration averaging
 - c. 1/12-octave band filter set meeting ANSI S1.11 specifications
 - d. Audio signal test measurement set
 - e. SPL functionality including dBA, dBB and dBC weighted scale functionality
 - f. STI-PA software or discrete device where intelligibility is required as part of the project scope
 - g. Larson Davis, Bruel & Kiae (B&K), NTi, or equivalent
 5. Audio Signal Generator: Continuously variable from 20.0 Hz to 20.0 kHz within +1.00 dB with less than 0.50 percent THD. Include the ability to produce Pink and White noise, sine wave (variable frequency) and sweep generator, with variable output: -60.0 dB-V to +4.00 dBm
 6. Distortion Analyzer: Tunable 1/12-octave band wave analyzer allowing readings down to 1.00 percent of the fundamental for measuring THD, hum amplitude and noise spectrum shape
 7. HDMI device and pre-terminated cable tests
- B. All field test instruments shall be within the calibration period recommended by the manufacturer.

1.010 AUDIO SYSTEMS TEST

- A. General:

HAWAII HEALTH SYSTEMS CORPORATION – KAUAI DIVISION

Samuel Mahelona Memorial Hospital

Behavioral Health New Patient Facility

Project No. 221093-01

Audio Video System Performance Verification

16819-3

1. General Inspection and Adjustment: Measure and subsequently document that all individual components are performing in accordance with each manufacturer's published specifications. Specifically, examine frequency response, audible harmonic distortion, and signal-to-noise (S/N) ratio. Replace any components found to be defective.
2. Freedom from Parasitic Oscillation and Radio-Frequency (RF) Pickup: Check to ensure that the system is free from spurious oscillation and radio-frequency pickup, both in the absence of any audio input signal and also when the system is driven to full output from 20.0 Hz to 20.0 kHz. Utilize a dual trace oscilloscope as specified.
3. Freedom from Buzzes, Rattles and Objectionable Distortion: Apply a slow sine wave sweep from 20.0 Hz to 20.0 kHz at a level 6.00 dB below rated power amplifier output voltage. Listen carefully for buzzes, rattles, and objectionable distortion. Correct any causes of these defects, unless the cause is clearly outside the sound amplification system equipment and installation, in which case, the cause shall be brought to the attention of the AV Consultant.
4. Gain Control Settings: Establish tentative normal settings for all gain controls. Settings may require further adjustment by the AV Contractor as a result of testing by the AV Consultant. After final gain and attenuator settings have been established, mark all control settings with an adhesive indicator dot or arrow on the amplifiers.
5. Initial Listening Test: Listen to normal program material to be sure that there are no remaining defects.

1.011 BALANCED TWISTED PAIR CABLE TESTING

- A. All outlets, cables, patch panels, and associated components shall be fully assembled and labeled prior to testing. Any testing performed on incomplete systems shall be redone upon completion of work.
- B. Testing shall be performed on each cabling segment. Sampling is not acceptable
- C. Test results submitted for balanced twisted pair cables shall be recorded by Fluke Linkware or approved format on CD and include but not be limited to the following:
 1. Wire Map: Verify pin-to-pin termination at each end and check for installation connectivity errors. Document which connectivity color scheme is used at each location as defined in ANSI/TIA-568-C.2.
 2. Cable Length: Report the length of each balanced twisted pair. The physical length of the link calculated using the pair with the shortest electrical delay shall be used for making the "Pass" or "Fail" determination.
 3. Propagation Delay: Report the propagation delay of each balanced twisted pair and verify that it does not exceed 498 ns per ANSI/TIA-568.2-D when measured at 10 MHz per ANSI/TIA-1152-A.

4. Delay Skew: Report the delay skew and verify that it does not exceed 44 ns per ANSI/TIA-568.2-D.
 5. Insertion Loss: Report worst case and worst margins in one direction for all four pairs.
 6. Near-End Crosstalk (NEXT): Report worst case and worst margins in both directions for the all possible pair combinations:
 7. Power-Sum Near-End Crosstalk (PS-NEXT): Report worst case and worst margins in both directions for all four pairs.
 8. Attenuation Crosstalk Ratio Near-End (ACR-N): Report worst case and worst margins in both directions for all possible pair combinations:
 9. Power-Sum Attenuation Crosstalk Ratio Near-End (PS-ACR-N): Report worst case and worst margins in both directions for all four pairs.
 10. Attenuation Crosstalk Ratio Far-End (ACR-F): Report worst case and worst margins in both directions for all possible pair combinations:
 11. Power-Sum Attenuation Crosstalk Ratio Far-End (PS-ACR-F): Report worst case and worst margins in both directions for all four pairs.
 12. Return Loss: Report worst case and worst margins in both directions for all four pairs.
 13. Provide Time Domain Xtalk Analyzer data.
 14. Provide Time Domain Reflectometer data.
- D. Testing of horizontal cabling shall not be performed on test equipment with marginal pass/fail notification disabled. If the tester is capable of indicating tests that pass with a measured value closer to the limit than the guaranteed accuracy of the tester, the test result shall be marked (typically as "Pass" or "Fail").
- E. Marginal pass results will not be accepted. Contractor shall correct issues and retest at no expense to the Owner.

1.012 VIDEO SYSTEMS TEST

A. Video System Tests:

1. AVC shall test every possible routing of sources and end point sinks and document the results for future preference. This procedure shall take place after the initial category cable point-to-point testing as detailed above.

1.013 DEMONSTRATION AND FINAL ACCEPTANCE TESTING

A. General:

1. Final Acceptance Testing shall not be performed until the AV Contractor's system checkout has been completed, documented, and results submitted to the AV Consultant for approval.
 2. Upon approval of the AVC test reports by the AV Consultant, and at a time established by the Consultant, demonstrate the operation of each major component of the system and the completed installation. Typically ten (10) working days after the AVC test documentation / As-Built Drawings have been submitted for approval.
- B. Site Testing: To be conducted in the presence of the Architect / Construction Manager / Owner (or representative) and the AV Consultant and shall consist of the following:
1. Final As-Built Drawings, run sheets, O & M Manuals, submitted test results, and other required documents, as detailed in the Construction Documents shall be on hand. One (1) complete set of these documents shall be delivered to the Owner at this time (one complete set shall have been delivered to the Architect prior to the scheduling of Final Acceptance Testing in PDF format).
 2. A physical inventory will be taken of all equipment on site and will be compared to equipment lists in the contract documents.
 3. The AVC shall demonstrate the operation of all system equipment installed.
 4. Both subjective and objective tests shall be required by the AV Consultant to determine compliance with the specifications. The AVC shall be responsible for providing test equipment for this exercise. Therefore, be prepared to repeat and verify test results previously submitted to the AV Consultant. It is anticipated that final loudspeaker tuning / equalization adjustments shall be made at the direction of the AV Consultant.
- C. After demonstration, assist as required in the following acceptance tests:
1. Listening tests: These tests may include speech intelligibility survey and subjective aural evaluations by observers at various positions under various operating conditions, using live speech and/or recorded music material.
 2. Equipment tests: Any measurements of frequency response, distortion, noise or other characteristics and any operational tests deemed necessary may be performed on any item or group of items to determine conformity with these requirements.
- D. Control System Operation: AVC shall coordinate with the Owner to review the operation of the AV system prior to and during installation. During the second training session, the Owner can request additional changes and updates to the GUI and system functionality if they so choose without additional cost to the project.
1. If the need for adjustment or modification becomes fully evident during demonstration and testing, continue working until the installation operates fully in accordance with the requirement of this specification.
 2. In the event significant adjustments are required during the Final Acceptance Testing phase, or defective equipment must be repaired or replaced, tests may be suspended or continued at the option of the AV Consultant, Architect, and/or the Owner. The AVC

can and shall be responsible for the AV Consultant's expenses such as, but not limited to, lodging, travel, airfare, and the AV Consultant's billable time.

1.014 DOCUMENTATION

- A. Project Record: The AV Contractor shall supply one (1) clean full-size print of the system drawings which show all changes which were made during fabrication and installation to the Architect / Owner.
- B. Maintenance Information:
 - 1. The AV Contractor shall provide technical information for all electronic apparatuses, including but not limited to schematic diagrams and parts lists, manufacturer's installation instructions, operating instructions, and technical specifications.
 - 2. The AV Contractor submittal shall include all shop drawings prepared and used by the AVC, as well as those which were not required to be submitted for approval. This shall include, but not be limited to, wiring diagrams, schedules for identification of building wiring and installation details useful to a maintenance technician.
- C. Operation and Maintenance (O & M) Manuals:
 - 1. Provide one (1) hard copy of an instruction manual to the Owner containing the following:
 - a. Table of Contents
 - b. Bill of Materials
 - c. Instructions for operating the system in all modes of operation and for fulfilling all functional requirements.
 - d. List of settings and adjustments for semi-fixed controls.
 - e. Manufacturer's sheets of specifications, operating instructions, and service information arranged alphabetically by manufacturer and then by model number.
 - f. Detailed wiring diagrams and the simplified one-line diagram.
 - g. All system and device software files, executables, and GUIs.
- D. Quick Reference Guides:
 - 1. AVC to provide the Owner with two (2) laminated "Quick-Reference Guides" detailing the operation of each standalone AV system.
 - 2. This shall include both touch-panel layouts and general system "how-to" quick-referenced.
 - 3. This guide should be no longer than two (2) pages where both sides of a standard letter sized sheet are used.

1.015 TRAINING AND INSTRUCTION

- A. A minimum of eight (8) hours of training shall be provided by the AV Contractor, at a time mutually agreed upon between the Owner and AV Contractor.

1. Four (4) hours prior to Final Acceptance Testing.
 2. Four (4) hours one (1) month following the initial training. This will allow the Owner to acquaint themselves with the system so that they can provide follow up questions as to the systems operation.
- B. During the training, the participants shall be given opportunities for “hands-on” experience with operating the controls. There shall be visual and audible demonstrations using the systems themselves as aids. Personnel for instruction and training for the AV systems shall be designated by the Owner.
- C. In the event the AVC does not have qualified instructors on staff for projects with sophisticated or complex equipment, the Contractor will provide a manufacturer’s representative for such instruction at no additional cost to the Owner.
- D. Training and instruction shall be provided in the presence of the AV Consultant. This condition may be waived at the discretion of the Consultant.
1. Training will be video recorded by the AVC on a DVD / Blu-ray disc or flash drive as designated by the Owner. AVC will supply the equipment necessary to record the training sessions. The AV Contractor shall provide two (2) electronic copies to the Owner and one (1) full-size set of documentation.

END OF SECTION 16819

DIVISION 18 - SECURITY ELECTRONICS

SECTION 18050 – COMMON WORK RESULTS FOR ELECTRONIC SECURITY

PART 1 GENERAL

1.01 SUMMARY

- A. This Section includes requirements that shall be applicable to all Work described in DIVISION 18 as described below:
 - 1. The Work described in Division 18 shall be provided by the Division 18 LVSS Sub-contractor as described in this Section.
 - 2. Provide all equipment, materials, and labor necessary to provide the systems shown in the Drawings and described in this Section and Related Sections. This shall include but not be limited to: all active and passive electronics and all enclosures and their supporting hardware, backboards, cable, pull ropes, connectors, and all other devices necessary to make the systems fully operational and meeting the performance requirements of this Section and Related Sections unless specifically noted otherwise.
 - 3. Provide all 5V, 12V, 24V, and class 2 power supplies, cabling, and terminations as necessary for the monitoring and control of all the systems and the systems of other Divisions which are monitored or controlled by the Work of this Section and Related Sections.
- B. BIDDING: A mandatory Pre-bid walk-through of the facility will be required.

1.02 RELATED SECTIONS

- A. 18320 - Access Control System.
- B. 18330 – Video Surveillance System.
- C. 18553 - Identification For Electronic Security.

1.03 REFERENCES

- A. ADA - Americans with Disabilities Act
- B. ADAAG, 2010
- C. ANSI – American National Standards Institute
- D. ASTM F1465 – American Society for Testing and Materials, Guide Standard for Security Control Systems.
- E. EIA - Electronics Industries Association
- F. FCC, Part 15 - Federal Communications Commission, RF Isolation and Interference.

February 27, 2026

- G. FM – Factory Mutual
- H. IBC - International Building Code
- I. IEEE – Institute of Electrical and Electronics Engineers
- J. NBFU – National Board of Fire Underwriters
- K. NECA – National Electrical Contractors Association
- L. NEMA – National Electrical Manufacturers Association
 - 1. NFPA-70 (NEC) – National Fire Protection Association, National Electrical Code Article 110.26, Spaces About Electrical Equipment
 - 2. Article 314.16, Box Sizing
 - 3. Article 725, Class 1, Class 2, and Class 3 Remote-Control, Signaling, and Power-Limited Circuit
 - 4. Article 800, Communications Circuit
 - 5. Chapter 9, Table 1, Wiring Combinations in Conduit
 - 6. Chapter 9, Table 4, Conduit Fill Limitations.
 - 7. NFPA-730 – Guide for Premises Security
 - 8. NFPA-731 – Standards For The Installation Of Electronic Premises Security Systems
- M. NFPA-72 (NFAC) - National Fire Protection Association, Fire Code
- N. NFPA-101 (Life Safety) - National Fire Protection Association, Life Safety
- O. NRTL – National Recognized Testing Laboratory Listing and Labeling
- P. OSHA 1910.7 – Occupational Safety Health Act
- Q. U.L. 1283 – Electromagnetic Interference (EMI) filters
- R. U.L. 1363 – Cord-Connected, Relocatable Power Taps (RPT)
- S. U.L. 1499 - Underwriters Laboratories, Surge Voltage Levels

1.04 DEFINITIONS

- A. All definitions listed in the National Electrical Code are recognized in this Section unless other specific definitions are given in this Section.
- B. “AHJ” means the Authority Having Jurisdiction and includes all applicable code authorities and other entities as defined in the NFPA including but not limited to the electrical inspector, building inspector, fire marshal, and others having statutory authority, as well as the Owner’s Contracting Officer.
- C. “ANSI” means American National Standards Institute. Copies of ANSI standards are available from the National Conference of States on Building Codes and Standards, Inc.
- D. “Appliance” means an electrical component which utilizes electricity to accomplish an end affect.

HAWAII HEALTH SYSTEMS CORPORATION – KAUAI DIVISION

Samuel Mahelona Memorial Hospital
Behavioral Health New Patient Facility
Project No. 221093-01

Common Work Results For Electronics Security
18050-2

February 27, 2026

- E. "ASTM" means the American Society for Testing and Materials. Copies of ASTM documents are available from ASTM International.
- F. "AWG" means American Wire Gauge.
- G. "Certified" means that the equipment has been documented that it has been tested and found by a nationally recognized testing laboratory to meet nationally recognized standards and to be safe for use for its intended purpose; if production is periodically inspected by a nationally recognized testing laboratory; and if it bears a label, tag, listing, or other record of certification.
- H. "Concealed" means embedded in masonry or other construction installed behind wall furring with double partitions or hung ceilings, in crawl spaces, in shafts. Not visible from occupied locations including storage spaces, water closets, and outdoor locations.
- I. "Control Room" means an enclosed officer's station.
- J. "Coordinate" means to meet with, discuss with, and share with other parties as necessary to communicate all necessary information as required to fully relate all information, performance criteria, operational and functional requirements, installation details, potential conflicts such that the final product meets all specified requirements.
- K. "Custom" means to be tailored for a unique application.
- L. "Damage" means any visible or invisible alterations in the products or materials, whether new or existing, whether provided by Contract or by others, which negatively affects performance or appearance and creates defective materials or workmanship.
- M. "Electrically Controlled Locking Mechanism" means an electrical solenoid lock or strike, motorized electric lock, motor controller of an electric lock or gate controller, or pneumatic actuator (motor or solenoid) used to lock or unlock a door or gate.
- N. "Defective Materials or Workmanship" means that the performance is below required minimums, or evidence that the system will not be reasonably maintainable, or errors in documentation, or anything which results in the system not meeting the specified requirements.
- O. "Exposed" means not concealed.
- P. "Failure" means any deviation from intended system operation and performance, as determined by the Contract Documents.
- Q. "Furnish" means to purchase and deliver to the Project site and unload, complete with every necessary appurtenance, support and accessory required for operation. This shall include all housings and enclosures which may be necessary for the installation including as required for outdoor applications. This shall include all necessary coordination with the parties responsible for installing

HAWAII HEALTH SYSTEMS CORPORATION – KAUAI DIVISION

Samuel Mahelona Memorial Hospital
Behavioral Health New Patient Facility
Project No. 221093-01

Common Work Results For Electronics Security
18050-3

- the Work as well as coordinating with other trades as required for establishing the mounting requirements of the equipment.
- R. "Install" means to perform every operation necessary to establish secure mounting and correct operation at the proper location in the Project. This shall include all terminations, wiring, labeling, programming, testing, and all documentation. This shall include all necessary coordination with parties responsible for furnishing the materials and equipment as well as coordinating with other trades as required for the mounting requirements of the equipment.
- S. "Installer" means the party installing and testing equipment.
- T. "Integrator" means the Low Voltage Systems Specialty Sub-contractor (LVSS) performing system engineering (including the design of assemblies and interfaces), installation of all cabling and field equipment, programming (including the modification of software, drivers, and intersystem interfaces), submittals (including equipment submittals, Shop Drawings, Testing Procedures and forms, O and M manuals, As-Built drawings), testing (including system mock-up and pre-testing, final testing), commissioning, and startup.
- U. "Labeled" means that where equipment is "labeled" it embodies a valid label, symbol, or other identifying marker of a nationally recognized testing laboratory such as Underwriters' Laboratories, Inc.; the laboratory makes periodic inspections of the production of such equipment; and the labeling indicates compliance with nationally recognized standards or tests to determine safe use in a specified manner.
- V. "Listed" means that where a product is mentioned in a list which is published by a nationally recognized laboratory which makes periodic inspection of the production of such equipment or states that such equipment meets nationally recognized standards or has been tested and found safe for its intended use.
- W. "Low voltage" means class 1 and class 2 circuits as defined by the NEC:
- X. "LVSS" means Low Voltage Security System.
- Y. "Nationally Recognized Testing Laboratory" means a testing laboratory which is approved, in accordance with OSHA regulations, by the Secretary of Labor.
- Z. "NEC" means National Electrical Code. Copies of the NEC are available from the National Fire Protection Association.
- AA. "NEMA" means National Electrical Manufacturer's Association. Copies of NEMA standards are available from the National Electrical Manufacturer's Association.
- BB. "NESC" means National Electrical Safety Code. Copies of the NESC are available from the Institute of Electrical and Electronics Engineers, Inc.
- CC. "NETA" means International Electrical Testing Association, Inc. Copies of the NETA standards and information are available from the International Electrical Testing Association, Inc.

February 27, 2026

- DD. "NFPA" means the National Fire Protection Association. Copies of NFPA documents are available from the National Fire Protection Association.
- EE. "NRTL" means Nationally Recognized Testing Laboratory accredited by the federal Occupational Safety and Health Administration (OSHA) after meeting the requirements of 29 CFR 1910.7.
- FF. "O&M" means Operator and Maintenance. The term is used to describe the type of manuals that are to be provided.
- GG. "Provide" means to furnish and install, completely ready for use, including all accessories required for operation.
- HH. "Sealed" when used in the context of:
 - 1. A "sealed room" electronics room means that the walls and floors have been painted or coated with a sealant to resist dust generation caused by traffic and normal use.
 - 2. A "sealed device" when used in the context of an intercom station or other wall mounted device means that a security sealant, or grout is used to seal the device tight to the wall.
- II. "TIA/EIA" means the Telecommunications Industries Association/Electronic Industries Association which publishes the TIA/EIA Telecommunications Building Wiring Standards. Standards and publications are adopted by TIA/EIA in accordance with the American National Standards Institute (ANSI) patent policy.
- JJ. "Work" means the act of managing, procuring, and all construction activities and includes all labor and materials required to provide the intent of the Contract Documents.

1.05 SPECIFICATION AND DRAWING INTERPRETATION

- A. The designs within these specifications and drawings are performance based. These are not prescriptive specifications.
 - 1. Contractor is advised that significant field investigation is required.
 - 2. Contractor is responsible for significant design details as necessary to meet the performance and functional requirements of these specifications.
- B. Work includes significant custom integration between subsystems and the design and fabrication of many custom assemblies. Take full responsibility for the performance of the total integrated security electronics system, including integration between subsystems and components as necessary. This includes all hardware, software, firmware necessary, as well as any software patches and other programming elements necessary to meet the performance requirements of these Contract Documents
- C. The meaning of abbreviations shall be the same whether:
 - 1. In lower case or upper-case letters.
 - 2. With or without periods.

February 27, 2026

- D. The use of words in the singular shall not be considered as singular where other indications denote more than one is required.
- E. This Specification contains a combination of prescriptive and performance requirements. Be responsible for fully implementing the functions described in the Specifications and shown on the Drawings. This requires substantial work selecting system components, integrating system functions, and integrating the various security systems with each other and with equipment provided and installed by other Divisions for a fully functioning system.
- F. The Work shall be provided in accordance with the intent expressed on the drawings and Specifications, and in conformance with the actual building architectural, structural, and system conditions. When in conflict, field conditions take precedence over the drawings. Extensive field investigation and coordination is required for the Work.
- G. Quantities to be provided are as shown on the drawings and indicated by the Specifications. When not specifically indicated or implied, a minimum of one is required.
- H. Drawings do not show every component that is required for a complete installation. Provide all materials and labor required for a complete and operational system.
- I. Drawings are diagrammatic and device placements shown are approximate unless specifically noted.
 - 1. Details that appear on the drawings which are specific with regard to the dimensioning and positioning of the work, are intended only for the purpose of establishing general feasibility.
 - 2. Exact finish locations cannot be indicated. Therefore, locations of all work and equipment shall be verified to avoid interferences, preserve headroom and keep openings and passageways clear.
 - 3. Device placement shall provide proper operation meeting the operational and functional requirements of the Specifications and avoid interference with other trades and building systems. Where dimensional discrepancies exist, the architectural drawings take precedence over the low voltage and security electronics drawings.
 - 4. Review the plans for the Work of the other trades and coordinate and adjust the Work of the other trades to achieve the best installation for the Contracting Officer without additional claims or charges.
 - 5. Be responsible to design, develop, and submit additional details as necessary to fully describe the Work and obtain necessary approvals.
 - 6. Coordinate the exact locations of call request stations and access control card readers. All are to be mounted flush and square meeting ADA required maximum height requirements.
 - 7. Conduit stub-ups located tight to the adjacent walls.

1.06 SUBMITTALS

- A. General: All submittals shall be as follows:

HAWAII HEALTH SYSTEMS CORPORATION – KAUAI DIVISION
Samuel Mahelona Memorial Hospital
Behavioral Health New Patient Facility
Project No. 221093-01

Common Work Results For Electronics Security
18050-6

February 27, 2026

1. Submit all Equipment Submittals and Shop Drawings at one time. Partial submittals will not be accepted.
 - a. Data not in conformity with the specified requirements will be returned for re-submittal.
 - b. Process submittals in ample time for review, selection or approval as applicable, so as not to delay Work. Allow a minimum of two weeks for each submittal review. Be responsible for all costs incurred by the Owner due to delays or additional services created by subsequent reviews of submittals rejected or returned for correction and re-submission.
 - c. Contracting Officer reserves the right to return submittals without review, if in the Contracting Officer's opinion, they provide insufficiently complete information. In such cases, the missing drawings and/or information will be requested in the rejection notice.

B. Product Data:

1. Assemble equipment submittal data in both digital and utilizing hard cover loose-leaf ring binders. Provide cover with permanently attached typewritten label with name of Project, job number and heading name. Include the General and Sub-contractors name, address, and telephone number and the date of submittal completion, including any revision numbers and their dates.
 - a. Group information in sets subdivided by specification section, each section containing one copy of data for each item. Provide a table of contents and labeled divider tabs for each section. Partial submittals for individual sections will be returned without review. Equipment submittals shall be in the same order as listed in the specifications. Each item submitted shall be cross-referenced to the specification Section, Article, Paragraph, and Subparagraph number.
 - b. Submit data on 8-1/2" x 11" size paper. Accordion fanfold all 11" x 17" Drawings to 8-1/2" x 11" size and include in submittal binder.
 - c. Provide a complete Bill of Material denoting manufacturers item name, part number, and quantity used for this project. Each item submitted shall be cross-referenced to the specification Section, Article, Paragraph, and Subparagraph number. Include descriptive literature, catalog cuts, illustrations, schematics, technical data sheets, and test data necessary to allow the reader to ascertain that the proposed equipment and materials comply with specification requirements.
 - 1) Include quantities of each device to be installed including any that had been substituted after award and before equipment submission.
 - 2) Include quantities of each device to be furnished as part of the spares inventory. Re-submit with the closeout submittals noting any products that had been substituted after the equipment submission along with the spares inventories noting all items that may be on back-order. Include quantities of all spares items and provide assistance to the Owner in demonstrating the spares inventories.
 - d. Catalog Cuts:

February 27, 2026

- 1) Catalog cuts shall be legible and shall clearly identify equipment being submitted.
 - 2) Include only information on exact equipment installed, not complete "line" of manufacturer.
 - 3) Identify proposed equipment with rubber stamp arrow or similar method.
 - 4) Each item submitted shall be cross-referenced to the specification Section, Article, Paragraph, and Subparagraph number.
- e. Substitution Requests: Submit catalog cuts for all materials and equipment including data on products for which approval as an acceptable substitution is requested. Each item submitted shall be cross-referenced to the specification Section, Article, Paragraph, and Subparagraph number. All rationale for the substitution request shall be provided in the request.
- f. Identify any equipment and/or accessories that are not listed by the manufacturer being submitted. Identify any custom components.
- g. Provide a complete list of Extra Materials including quantities to be provided.
- h. Include required calculations, I/O points lists, system zone schedules, and other tabular data as necessary to clarify system sizing and configuration. Do not consider such submittals as a substitute for complete Shop Drawings.
- i. Paint and Materials: Submit with each equipment submittal paint chips.
- C. Scheduling: Prior to submitting closeout submittals, and prior to requesting the Contracting Officer's presence at final testing submit
1. Manufacturers' certificate of satisfactory completion.
 2. Completed System Startup test forms and punch lists. The Contracting Officer will not go to the site until these test forms have been filled out and punch lists developed by the Contractor.
 3. After completion of final testing, submit a statement in writing that all items are complete and ready for final review.
 4. After completion of all the tests and adjustments, submit for inclusion in the maintenance manuals copies of the test reports required by the Related Sections.
- D. Shop Drawings:
1. Shop Drawings are required for all systems, sub-systems, and component assemblies.
 2. Provide drawing cover sheet including:
 - a. The LVSS Sub-contractor's name, address, and phone number.
 - b. Directory giving sheet number, title, project address, revision status, approval status, and other relevant information.
 - c. Revisions on subsequent submissions shall be clouded and noted as to revision number and their respective dates.
 - d. Symbols list describing each component shown on the floor plans. Symbols shall be consistent between floor plans and all other drawings

HAWAII HEALTH SYSTEMS CORPORATION – KAUAI DIVISION

Samuel Mahelona Memorial Hospital
Behavioral Health New Patient Facility
Project No. 221093-01

Common Work Results For Electronics Security
18050-8

and details. Symbols may be duplicated on floor plans and other drawings as applicable.

3. Diagrams for systems to be complete drawings for specific system installed. Include:

- a. Floor plans to be modified contract drawings:
- b. Do not alter grid lines, scales, or building plan orientation.
- c. Dimensionally accurate drawing(s) at 1/8"=1'-0" or other approved scale, showing interior device and equipment placement and mounting in relation to walls, doors, windows, and other interior features.
- d. Include wire and cable types and quantities, outlet boxes, and raceway sizing and routings.

4. Operator and Maintenance Manuals:

- a. Provide Operating Manuals and Maintenance Manuals. Each manual shall contain but not be limited to: A statement of warranty including date of warranty termination and name, address, and telephone number (technical support-normal, technical support-emergency and sales) for each responsible party and contact person.
 - 1) Group information contained in manuals into sets, subdivided by system, containing one copy of data for each item.
 - 2) Incorporate in manuals data copies, 8-1/2" x 11" size paper. Accordion fold 11" x 17" detail to 8-1/2" x 11" size and include in binder.
 - 3) Information included shall be of the exact equipment installed, not complete "line" of manufacturer. Where sheets show equipment installed as well as other equipment, identify installed equipment with rubber stamp arrow or similar method.
 - 4) Assemble complete manuals in hard cover loose-leaf ring binders. Provide front covers with permanently attached typewritten label indicating name of job, Contracting Officer, General Contractor, and year of completion. Label binding edge with job name, Contracting Officer and date of completion.
- b. Provide individual factory issued manuals containing all technical information on each device installed. Advertising brochures, catalog cut sheets, or operational instructions provided in lieu of the required technical manuals is not acceptable. Include in titles:
 - 1) Building name and address.
 - 2) The name, address and phone number of the General Contractor, system manufacturer and Sub-contractor.
 - 3) Project name and number.
- c. Maintenance Manual shall address:
 - 1) Theory of operation including block diagrams and text discussing circuit components, function, interrelation, and electrical and

sensitivity parameters. Include references to sheets of the As-Built Drawings where applicable.

2) Parts list and parts layout diagrams.

5. As-Built Drawings:

- a. Maintain at the Site one complete set of prints for recording As-Built conditions. Keep As-Built Drawings clean, undamaged and up to date as Work progresses. Accurately indicate Work as actually installed with indications of all deviations, additions and omissions.
- b. As-Built Drawings shall be submitted on each system before final acceptance of Work. Submit As-Built drawings including site plans, floor plans, interconnection system details, system diagrams, and all updated Shop Drawings. Include all addenda revisions, clarifications, and change order items.
- c. All site plans and floor plans shall be modified to show all cable runs whether in conduit or not. All cable runs shall be tagged on the plans to indicate wire size, type, and associated subsystem.
- d. All As-Built Drawings shall be on the latest version of AutoCAD. Submit original plots, two blue lines copies, and all disks necessary for the Contracting Officer to plot additional sets.

6. Closeout Submittals: After completion of all the tests and adjustments, submit the following information:

- a. As-Built Drawings.
- b. Operator and Maintenance Manuals.
- c. Certificates of Code Authority Acceptance, where applicable.
- d. Test data.

1.07 DELIVERY STORAGE AND HANDLING

- A. Deliver equipment with UL label and bearing manufacturer's name.
- B. Protect all materials and equipment from damage during storage at the site and throughout the construction period.
 1. Protect equipment and materials during shipment and storage against physical damage including damage resulting from exposure to sun, dirt, dust, moisture, ground water, cold, rain, and any foreign substances that may damage the equipment. Protect painted surfaces with removable heavy Kraft paper, sheet vinyl or equal, installed at the factory and removed prior to final inspection.
 2. Repair or replace damaged equipment at no additional cost.
 3. Repaint and finish damaged paint on equipment and materials with the same quality of paint and workmanship used by manufacturer so that repaired areas are not visible.
 4. Do not purchase, fabricate, or install materials or equipment until equipment submittals and Shop Drawings have been approved.
 5. Do not perform any field installation without approved Shop Drawings.
 6. After systems installation perform systems testing, develop punch lists, initiate and complete all necessary corrective actions, and submit completed

test report forms with request for Contracting Officer witnessing of final testing.

1.08 PROJECT/SITE CONDITIONS

- A. Environmental Requirements: Do not install active electronics equipment in areas not meeting the manufacturer's environmental Specifications.
- B. Signal Integrity:
 - 1. Take all precautions necessary to guard against electromagnetic and electrostatic hum, RF noise, supply adequate ventilation, and install all equipment:
 - a. So as to meet the performance criteria of these specifications.
 - b. For the maximum safety of the users, occupants, and the maintenance personnel. Any of these conditions that affect system performance shall be corrected at no additional cost to the Owner.
- C. Safety:
 - 1. The Drawings and the Specifications do not include design or construction details or instructions relating to the safety precautions or to means, methods, techniques, sequences or procedures required to perform the Work.
 - 2. Adhere to all and all other local, state, and federal regulations. Adhere to all other local, state, and federal regulations.
 - 3. Be responsible for rigging, fastening, wiring, and other installation methods. If safety will be compromised in the installation of any specified equipment in the locations specified, notify the Contracting Officer in writing prior to proceeding with the work.
- D. Interruption of Service: Any activity (intentional or accidental) which result in the interruption of any electrical, fire alarm, HVAC, plumbing, or other utilities to this facility or other facilities on the Site shall be immediately brought to the attention of the General Contractor.

1.09 WARRANTY

- A. For each system described in this Section and all Related Sections, provide documentation affirming that each system shall be warranted to be free from all defects of material and workmanship for a period of one (1) year effective upon date of substantial completion of the project. Equipment or components shown with inherent defects of a mechanical or electrical nature shall be replaced at no expense to Owner. All factory recommended maintenance outlines and adjustments shall be done during the warranty period at no cost to the Owner.
- B. Receive and respond onsite within 4 hours with a factory trained and factory authorized technician, 24 hours a day, seven days per week to all service calls. Responding technician shall arrive with all necessary tools, metering equipment and replacement parts.

February 27, 2026

- C. Have adequate stock on hand to repair systems and replace faulty component within the time constraints specified in the "Maintenance" article of this Section.

1.10 SYSTEM STARTUP, CONTRACTING OFFICER'S INSTRUCTIONS, COMMISSIONING

A. Test, Inspection:

1. Test each circuit, device, and all equipment for shorts, continuity, safety, defects, and proper operation.
2. Field test after delivery and installation of headend equipment: Each controlled device, each monitored device, and each sub-system for meeting requirements of the associated Specification Section and its Related Sections.
3. All active electronics equipment for each system shall be fully tested prior to delivery, exception: door monitoring devices and electrically controlled locking mechanisms, call request stations.
4. All test equipment shall be industrial grade.
5. The door hardware Sub-contractor shall be present during the final testing with the Contracting Officer and shall assist the Contracting Officer in witnessing the final testing of applicable systems.
6. All equipment shall be tested to the manufacturers' standards.

PART 2 - PRODUCTS

2.01 EQUIPMENT

- A. Materials and equipment used on this Project unless specifically noted otherwise shall be delivered to the Site new, in their original unbroken packages and shall be of the best quality of their respective kinds. All materials and equipment shall conform to the latest Standard Specifications of the American Society for Testing Materials, National Electrical Manufacturer's Association or NEMA, National Board of Fire Underwriters, Institute of Electronic and Electrical Engineers, Electronic Industry Association, Federal Communications Commission or other appropriate and recognized agency. Where available, materials and equipment shall bear the stamp indicating listing by Underwriter's Laboratories, Inc. Provide equipment and materials that are:
 1. Selected for accessibility for maintenance, part replacement and alignment.
 2. Materials and equipment furnished shall be of the current production by manufacturers regularly engaged in the manufacturing of such items, for which replacement parts are available, of the manufacturer's latest model or type offered. Exception: All equipment shall be fully developed with at least one-year operating experience after beta testing for its intended use.
 3. When more than one unit of the same class of equipment or material is required, such units shall be the products of a single manufacturer. Constituent parts that are similar shall be the products of a single manufacturer. All components of an assembled unit need not be products of the same manufacturer, however all components must be acceptable to the

Contracting Officer. Components shall be compatible with each other and with the total assembly for the intended service.

4. Rated for continuous duty.
5. Rated for 115 to 120 VAC, 60 Hz input power. Exception: As described elsewhere in these Specifications.
6. UL listed for their application and use.
7. Catalog and model numbers where used are intended to indicate type and quality of design and material as well as exact operating features required.

2.02 SUBSTITUTIONS

- A. Most products specified include multiple manufacturers and model numbers as well as descriptions of the product which document some of the critical features or performance criteria of the product. The products specified establish:
 1. Minimum qualities that alternate and substitute equipment must meet to be considered acceptable.
 2. The basis for equipment sizing, wire and cable design, power consumption, room cooling criteria, and other design parameters.
- B. All requests for and substitution equipment shall be confirmed to meet the specified requirements of the project. Be responsible to ensure that:
 1. The equipment meets the minimum performance, reliability, functionality, flexibility, expandability requirements of the Contract Documents.
 2. No conflicts in signal levels, types, protocols or other electronic characteristics of the proposed equipment exist.
- C. Equipment and materials installed on the project other than those specified or as an approved substitute item shall be subject to rejection by the Contracting Officer and if rejected shall be promptly removed and replaced with the proper item at no cost to the Owner.
- D. To request substitution of a product after award, submit a request which will be approved only if:
 1. Be responsible for all design, coordination, associated with the substitution including, but not limited to:
 - a. Its integration into the total system including physical mounting space, electrical interconnection, signal wiring, power, quality, electromagnetic interference, communication protocols, functional and performance characteristics, operational and maintenance characteristics, and similar design considerations is met.
 - b. All additional materials, equipment, components, accessories, and other items required for equivalent system operation and performance is included.
 - c. All necessary changes to branch power circuits, circuit protective devices, and the Work of other trades are included.
 - d. All modifications to wire, cable, and raceway design are included.
 - e. Provide the rationale for the request including:

February 27, 2026

- 1) Product unavailability due to the manufacturer replacing the device with a sub-sequent replacement model, or obsolescence of the product specified.
- 2) Extended lead time which would cause scheduling conflicts.
- 3) Increased performance, reliability, functionality, flexibility, expandability, etc.
- 4) There is a decreased cost to the Owner.
- 5) Other rationale describing why it is to the Owners benefit to approve the request.

PART 3 - EXECUTION

3.01 ERECTION, INSTALLATION, APPLICATION, CONSTRUCTION

- A. Meetings: Contractor's Project Manager shall attend 1-hour bi-weekly meetings with the Owner and its designated representatives during all periods when Work is to be done on the site.
- B. Special Techniques:
 1. Protection:
 - a. Do not allow cable harness support to break or deform. Provide tie-wraps 6" OC in all plastic wire ways and 12" OC in all gutters.
 - b. Do not allow cable insulation to break. Install UL approved plastic insulated bushing on all holes, lips or other locations where cable can be damaged due to sharp edges. Apply shrinkable tubing where necessary to secure the insulation against traveling or fraying.
 - c. Wiring within equipment racks and cabinets shall be neatly grouped and tied and run in plastic snap-cover wire ways sections.
 2. Splices and Terminations:
 - a. All splices shall be in boxes utilizing wire nuts or crimp style compression fittings. Butt splices are not acceptable.
 - b. No splices are allowed in pull boxes. Splices allowed in junction boxes are limited to Class 1 and Class 2 control circuits.
 - c. All terminations in wall cabinets and wall and floor mounted racks shall be on screw down terminal strips unless noted otherwise.
 - 1) All 24-volt connectors shall be screw-down or shall employ compression attached full 360-degree ring type or spade type terminators securely fastened to the device terminals. A 3" termination loop shall be formed immediately adjacent to each terminal. Push-on connectors are prohibited.
 - 2) Do not use compression connectors on solid wires.
 - 3) Use compression connectors on wire of the correct gauge only.
 - 4) Termination of multiple wires on a common compression connector is allowed only where-in the size of the connector is appropriate for the combined sizes of the wires and all wire sizes are the same, and the number of wires does not exceed three.

HAWAII HEALTH SYSTEMS CORPORATION – KAUAI DIVISION

Samuel Mahelona Memorial Hospital
Behavioral Health New Patient Facility
Project No. 221093-01

Common Work Results For Electronics Security
18050-14

- d. Terminal strips shall be fully insulated but allow insertion of test equipment probes. Each terminal segment shall be numbered to correspond with the Drawings and conductor identification numbers.
 - e. Where field devices are provided with terminated plug/jacks at a pigtail: Utilize the plug jack and shall terminate the home-run cabling directly to the plug/jack. Use scotch locks or other intermediate splicing device to connect the homerun wires to the pigtail. There shall be no splices within 4' of a plug/jack other than that provided by the field device manufacturer.
3. Locations: Verify all locations with actual field conditions, architectural, structural, plumbing, heating and ventilating plans to avert possible installation conflicts. Any Work which is incorrectly installed will be ordered removed and relocated.

3.02 FIELD QUALITY CONTROL

A. Site Tests, Inspection:

1. System Startup Test:

- a. After system installation complete a System Startup test using the approved System Startup test procedures.
- b. Submit the completed System Startup test procedures noting all deficiencies have been corrected. Notify the Contracting Officer in writing that the system is completely operational with no defects or deficiencies.
- c. Test features and functions that are provided in other Sections and integrated with this Section.

2. Final Acceptance Tests:

- a. After installation and System Startup Testing is completed, conduct a Final Acceptance Test. Use the approved Final Acceptance Testing procedures to conduct test. The tests to be performed in the presence of Contracting Officer.
- b. Test features and functions that are provided in other Sections and integrated with this Section.
- c. Furnish all instruments and personnel required for tests.
- d. Furnish all equipment including man lifts, ladders, screw drivers, flashlights, measuring tapes, and vehicles required to perform test.
- e. Test instruments shall be available to the Contracting Officer during Final Acceptance Testing.
- f. Final Acceptance Testing shall be completed to the approved test procedures. Any test procedure resulting in failures shall require re-testing after the corrections have been completed. Compensate the Owner for any additional costs relating to any additional travel and per diem costs necessary all subsequent site visits.

B. Manufacturers Field Services:

February 27, 2026

1. Refer to the Quality Assurance, Warranty, and Maintenance articles of this Section and all Related Sections.
2. Maintain spares inventory of all equipment furnished throughout the warrantee period.

3.03 TRAINING

- A. Training to be coordinated at least 2 weeks in advance.
- B. Requests for training dates is to be accompanied with a syllabus of the training.
- C. Training of Operators and Training of Maintenance staff to be held in separate seminars.
- D. Training seminars to be conducted in 2-hours periods during normal business hours. Refer to the Training paragraph is each of the Division 18 Sections for the number of hours of training for each system for operators and maintenance personnel.
- E. Each training seminar to include a detailed Power Point Presentation.
- F. Obtain signed attendance receipts for all staff attending the presentation affirming their attendance and that they understood the instructions.
- G. After training, submit PPT presentations files, signed attendance receipts with As-Built drawings, O&M Manuals, and Spares Inventory manifests.

3.04 CLEANING

- A. Clean all foreign matter from the interior and exterior of all equipment and touch-up scratched or marred surfaces to match original finish.
- B. Control all dust, dirt, and foreign material caused by the performance of the Work. Clean work areas daily.

END OF SECTION

DIVISION 18 - SECURITY ELECTRONICS

SECTION 18320 - ACCESS CONTROL SYSTEM

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. The requirements of Section 18050 COMMON WORK RESULTS FOR ELECTRONIC SECURITY are required by this Section as if written herein.
2. Controllers (a.k.a. Data Gathering Panels access control circuit boards).
3. Door power supplies.
4. Controller input and output cards.
5. Controller power supplies.
6. Card readers.

B. Work Provided by Others: Owner shall be responsible for all entering all employee-specific information regarding door access and hours of access.

C. Related Sections:

1. 18050 - Common Work Results for Electronic Security.
2. 18330 – Video Surveillance System.
3. 18553 - Identification for Electronic Security.
4. 18330 – Video Surveillance System.

1.02 SYSTEM DESCRIPTION

A. Design Requirements:

1. The project is for the provision of access control card readers and their associated DGP I/O cards and card cages as the expansion of an existing site-wide Enterprise level system. Interfacing the new system to the existing system is required. No site processor/controller is necessary. Cards are by Owner.
2. Include all connections as required to interface with the door locks, electrically operated door locking mechanisms and door position switches, etc. as required.
3. Wire and cable:
 - a. Provide wire and cable meeting manufacturer's recommendations.
 - b. All cables specifically rated for their use (i.e., class 1, class 2, riser, plenum rated, tray rated, underground, etc.).
 - c. All class 1 and class 2 cabling and all signaling cabling shall be provided.
 - d. All cable shall be in conduit unless otherwise noted.

February 27, 2026

- B. Use all caution and due diligence in assuring that the Work will not impact facility operations.
- C. Performance Requirements:
 - 1. This system shall accept inputs from initiating devices and control access to selected areas of the facility as described in this Section. Operationally the system shall be capable of using combination Keypad/Card Readers in logic AND and logical OR configurations, but for purposes of the initial installation, the Keypad/Card Reader system shall be programmed in a logical "OR" configuration.
 - a. Card Access: When a user presents a card at a card reader the system shall verify whether the person is allowed access through the associated door. If authorization is granted, the electrically controlled door shall be released. If authorization is denied, the door shall remain locked and an access denied alarm shall be reported.
 - b. Keypad Access: When a user keys in his/her PIN number onto the keypad, the system shall verify whether the person is allowed access through the associated door. If authorization is granted, the electrically controlled door shall be released. If authorization is denied, the door shall remain locked and an access denied alarm shall be reported.
 - 2. Maximum response time of 2 seconds on valid card reads and door activations.
 - 3. Communications Reliability: Remote data gathering panels (DGP's) that continue to operate their associated doors as programmed, and keep an event log in memory until downloaded to host computer upon re-establishment of communications.
 - 4. All existing mapping, alarm generating, reporting, and other system level functions contained within the site-wide system shall remain and shall be extended to include the expansion areas.

1.03 SUBMITTALS:

- A. General: As required by Section 18050 Common work Results for Electronic Security.

PART 2 - PRODUCTS

2.01 EQUIPMENT

- A. These specifications and the layout of the system as shown on the drawings is based on the use of Lenel. NO SUBSTITUTES.
- B. Workstation Interface: Security Desk Client Connection (provide at all workstations): Lenel, OnGuard Version 8.3.
- C. Threat Module: As recommended by Lenel.
- D. Controllers: Lenel, S2, LNL-3300.
- E. Reader Interface: Lenel LNL-1300; or equal.

February 27, 2026

- F. Server: HP Proliant DL585, rack mount with slide out rails; or approved equal. Equip with KVM switch as required.
- G. Licenses: As required by Lenel for all access control equipment and CCTV interfacing if required by manufacturer.
- H. Combination Keypad/Card Reader, Short Range: Lenel, LNL-R11325-05RB.
- I. Power Supplies: Altronix, AL600 ULPD4CD; or approved equal.
- J. Cable: As recommended by system manufacturer.
- K. Software: Lenel OnGuard version 8.3.
- L. Computer: Identical to Video Surveillance System Computer. Refer to Related Sections.
- M. Computer Monitor: Identical to Video Surveillance System Computer Monitor. Refer to Related Sections.

2.02 SPARES

- A. Equipment: Provide 5% or 1, whichever is greater, of all active electronic devices including access control card readers, DGP I/O boards, and power supplies, etc.
- B. Space: Within the electronics room where DGP's are to be provided:
 - 1. Provide sufficient space within the wall cabinet area such that at least one additional card for the control of at least 2 new access control doors with card readers can be added in the future without the need to add an additional wall cabinets. Where this necessitates the provision of wall cabinet not otherwise required, include plastic wireways and all other materials necessary for the future installation of the expansion boards.
 - 2. Provide sufficient wall space adjacent to the DGP's to allow for future expansion of at least 2 additional DGP's. Coordinate to ensure that no electrical boxes or conduits or other devices hinder the future installation of these DGP's or their supporting conduit that can be anticipated.

PART 3 – EXECUTION

3.01 ERECTION / INSTALLATION / APPLICATION

- A. Tolerances: Where proximity card readers are required to be mounted on or near metal surfaces, provide custom non-ferrous mounting hardware to maintain specified read ranges.
- B. Combination Keypad/Card Reader Format: Weigand 26-bit.

3.02 QUALITY ASSURANCE

- A. Performance Testing:
 - 1. Present valid cards to a sampling of 5 readers and measure that the maximum response time is less than 1 seconds for authorization and activation of valid card reads.

February 27, 2026

2. Communications Reliability: Test that remote data gathering panels (DGP's) continue to operate their associated doors as programmed during communications failure, and keep an event log in memory until reconnected to the host computer. Test download and re-synchronization of data upon re-establishment of communications.
- B. Functional Testing:
1. Each data gathering panel: Disconnect from the host computer during testing and test each reader:
 - a. Present valid card. The door shall open, and the transaction shall be stored for later reference. Measure maximum response time (less than 1 second) for authorization and activation of valid card reads.
 - b. Verify that read ranges are per specification and similar for all card readers of same type and similar physical location.
 - c. Present invalid card to the reader. Access shall be denied and an alarm generated and stored for future reference.
 2. Present invalid cards to each reader with the DGPs integrated to the existing site-wide system.
 3. Test each individual door to verify the proper operation of all door position switches, electric latches

END OF SECTION

DIVISION 18 - SECURITY ELECTRONICS

SECTION 18330 – VIDEO SURVEILLANCE SYSTEM

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. The requirements of SECTION 18050 - Common Work Results for Electronic Security are required by this Section as if written herein.

B. Related Sections:

1. 18050 - Common Work Results for Electronic Security.
2. 18320 - Access Control System.
3. 18553 - Identification for Electronic Security.

1.02 REFERENCES

- A. ANSI/EIA/TIA 568 – Commercial Building Telecommunications Wiring Standard.
- B. ASTM F1465 – American Society for Testing and Materials, Guide Standard for Security Control System.
- C. BICSI, Building Industry Consulting Service International.
- D. FCC, Part 15 – Federal communications Commission, RF Isolation and Interference.
- E. Institute of Electronic and Electrical Engineers (IEEE) 802.3 standards
- F. International Telecommunication Union (ITU) - H.263 Video coding for low bit rate communication.
- G. ITU - H.264 Advanced video coding for generic audiovisual services.
- H. ONVIF, Version 1, c.

1.03 SYSTEM DESCRIPTION

A. Design Requirements:

1. Software: Provide software as necessary to extend the existing site CCTV system to the new facility. This includes but is not limited to:
 - a. Video Review Station software, NVR software, and software for all of the Ethernet Switches connected to the existing system.
 - b. RAID6 Server array software as necessary to expand the existing video archival system to the new facility.
2. Ethernet Switching: Provide Power Over Ethernet + (POE+) Ethernet switches as necessary to connect all CCTV system computer workstations and IP cameras as shown on the drawings. LAN to maintain separation

between security (i.e. access control and surveillance television) from all other LANs. Provide Ethernet switches in quantities to facilitate 20% unused ports for future.

3. Cameras: Include new IP cameras only. Refer to the drawings for types and locations.
 - a. Include outdoor cameras with outdoor wall mounting brackets as necessary.
4. Cables, Copper: All wiring and cabling work shall comply with the ANSI/EIA/TIA 568 Commercial Building Telecommunications Wiring Standard, all relevant EIA/TIA Technical Systems Bulletins, and the recommended installation procedures in the BICSI TDM Manual.
5. Include licenses for all hardware, software, and firmware.
6. Storage: System to be a RAID6 array and networked to the existing site NVR system.
 - a. 24 hour – 7 days/per week continuous recording of all cameras at 1080P or higher resolution as is available from each specific camera at a minimum of 15f/s for a period of not less than 60 days prior to loss of any recorded information.
 - b. Include an additional 15% memory for future camera expansion.
- B. Streaming: Provide separate streaming of video. Meet with the Owner to confirm 15f/s of 1080p video for both live and recorded video.
- C. Camera Mounting Coordination: Coordinate with other trades including surface mounted lighting fixtures, exit lights, signage, conduit and piping, down spouts, columns, eaves, HVAC ductwork, etc., ceiling speaker grilles, fire suppression equipment etc. Coordinate to allow clear field of view of the target area (field of view) of the camera.
- D. At outdoor locations where a box is required and is separate from mounting hardware, provide liquid tight flex of not more than 18” for cabling between the box and the mounting/camera configuration. This liquid tight flex shall elbow down and have sufficient length and be arched to allow water to drip from the flex away from the electrical box and camera.

PART 2 PRODUCTS

2.01 EXISTING EQUIPMENT

- A. VMS software is: **(Confirm with Owner)**

2.02 EQUIPMENT

- A. Cameras, IP: Vicon “NEXT”, VNX-SN-VRS1-0, Axis; or approved equal. This is not to be construed to be a proprietary specification.
 1. All cameras to be:
 - a. Varifocal lens.
 - b. Fixed 1080p or greater as indicated on the drawings.
 - c. Mini-Dome.

February 27, 2026

- d. Color.
 - e. Vandal resistant (IK-10 or better).
- 2. Camera, 360-degree (panoramic, 4-head, multi-sensor): Vicon, V2360W-12-1; Axis, P3747-PLVE; or approved equal.
- 3. Camera, Indoor/Outdoor: Vicon Roughneck, VCELL-HD-C; Axis, P3267-LVE; or approved equal.
- B. Network Video Management System: Existing to be expanded.
- C. CAT6 Copper Cable: Commscope; or approved equal.
 - 1. Plenum rated (except where underground, wet location cable is required)
- D. Patch Panel: Identical to Division 17:
 - 2. 48 port.
 - 3. UTP.
 - 4. 1RU.
 - 5. CAT6.
 - 6. 10G.
 - 7. 110 type punch.
 - 8. Color coded jacks (coordinate with Owner).
 - 9. With port labeling system.
- E. Computer: HP EliteDesk 800 6G Desktop Mini PC:
 - 1. VESA Mounting Capable.
 - 2. Intel Gen 8, I7, Pentium
 - 3. BDR4 Ram; 64GB.
- F. CCTV System Computer Workstation Monitor: 1080p monitor (All locations except as specifically noted on the drawings): 24". Orion, HD-SDI; or approved equal.
 - 1) Metal Chassis.
 - 2) Resolution: 1080P @ 60 Hz.
 - 3) Colors: 16.7M.
 - 4) Surface: Non-Glare.
 - 5) Brightness 250 cd/MxM
 - 6) Contrast Ratio: 1000:1.
 - 7) Viewing Angle 178/178 degrees.
 - 8) Response Time: 8ms (gray to gray).
 - 9) Speakers: Built-in.

- 10) Mount: VESA 100 and VESA 200.
 - 11) Where the drawings indicate a specific sizes other than the one in this Section, provide the size as shown on the drawings. All other specification requirements above are to be maintained for each monitor regardless of size.
 - 12) Provide all mounting hardware as shown on the drawings.
- G. Ethernet Switches (48-port with fiber optic in/output ports):
1. Rack mounted units: Axis, T8524; or approved equal.
 2. Units shall be Layer 3 with IEEE 802.3af POE.
 3. Include new patch panels patch cords, and cable management to support the new switches.
- H. Network Server, Directory: Dell; Adaptec; or approved equal.
- I. Network Equipment (Passive):
1. Station Cabling.
 2. Station Connectors.
 3. Copper patch panels.
 - a. For all 24 port switches used for video, land from right to left.
 - b. Only use flat patch panels for video systems.
 4. Cable management equipment.

2.03 SPARES

- A. At a minimum, spares parts are to include: 5% spares inventories shall be provided of all active electronics, or 1 whichever is greater.

PART 3 - EXECUTION

3.1 ERECTION / INSTALLATION / APPLICATION

- A. Special Techniques:
1. Coordinate the exact locations of the following:
 - a. Outdoor corner mounted cameras shall be coordinated with other trades and the electrical box are as follows:
 - 1) Boxes: Mounting hardware and electrical box within 8" of each other; or the box is part of the mounting hardware. Where the box is not part of the mounting hardware it shall be positioned such that the box coverplate of the box is obscured from the view of persons on the ground by the camera housing and mounting bracket as much as possible without compromising accessibility.
 - 2) Interior Corners: Corner mounted cameras are to be mounted tight in the corner.
 - 3) Owner: Prior to final rough-in of cameras, confirm location of rough-in by taking a picture from the proposed new camera location and submit for Owner acceptance.

- a) Use a lens and chip that are the same as the camera to be provided at the__ proposed location. Prior to installation, submit the resulting pictures to the Owner for confirmation that the camera will be in the correct location. The pictures from all proposed locations shall be captured and saved to a disk and turned over to the Owner for comparison to the imagery of the camera after camera installation.
 - b) Contractor shall adjust the exact location to accommodate any changes in location requested by the Owner. Upon final completion, Contractor shall take screen shots of all new and replaced cameras and include them in the O&M manuals to establish a base line for future use.
2. CCTV head-end equipment in racks:
- a. Maintain signal separation in all racks.
 - b. Rack mounted equipment shall be arranged and mounted to facilitate front and back access to all rack mount equipment without the need for removal of any other equipment.
 - c. Where cameras are equipped with IR cut filters, remove from all indoor cameras except where perimeter windows can be expected to allow direct sunlight into the space during any time of the year. Refer to Performance Testing in this Section for additional information.
 - d. All labeling to include IP address. Include labeling of monitors and all cabling. Refer to 18553 - Identification for Electronic Security.
3. Utilize Axis Management Tool (**Owner to confirm**) for intra-system management and testing.

3.02 OWNER MEETINGS

A. Owner Coordination:

- 1. Rough-In:
 - a. Allow at least 24 hours of meeting time in multiple 2-hour segments to establish confirmation of camera rough-in for field of view confirmation described above and as required for cable color coordination as described in Section 18553 – Identification For Electronic Security.
- 2. Programming:
 - a. Camera network assignments and as necessary for software/firmware updates.
 - b. Camera field of view assignments as a function of multi-head camera image definitions.
 - c. After installation but before connection to the system, confirm with Owner that the following programming currently in use is correct and that no additional programming is necessary:

- 1) Which staff members are to be in which of the various groups that define authorization levels within the software authorization levels for the cameras.
 - 2) Which cameras are to be defined and programmed into salvos, what order, and which monitors that the salvos are to be assigned to.
 - 3) Which cameras are to be defined and programmed into tours, what order, and which monitors that the tours are to be assigned.
 - 4) What the programmed fields per second requirements are to be for each individual camera for live viewing and for each computer workstation.
 - 5) What the programmed fields per second each individual camera is to be set at for recorded imagery.
 - 6) What the programmed resolution each individual camera is to be set at for live viewing.
 - 7) What the programmed resolution each individual camera is to be set at for recorded imagery.
 - 8) What the specific camera number is to be for each camera.
 - 9) What the specific camera name is to be for each camera.
 - 11) What titling should be displayed on the monitor for each camera and where on the image the title is to be displayed.
 - 12) Whether the time and date is to be displayed on each image, or in one location on each monitor, or no time and date is to be displayed.
 - 13) Whether the camera titling, and time and date is to be displayed on the recorded imagery.
 - 14) All system addressing requirements.
3. Programming Meetings: Allow at least 8 hours of meeting time in multiple 2-hour sessions.

3.03 PROGRAMMING

- A. Programming: Provide enough programming time to implement all of the requirements including the results of the meetings described under Owner Meetings. Include an additional 24 hours of programming time to implement additional programming items and changes requested by the Owner during final testing and cutover.

3.04 TESTING

- A. Performance Testing:
1. Visually confirm that each camera on each monitor:
 - a. Is free of dust and dirt on the lens and housing window. Is in focus.
 - b. Has the correct field of view as coordinated with the Owner.
 - c. Is free of skip.
 - d. Does not exceed the amount of latency allowed by these specifications.

February 27, 2026

- e. Does not freeze frame.
- f. Does not display image noise.
- g. Does not shake and maintains stable imagery.
- h. Where cameras have perimeter windows within their field of view, bring to the attention of the Owner. Owner reserves the right to require the contractor to remove IR cut filters as the Owner feels appropriate.

B. Functional Testing:

1. Utilizing the computer workstation to manually select each fixed camera individually to the call-up monitor. Test that each camera:
 - a. Is properly selected and titled.
 - b. Is adjusted for color balance, contrast, brightness.
 - c. Is physically adjusted for proper field-of-view including the vari-focal lens.
 - d. That neither the housing window nor light fixtures or other objects obstruct the field-of-view.
 - e. Is properly selected and titled.
 - f. Is being recorded on the video archival system.
 - g. The camera automatically homes to each of its pre-set points.
2. Salvos and Dwell Times: Test each salvo shot and the dwell time between each, as well as any salvo mode changes by time-of-day or operator selection.
3. Video Review Station System Configuration: Test the video review station default live viewing monitor displays. Test recording settings and alarm integration with motion detection, alarming, frame rates, and resolutions, as well as integrated audio with alarms. Test motion detection settings and alarm configurations as required by the Owner.

3.05 CLOSEOUT ACTIVITIES

A. Demonstration: Maintenance Instruction:

1. Provide 4 hours of maintenance instruction.
2. Provide 8 hours of operational instruction including:
 - a. 4 hours of general usage instruction
 - b. 4 hours of instruction on programming camera analytics. Include a thorough and detailed description of all analytics of the system and assist the Owner in programming each analytic function to each individual camera in the project.

B. Refer to the Testing Requirements of Section 18050 – Common Work Results of Electronic Systems.

DIVISION 18 - SECURITY ELECTRONICS

SECTION 18553 – IDENTIFICATION FOR ELECTRONIC SECURITY

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. This Section includes Identification for Electronic Safety and Security that shall be applicable to all Work described under this and other Sections.
2. Provide all equipment, materials, and labor necessary to provide the systems shown in the drawings and described in this Section and other Sections.
3. All Work described in SECTION 18050 – COMMON WORK RESULTS FOR ELECTRONIC SECURITY shall be required by this Section as if written herein.

1.02 SYSTEM DESCRIPTION

A. Design Requirements:

1. Cable Identification:
 - a. Identify all cables with an identification number.
 - b. Identification numbers shall be logically sequenced and reflect both the device being controlled or monitored and the location of the device (door number, room number, etc.).
 - c. Wire labeling shall be through the use of a machine generated labeling system.
 - 1) The use of Dymo labels and hand-written labeling is prohibited.
 - 2) The use of masking tape, Gaffer tape for labeling is prohibited.
2. Wire Color Coding:
 - a. Each wire in each cable shall be color coded for each function shall be uniquely color-coded and grouped together for that function and housed in an overall sheath. Each functional grouping shall be encased in an overall sheath and color coded.
 - b. Confirm access control cable colors with Owner prior to equipment submittal preparation.
 - c. Red shields shall only be used for fire alarm.
 - d. Green wire insulation shall only be used for ground circuits.
 - e. Color coding of cables shall be consistent for the entire run including the cable patch cords and plugs as applicable.
3. Cross-reference the interconnection diagrams of the “as-installed” shop Drawings with the cable identification numbers on the cables. Wire numbers

and terminal numbers shall be codified alike and shown on the shop drawing wiring diagrams.

4. All components in the ceilings shall be tagged on the t-bar.

1.03 SUBMITTALS

- A. General: Submit in accordance with SECTION 18050 COMMON WORK REULSTS FOR ELECTRONIC SECURITY.
- B. Shop Drawings: All wiring drawings shall include wire numbers cross-referenced with field device numbers. Field device numbers shall utilize the associated door or room numbers within the numbering scheme.
- C. As-Built Drawings: The As-Installed Drawings shall be modified shop drawings and shall be up-dated to include all changes.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. As described elsewhere in this Section:
 1. The use of Dymo labels and hand-written labeling is prohibited.

PART 3 – EXECUTION

3.01 ERECTION, INSTALLATION, APPLICATION, CONSTRUCTION

- A. Special Techniques:
 1. Wire labeling shall be through the use of a machine generated labeling system that permanently prints the black cable identification number onto a white, 1-inch to 1-1/5-inch long piece of heat shrinkable material sized as is appropriate for the cable.

END OF SECTION

Room	Room Qty	Manufacturer	Model	Short Description
Conference	1	Barco	R9861613USB2	CX-30 ClickShare Conference Set TAA Compliant Gen 2
Conference	1	BrightSign	LS425	BrightSignOS enabled media player. Single Full HD video decode. USB-C, Analog/SPDIF Audio output. microSD storage options
Conference	1	Chief	AS3LDP7	TEMPO FP WALL MOUNT SYSTEM, PDU BUNDLE
Conference	1	Extron Electronics	60-1271-13	DTP HDMI 4K 230 Rx HDMI Twisted Pair Receiver - 230 feet (70 m)
Conference	1	Extron Electronics	60-1421-13	DTP Transmitter for HDMI - Decorator-Style Wallplate, White - 230 feet (70 m)
Conference	1	Extron Electronics	60-1911-01	IPCP Pro xi Control Processor
Conference	1	Extron Electronics	60-1604-01	Four Input 4K/60 HDMI Switcher
Conference	1	Extron Electronics	60-1667-03	3.5" Portrait Wall Mount TouchLink Pro Touchpanel - White
Conference	1	LG Electronics	65UR340C9UD	HDMI(3), RS-232C(1), USB(1), RF in(1), audio out(1), RJ45In, NO EXT. SPK OUT
Conference	1	Logitech	960-001308	Rally Bar, Graphite, Video Bar, 4K, 15x zoom, PTZ, all-in-one design for sm/med rooms. Includes: Rally Bar w/stand, power supply, AC power cord, HDMI cable (2m/6.5ft), USB cable (2.2m/7.2ft), BT remote control, lens caps 2-yr limited warranty
Conference	1	Netgear	NET-GS305EPP-100NAS	NETGEAR 5-Port Gigabit Ethernet High-Power PoE+ Smart Managed Pl
Consult	1	Barco	R9861613USB2	CX-30 ClickShare Conference Set TAA Compliant Gen 2
Consult	1	BrightSign	LS425	BrightSignOS enabled media player. Single Full HD video decode. USB-C, Analog/SPDIF Audio output. microSD storage options
Consult	1	Chief	FPIWMS	TEMPO FP IN-WALL MOUNT SYSTEM
Consult	1	Extron Electronics	60-1911-01	IPCP Pro xi Control Processor
Consult	1	Extron Electronics	60-1667-03	3.5" Portrait Wall Mount TouchLink Pro Touchpanel - White
Consult	1	LG Electronics	65UR340C9UD	HDMI(3), RS-232C(1), USB(1), RF in(1), audio out(1), RJ45In, NO EXT. SPK OUT
Consult	1	Logitech	960-001308	Rally Bar, Graphite, Video Bar, 4K, 15x zoom, PTZ, all-in-one design for sm/med rooms. Includes: Rally Bar w/stand, power supply, AC power cord, HDMI cable (2m/6.5ft), USB cable (2.2m/7.2ft), BT remote control, lens caps 2-yr limited warranty
Consult	1	Netgear	NET-GS305EPP-100NAS	NETGEAR 5-Port Gigabit Ethernet High-Power PoE+ Smart Managed Pl
Consult	1	Protective Enclosures Company	TVSPRO6570LT	The TV Shield PRO Lite 65-70" Indoor Wall Unit
Consult	1	The Display Shield	Anti-Ligature Slope Top	Anti-Ligature Slope Top
CR Observation	1	Barco	R9861613USB2	CX-30 ClickShare Conference Set TAA Compliant Gen 2
CR Observation	1	BrightSign	LS425	BrightSignOS enabled media player. Single Full HD video decode. USB-C, Analog/SPDIF Audio output. microSD storage options
CR Observation	1	Chief	FPIWMS	TEMPO FP IN-WALL MOUNT SYSTEM
CR Observation	1	Extron Electronics	60-1911-01	IPCP Pro xi Control Processor
CR Observation	1	Extron Electronics	60-2040-01	1G HDMI Compact Encoder
CR Observation	1	Extron Electronics	60-2056-23	One Powered NF 4C LP and One Passive NF 4C S LP
CR Observation	1	Extron Electronics	60-1603-01	Two Input 4K/60 HDMI Switcher
CR Observation	1	Extron Electronics	60-1667-03	3.5" Portrait Wall Mount TouchLink Pro Touchpanel - White
CR Observation	1	LG Electronics	65UR340C9UD	HDMI(3), RS-232C(1), USB(1), RF in(1), audio out(1), RJ45In, NO EXT. SPK OUT
CR Observation	1	Netgear	NET-GS305EPP-100NAS	NETGEAR 5-Port Gigabit Ethernet High-Power PoE+ Smart Managed Pl
CR Observation	1	Protective Enclosures Company	TVSPRO6570LT	The TV Shield PRO Lite 65-70" Indoor Wall Unit
CR Observation	1	The Display Shield	Anti-Ligature Slope Top	Anti-Ligature Slope Top
Day Room	1	Barco	R9861613USB2	CX-30 ClickShare Conference Set TAA Compliant Gen 2

Day Room	1 BrightSign	LS425	BrightSignOS enabled media player. Single Full HD video decode. USB-C, Analog/SPDIF Audio output. microSD storage options
Day Room	1 Chief	FPIWMS	TEMPO FP IN-WALL MOUNT SYSTEM
Day Room	1 Extron Electronics	60-1911-01	IPCP Pro xi Control Processor
Day Room	1 Extron Electronics	60-2040-01	1G HDMI Compact Encoder
Day Room	1 Extron Electronics	60-2056-23	One Powered NF 4C LP and One Passive NF 4C S LP
Day Room	1 Extron Electronics	60-1603-01	Two Input 4K/60 HDMI Switcher
Day Room	1 Extron Electronics	60-1667-03	3.5" Portrait Wall Mount TouchLink Pro Touchpanel - White
Day Room	1 LG Electronics	65UR340C9UD	HDMI(3), RS-232C(1), USB(1), RF in(1), audio out(1), RJ45In, NO EXT. SPK OUT
Day Room	1 Netgear	NET-GS305EPP-100NAS	NETGEAR 5-Port Gigabit Ethernet High-Power PoE+ Smart Managed Pl
Day Room	1 Protective Enclosures Company	TVSPRO6570LT	The TV Shield PRO Lite 65-70" Indoor Wall Unit
Day Room	1 The Display Shield	Anti-Ligature Slope Top	Anti-Ligature Slope Top
Large Therapy/Craft	1 Barco	R9861613USB2	CX-30 ClickShare Conference Set TAA Compliant Gen 2
Large Therapy/Craft	1 BrightSign	LS425	BrightSignOS enabled media player. Single Full HD video decode. USB-C, Analog/SPDIF Audio output. microSD storage options
Large Therapy/Craft	1 Chief	FPIWMS	TEMPO FP IN-WALL MOUNT SYSTEM
Large Therapy/Craft	1 Extron Electronics	60-1911-01	IPCP Pro xi Control Processor
Large Therapy/Craft	1 Extron Electronics	60-2040-01	1G HDMI Compact Encoder
Large Therapy/Craft	1 Extron Electronics	60-2056-23	One Powered NF 4C LP and One Passive NF 4C S LP
Large Therapy/Craft	1 Extron Electronics	60-1603-01	Two Input 4K/60 HDMI Switcher
Large Therapy/Craft	1 Extron Electronics	60-1667-03	3.5" Portrait Wall Mount TouchLink Pro Touchpanel - White
Large Therapy/Craft	1 LG Electronics	65UR340C9UD	HDMI(3), RS-232C(1), USB(1), RF in(1), audio out(1), RJ45In, NO EXT. SPK OUT
Large Therapy/Craft	1 Netgear	NET-GS305EPP-100NAS	NETGEAR 5-Port Gigabit Ethernet High-Power PoE+ Smart Managed Pl
Large Therapy/Craft	1 Protective Enclosures Company	TVSPRO6570LT	The TV Shield PRO Lite 65-70" Indoor Wall Unit
Large Therapy/Craft	1 The Display Shield	Anti-Ligature Slope Top	Anti-Ligature Slope Top
Lobby	1 BrightSign	LS425	BrightSignOS enabled media player. Single Full HD video decode. USB-C, Analog/SPDIF Audio output. microSD storage options
Lobby	1 Chief	LTA1U	Tilt Wall Mount, Large
Lobby	1 LG Electronics	65UR340C9UD	HDMI(3), RS-232C(1), USB(1), RF in(1), audio out(1), RJ45In, NO EXT. SPK OUT
Visit/Tele	1 Barco	R9861613USB2	CX-30 ClickShare Conference Set TAA Compliant Gen 2
Visit/Tele	1 BrightSign	LS425	BrightSignOS enabled media player. Single Full HD video decode. USB-C, Analog/SPDIF Audio output. microSD storage options
Visit/Tele	1 Chief	FPIWMS	TEMPO FP IN-WALL MOUNT SYSTEM
Visit/Tele	1 Extron Electronics	60-1911-01	IPCP Pro xi Control Processor
Visit/Tele	1 Extron Electronics	60-1667-03	3.5" Portrait Wall Mount TouchLink Pro Touchpanel - White
Visit/Tele	1 LG Electronics	65UR340C9UD	HDMI(3), RS-232C(1), USB(1), RF in(1), audio out(1), RJ45In, NO EXT. SPK OUT
Visit/Tele	1 Logitech	960-001308	Rally Bar, Graphite, Video Bar, 4K, 15x zoom, PTZ, all-in-one design for sm/med rooms. Includes: Rally Bar w/stand, power supply, AC power cord, HDMI cable (2m/6.5ft), USB cable (2.2m/7/2ft), BT remote control, lens caps 2-yr limited warranty
Visit/Tele	1 Netgear	NET-GS305EPP-100NAS	NETGEAR 5-Port Gigabit Ethernet High-Power PoE+ Smart Managed Pl
Visit/Tele	1 Protective Enclosures Company	TVSPRO6570LT	The TV Shield PRO Lite 65-70" Indoor Wall Unit
Visit/Tele	1 The Display Shield	Anti-Ligature Slope Top	Anti-Ligature Slope Top