

## DIVISION 01 – GENERAL REQUIREMENTS

### 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 the construction of a Modular Community Center, parking lot, landscaping and associated sitework.
- B. Contract Documents:
  - 1. List of Documents: All of the following documents apply to the Contract.
    - a. Drawings:
      - i. Bound hardcopy set of Group 70 International and their consultants bound therein volumes 01-16.
    - b. Project Manual:
      - i. Bound hardcopy set of "Project Manual" of Group 70 International and their Consultants bound therein.
    - c. Soils Report: Prepared by Geolabs Inc. provided by Owner.
    - d. Other: As included in listing of Contract between Owner and Contractor.
  - 2. Data Availability:
    - a. Availability: All documents, which impact the Project, are available from the Owner.
    - b. Owner Paid For: Owner will make available selected primary Contract Documents without charge to the Contractor.
    - c. Contractor Responsibility: Full review of all Contract requirements is Contractor's responsibility.

##### 1.03 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 I 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.

#### 1.04 QUALITY ASSURANCE

- A. Standards of Quality: The highest quality of work is to be provided as necessary to comply with all of following.
1. Contract requirements; unless in conflict with Code or other Authority requirements, then such requirements to 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 is 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.

#### 1.05 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.

#### 1.06 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.
  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 Contractor's ongoing Work.
  16. Verification of any work to be done by Owner not included in this Contract, if any, impacting Work of this Contract.
  17. Verify salvageable work required by Owner.
  18. Other Owner requirements.
- B. 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.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

### 3.01 CONTRACTOR'S USE OF SITE

- A. General: 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.
  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 Contact 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.
- D. Site Information:
- 1. Available Soils Data: Copy is retained by owner. Review data.
  - 2. Use of Information: It shall be understood that this data is offered solely for the purpose of placing the Contractor in receipt of the available information, that no warranty or representation is made by Owner or any of Owner's consultants, agents, or representatives with regard to data furnished, and such data is not to be considered a part of the Contract Documents. The Contractor must interpret such data according to his own judgment and acknowledges that he shall assume all responsibility for its use.

END OF SECTION

## SECTION 01046 – REQUEST FOR INFORMATION

### PART 1 - GENERAL

#### 1.01 SUMMARY

- A. Section Includes:
  - 1. Administrative requirements for “RFI’s”.
- B. Related Sections:
  - 1. Division 1 Sections.

#### 1.02 DEFINITIONS

- A. Request for Information (RFI): Contractor’s written request for information to confirm, reverify, or further clarify intent required by Contract Documents.

#### 1.03 SUBMITTALS

- A. Architect’s Form: Submit RFI on Architect’s form. Secure form from Architect where not included with Contract Documents.

#### 1.04 QUALITY ASSURANCE

- A. Architect’s Intent: It is a condition to the Contract for the Work, that prior to the signing of the Contract, that the Contractor be fully familiar with and clear to the requirements (Architect’s design intent) for this Project as represented in the Contract Documents. It also a condition to the Contract for the Work, that prior to the signing of the Contract, should there be any aspect of the Contract which is not clear or not complete enough, that the Contractor is to secure the necessary information from the Architect in order to attain the required understanding of the Project. The primary reasons for this are as follows.
  - 1. Contract Amount: It is important that the Owner secure a fair and complete cost proposal for the Work; without hidden or additional costs to the Owner.
  - 2. Administrative Costs: Minimize unnecessary costs to administer the Project during the progress of the Work.
- B. Architect’s Drawings & Specifications:
  - 1. Design Intent: It is an accepted historical and understood practice in the industry that the Architect’s Drawings and Specifications reasonably and professionally convey his design intent for the Project, without necessarily indicating every single condition for the Work, but to the degree necessary that Contractors can propose a fair and complete cost for the Work, including for the work not indicated, but implied by the Architect’s design intent.
  - 2. RFI’s - Basis of Communication: Due to the fact all conditions are not indicated by the Contract Documents it is understood that additional clarifications will be made necessary during the course of the work by the Contractor in order to fully achieve all aspects of the Architect’s design intent and that the RH procedure becomes the administrative basis by which information is formally communicated between the Architect and the

Contractor.

C. 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.
2. Administrative Costs: Where misuse does occur, submittals will be returned and Contractor is to pay for administered costs at Owner's, Owner's Representative's, and their Consultant's standard rates; for all who were involved in review of such submittals. An itemized listing will be provided to Contractor in addition to the bill.

D. Contractor Initiation: RFI's must be submitted through the General Contractor.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 PROCEDURE

A. Contractor's Responsibilities

1. Examination: Upon discovering a potential aspect of the Work which may require further clarification from the Architect, thoroughly examine the Contract Documents to ensure that the information is not indicated.
2. Submittal, failure to provide any of the below shall be considered an incomplete RFI submission.:
  - a. Use of Architect provided RFI form.
  - b. General: Where a reasonable search for needed information has been conducted without success, complete and submit an RFI.
  - c. Contractor's Interpretation: In space provided or as an attachment, if required, submit Contractor's interpretation of what he believes to be Architect's intent for area or subject requiring clarification. Also provide a narrative of the contractors contracted scope to provide a complete and occupiable project. All RFI's shall also provide a contractor provided solution as a "no cost solution".
  - d. Cost and Schedule Impact: Each and every RFI must indicate whether there will be a cost and/or schedule impact linked to it. Nebulous or inconclusive statements such as potential or pending are not acceptable, a rough order of magnitude shall be included in RFI.

B. Architect's Responsibilities:

1. Review: Not less than 5 and no later than 10 working days after each RFI is received. Working days shall be counted as whole days on RFI logs. Return to Contractor a response on the submitted form.
2. Information Indicated in Contract Documents: If any, requested information is found to be already indicated in the Contract Documents, following is to occur.

- a. RFI Form: Architect to record location of the requested information on the submitted RFI form.
- b. Administrative Costs: Owner may deduct the sum of one hundred dollars (\$100) minimum, for the Architect's time to administer and process each such RFI. Additional costs may be deducted when itemized by the Architect and submitted to the Owner.

END OF SECTION



## SECTION 01050 – FIELD ENGINEERING

### PART 1 - GENERAL

#### 1.01 SUMMARY

A. Section Includes:

1. Surveying and site layout work by Surveying Professional.
2. Contractor responsibilities.

B. Related Sections:

1. Division 1 Sections.
2. Division I - Special Project Procedures.

#### 1.02 SUBMITTALS

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

B. Project Closeout Submittals: Submit following from Surveying Professional. Comply with requirements of Division 1 - Project Closeout Section.

1. Certifications: Written and signed certification; certifying following.
  - a. Regarding Improvements: Certify location and elevation of improvements are accurate relative to established permanent benchmarks and comply with intent of Contract Documents.
  - b. Regarding Final Property Survey: Certify that indicated information, including principal metes and bounds, and location, lines and levels shown are accurate to actual final Project conditions.
2. Project Record Documents: Submit following Record Documents.
  - a. Final Property Survey Drawings: Show significant features (real property) for Project, and in addition to other required information, indicate established final permanent benchmarks.
  - b. Surveyor's Log.
  - c. Copies:
    - i. Drawings: Submit three (3) copies of the final survey and one (1) CD containing survey in AutoCADD 2013 format.
    - ii. Surveyor's Log: Submit six (6) copies.

#### 1.03 QUALITY ASSURANCE

A. Contractor Responsibilities:

1. Secure licensed Surveying Professional for site layout work.
2. Ultimately responsible for location, tolerances, grades, lines, level, and plumb of all improvements on Project site.
3. Additional surveying work not provided by Surveying Professional and as required to ensure proper installation of all Work.

B. Surveying Professional:

1. Responsibility: Responsible for primary site layout work as specified herein.
2. Available Professionals: At Contractor's option, engage one of following types of licensed professional for land surveying work.
  - a. Land Surveyor.
  - b. Professional Engineer.
3. Qualifications: Selected Professional to be acceptable to Architect. Submit qualifications. Minimum qualifications as follows.
  - a. Experience: 5 continuous years minimum performing land surveying work of type required for Project; unless otherwise acceptable to Architect.
  - b. Licensure: Current applicable license in State where Project is located.

C. Owner Furnished Documents: Owner will provide survey identifying existing control points and property line corner stakes.

1. Physical Markers:
  - a. Established Markers: Do not change or relocate physical markers which represent benchmarks, reference points, and control points without prior written approval from Architect.
2. Notification: Promptly report to Architect following.
  - a. Lost or destroyed physical markers.
  - b. Need for relocation of physical markers made necessary by changes that make it unreasonable to retain markers in original location.

D. Project Record Documents: Make available to Architect and their consultants for review.

E. Dimensional and Tolerance Deviations: Comply with following.

1. Notifications: Where dimensional and tolerance deviations exceed indicated or recognized Industry tolerances, notify Architect immediately.
2. Contractor Responsibility: Correct deviations to meet Contract requirements, unless otherwise acceptable to Architect.
3. Project Record Documents: Record dimensional and tolerance deviations not corrected.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verifications of Work: Prior to start of site work, verify following.

1. Owner's Survey: Verify layout information shown on Owner's furnished

survey is accurate prior to start of layout work, provide written certification/confirmation that all site work and the layout of the proposed improvements are per the contract documents and/or as-builts. If discrepancies are found they must be submitted in writing to the Owner prior to advancing any work.

2. Other Existing Work:

- a. Underground Work: Indicated underground work is based upon available documented information and their existence is not guaranteed.
- b. Verification: Investigate and verify the existence and location of indicated underground utilities and other construction.
- c. Utilities: Prior to construction, coordinate with local utilities the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water service lines.

3.02 PREPARATION

- A. Permanent Benchmarks: Establish and maintain a minimum of two (2) permanent benchmarks on the site, referenced to data established by survey control points.

3.03 SITE LAYOUT, GENERAL

- A. Control Points: Working from established benchmarks and reference points, locate other physical markers as control points for Project and to ensure that each element of the Project can be accurately located and installed true to line, level, and plumb.
- B. Dimensions and Tolerances: Maintain dimensions within indicated or recognized Industry tolerances. Do not scale drawings to determine dimensions.
- C. Coordination: Advise Contractor of established benchmarks and control points. Contractor to disseminate information as required to appropriate entities requiring information and to ensure that installed work is properly located.
- D. Site Improvements: Locate and lay out site improvements, including pavements, stakes for grading, fill and topsoil placement, utility slopes, and invert elevations.
- E. Building Lines and Levels: Locate and lay out batter boards for structures, building foundations, column grids and locations, floor levels, and control lines and levels required for mechanical and electrical work.
- F. Existing Utilities: Furnish information necessary to adjust, move, or relocate existing structures, utility poles, lines, services, or other appurtenances located in, or affected by, construction. Coordinate with local Authorities having jurisdiction.

3.04 FIELD QUALITY CONTROL

- A. Accuracy of Installed Work: Conduct periodic checks to ensure that Work is accurate to line, level, and plumb.
- B. Preservation of Established Markers: Promptly replace inaccurate, damaged, or lost Project markers. Base replacements on original established permanent

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OWNER'S SAMPLE DESIGN  
NOT FOR CONSTRUCTION

survey benchmarks.

END OF SECTION

## SECTION 01210 - ALLOWANCES

### PART 1 - GENERAL

#### 1.01 SUMMARY

- A. This Section includes administrative and procedural requirements governing allowances.
  - 1. Certain materials, equipment, and services are specified in the Contract Documents by allowances. In some cases, these allowances include installation. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when additional information is available for evaluation. If necessary, additional requirements will be issued by Change Order.
- B. Types of allowances include the following
  - 1. Lump-sum allowances
- C. Related Sections Include the Following
  - 1. Section 01250 – CONTRACT MODIFICATION PROCEEDURES for procedures for submitting and handling Change Orders.

#### 1.02 DEFINITIONS

- A. Allowances; Cash amounts established in the Contract Documents to be included in the Contract Base Sum to cover the cost of items not specified in detail.

#### 1.03 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.
- B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by Architect from the designated supplier.

#### 1.04 SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.
- B. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- C. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.
- D. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

#### 1.05 COORDINATION

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

1.06 LUMP SUM ALLOWANCES

- A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.
- B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.
- C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.
  - 1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

PART 2 - PRODUCTS - (Not used)

PART 3 - EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

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

END OF SECTION

## SECTION 01250 – CONTRACT MODIFICATION PROCEDURES

### PART 1 - GENERAL

#### 1.01 SUMMARY

- A. Section Includes:
  - 1. Change Orders.
- B. Related Sections:
  - 1. Division 1 Sections.

#### 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. Proposal Request (Change Order Proposal): For each proposal, following.
  - 1. Primary Document: From Contractor, submit 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 proposal, following.
  - 1. Primary Document: Submit as part of Contractor's “Application for Payment”; 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's Representative and Architect.
2. Spreadsheet: In addition to other required data, include direct costs, indirect costs, overhead, profit, and G.I.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:
  - 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 PROCEDURES

- A. Proposal Request:
  - 1. Initiation: May be initiated by Contractor or may be initiated by a request for proposal from the Owner/Owner's Representative to the Contractor and resulting in Contractor's "Proposal Request" to Owner/Owner's Representative.
  - 2. Architect's Request for Proposal: Request for Information (RFI) is neither a Change Order nor directive to proceed with the work, but is a request for information. If Contractor believes the request alters the Contract Sum and/or Project Schedule. Contractor is to provide a Proposal Request for review and written approval prior to initiating any of the requested work, failure to achieve approval prior shall be solely at the contractors risk to include denial of compensation, regardless if the work was necessary.
  - 3. Time of Submission: Prior to commencing proposed work, but not later than required to allow for proper review by Owner/Owner's Representative, and as necessary to allow for timely incorporation into Project Schedule.
- B. Change Order: For Owner approved Change Proposal Requests, the following is to be accomplished.
  - 1. Owner/Owner's Representative Responsibility: Issue written approval of Proposed Change Order to Contractor.

2. Contractor's Responsibility: With Owner/ Owner's Representative, sign Change Order. Upon receiving Change Order, comply with following.
  - a. Progress Schedule: Incorporate into Progress Schedule and submit revised schedule; unless otherwise acceptable to Owner's Representative and Architect.
  - b. The Work: Proceed with the work.
  - c. Application for Payment: Upon completion of work, submit request for payment as part of first application for payment due after work complete. Application for Payment to distinguish each Change Order work from other work.

END OF SECTION

## SECTION 01310 – PROJECT MANAGEMENT AND COORDINATION

### PART 1 - GENERAL

#### 1.01 SUMMARY

- A. Section Includes:
  - 1. Administrative requirements.
  - 2. Coordination of Owner's work.
  - 3. Coordinate with other Contractors and adjacent projects.
- B. Related Sections:
  - 1. Division 1 Sections, general.
  - 2. Section 01100 - SUMMARY OF WORK.
  - 3. Division 01330 - SUBMITTAL PROCEDURES.

#### 1.02 SUBMITTALS

- A. Superintendent & Quality Control Officer Resume:
  - 1. Document: Submit copies of each person's written resume.
  - 2. Submittal Time: Prior to execution of the Contract.
- B. Contractor's Organization Chart and Key Personnel & Assignments:
  - 1. Document: Submit written organization chart and list of officers and key personnel. Chart to indicate general hierarchy of those responsible to Project from CEO down to those on Project Team. List to include names, titles, description of primary responsibilities, addresses, and direct phone, facsimile, and E-mail numbers.
  - 2. Submittal Time: Within 10 working days after Notice to Proceed is given by Owner.
- C. Primary Subcontractors:
  - 1. Document: Submit written list of primary Subcontractors for each key part of the Work. List to include name of company, address, phone numbers and facsimile numbers, and primary personnel to be contacted.
  - 2. Submittal Time: Within 10 working days after Notice to Proceed is given by Owner.
- D. Project Progress Reports and Progress Schedule: Refer to specific requirements in other paragraphs herein.
- E. Progress Meetings:
  - 1. Document: Submit written document of agenda for each scheduled meeting. List all parties copied.

2. Submittal Time: Submit written agenda, to be received, not less than 2 working days prior to each scheduled meeting and distribute to all invited parties. Provide additional copies at each meeting.

### 1.03 QUALITY ASSURANCE

#### A. Key Personnel Qualifications:

1. General: Experience and skills to be commensurate with responsibilities.
2. Lead Personnel:
  - a. Experience: Not less than 10 years current experience in supervising work of scope and complexity of this Project.
  - b. Commitment: For duration of Project. Where replacement is necessary, it is mandatory that lead personnel provide a transition period necessary to fully inform replacement of all his responsibilities, but not less than 20 working days. If any lead personnel is replaced, replacement to be acceptable to Owner's Representatives.
  - c. Project Superintendent: Assign a full time superintendent responsible for the Project in its entirety.
  - d. Quality Control Officer: Assign a full time Quality Control Officer experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.
  - e. Project Engineer: Provide during key Structural, Division 14, 15 and 16 submittals provide the services of a State of Hawaii Licensed Mechanical Engineer to review, coordinate and submit Mechanical and Electrical submittals to ensure all work is coordinated by each trade and properly organized and presented per specifications.
  - f. Elevator/Conveying Systems Specialist: Provide a recognized Elevator/Conveying Systems Specialist to review and provide certification of the elevator system and its incorporation into the project, to include review of all applicable building codes and review of the Electrical, Mechanical and Structural drawings.
3. Immediate Assistants to Lead Personnel:
  - a. Second-In-Line Experience: Those second-in-line to lead personnel should have similar experience and be fully capable of assuming lead personnel's responsibilities where lead personnel should they have to leave position for whatever reason; whether temporary or permanent.
  - b. Experience of Other Related Personnel to Lead Positions: Assign other personnel to assist primary lead personnel as required. Ensure that each personnel has specific expertise in areas for which they are responsible.

#### B. Project Progress Reports:

1. General: Refer to "Execution" paragraphs herein for specific submittal requirements.

2. Format: Format and data required to be acceptable to Owner and his Representatives.
3. Condition for Payment: It is a condition that data for reports be submitted and that they are up to date and in conformance with Owner's Representative's requirements for certification of any Payment Requests. Any incomplete report will not be reviewed until compliance is achieved.
4. Contractor's Records: Produce reports on a regular and continuous basis for full duration of Project to give a continuous ongoing representation of Project progress. Maintain such reports regardless of whether such reports are required to be submitted on a regular basis. Provide such reports for review by Owner's Representatives whenever requested.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

### 3.01 ADMINISTRATIVE REQUIREMENTS

#### A. Progress Meetings:

1. Contractor's Meetings: As required for proper coordination of the Work.
2. OAC (Owner, Architect, Contractor) Meetings:
  - a. Time: Establish a regular scheduled meeting to occur twice each month for which attendance is required for the invited participants. Work with Architect in establishing dates and times agreeable to primary parties involved.
  - b. Agenda: Prior to each meeting, verify agenda from Owner, Architects, and other invited parties. Incorporate with Contractor's agenda where different.
  - c. Participants: Each meeting will include the Contractor, the Owner, the Architect, other Subcontractors, and such other parties deemed necessary by the Contractor, and the Architect, or Owner, based upon agenda required by meeting. At each meeting, for each Entity there is to be representation by at least one participant who can make binding decisions for the party or company he/she represents. Requests for participation of any of the Architect's consultants shall be through the Architect.
  - d. Minutes – Contractor's Responsibility.
    - i. Recording: Record detailed minutes.
    - ii. Distribution: Distribute written minutes of each meeting within 3 working days of each meeting. Distribute to Owner's Representatives and their Consultants and to all parties affected by decisions of each meeting and for which Contractor has responsibility for.

#### B. Preinstallation Conferences:

1. General: Conduct as required.
2. Contract (Specified) Conferences: Comply with specified requirements and requirements under "Progress Meetings" paragraphs herein.
- C. Construction Activities:
  1. General: Coordinate to assure efficient and orderly installation of each part of the Work.
  2. Progress Schedule: Continually update schedule to reflect current progress of the Work.
  3. Project Progress Reports: Keep written daily records of progress of Project.
  4. Administrative Submittals: Refer to Division 1 – Submittal Procedures Section for requirements.

### 3.02 PROJECT PROGRESS REPORTS - SUMMARY OF TYPES

- A. Project Progress Manual: Manual consisting of compilation of various reports, including following.
  1. Project progress summary sheet.
  2. Project Schedule Summary, abbreviated overview.
  3. Cash flow reports.
  4. Project drawings.
  5. Project progress photos - selected.
  6. Payment Request.
  7. Lien Waivers.
- B. Other Project Progress Reports: Other reports include following.
  1. Submittal Status Reports.
  2. RFI Status Reports.
  3. Change Order Status Reports.
  4. Material Status Reports.
  5. Stored Materials Status Reports.
  6. Daily Manpower Status Reports.

### 3.03 PROJECT PROGRESS REPORTS - PROJECT PROGRESS MANUAL

- A. General:
  1. Format: Submit a finished and bound manual in a format acceptable to Architect and complying with requirements herein.
  2. Submittal Time:
    - a. For Approval of Format: Submit draft of proposed manual within ten (10) working days after Notice to Proceed is given. Adjust format and

data categories as required until successful review of documents by Owner and Architect is achieved.

- b. Thereafter during Contract Period: Submit updated manuals for each application for payment in advance of the day that the executed application for payment is due to the Owner and as required for timely and reasonable full review by Owner's Representatives. The certified (executed and signed) "Application for Payment" is due to the Owner on the 20<sup>th</sup> calendar day of each month, or the working day closest to the 20<sup>th</sup> where the 20<sup>th</sup> falls on a weekend.
- c. Closeout Submittal: Submit nil successfully reviewed records to Owner as historical record of Project. Comply with Division 1 - Project Record Documents Section.

B. General Binding Requirements:

- 1. Covers: Hardcover front and back.
- 2. Binding: To allow for removal of contents.
- 3. Cover Sheet: First page to be a cover sheet showing official Architect's title for Project, Owner's designated Project Number, and such other data to be determined.
- 4. List of Primary Involved Entities: Provide name, address, telephone numbers, and primary contacts of Contractor, Owner, Architect and Architect's Consultants.
- 5. Contents: Three hole punched copies of required data. Format data at bound edge with enough space to allow readability of all data and so that punched holes do not obscure any data.
- 6. Size: 8-1/2" x 11"; or as otherwise acceptable to Owner's Representative. 8-1/2" x 17" or other standard size foldouts will be considered.
- 7. Dividers: Provide tabbed and labeled indexed dividers for each primary section of information.

C. Project Progress Summary Sheet: Written narrative summarizing primary current Project activities by area and Trade. In addition to indicating general status of activities, list any scheduling or construction problems and current strategies for resolving such problems, if any.

D. Progress Schedule - Summary Sheet: Refer to "Progress Schedule" paragraphs herein.

E. Cash Flow Reports:

- 1. Document: Graphs generated from Progress Schedule software showing cash flow over time. Document to show two graphs consisting of base line graph and current actual cash flow.
- 2. Base Line Graph: Contractor's proposed cash flow for Project projected over Contract duration.
- 3. Actual Cash Flow Graph: Contractor's actual expenditures to date of submittal.

- F. Project Drawings: To be selected by Owner and may include Site Plan, primary elevations, and typical units.
- G. Payment Request Documents: Submit all of following at time of each application for payment.
  - 1. Document - Application & Certificate for Payment: Execute on AIA Document G702; current document.
  - 2. Document - Schedule of Values:
    - a. Data: All costs to be current up to 20<sup>th</sup> day of each month or such other date approved by Owner's Representatives.
    - b. Form: Submit spreadsheet generated by computer software, e.g. Excel or other Architect acceptable software. Data to coincide with data provided on cash flow reports.
    - c. Format - Form: Submit organized and detailed cost breakdown similar to categories and organization of AIA Document G703; current document.
    - d. Format - Basic Data Organization: Organize each related work into same primary work related categories as specified in Specifications. Identify each work group by similar Specification Section number and title; then show detailed breakdown of each work thereunder.
    - e. Other Related Costs: Include other related costs as separate line items as required to show complete cost for the Work including, but not limited to, following.
      - i. Performance and Payment Bonds.
      - ii. Field Supervision and layout.
      - iii. Temporary Facilities and Controls.
      - iv. Insurance.
      - v. Gross Income Tax.
      - vi. Overhead & Fee.
    - f. Total: Indicate total sum of all line items to equal the Contract Amount.
    - g. Figures: Round off to nearest dollar.
- H. Lien Waivers:
  - 1. General: Submit waivers of lien from every entity who could lawfully and possibly file a lien in excess of \$100 arising out of the Contract. Waivers to clearly show entity providing work and signature in script and printing of person who can legally bind company and with person's title. The Owner reserves the right to designate which entities involved in the Work must submit waivers.
  - 2. Document - Types:
    - a. Partial Lien Waivers: Except for Final Payment Request when Final Lien Waivers required, submit Partial Lien Waivers for all work up to last certified Payment Request. Submit waivers on forms provided in Appendix or on other forms acceptable to Owner.



- b. Final Lien Waivers: Submit final lien waivers in conformance with General Conditions of the Contract and Division I – Contract Closeout requirement; covering substantially all work required under Contract.
3. Lien Waivers From: Waivers required from each of following.
  - a. Contractor.
  - b. Subcontractors.
  - c. Suppliers.
  - d. Tax Lien Releases.
  - e. Union Lien Releases.
  - f. Other as required to comply with requirement and as otherwise requested by Owner.
4. Project Progress Photographs: Owner's Project Representative's selected color (Xerox) reproductions of photographs as required by Division I - Project Record Documents Section to be included.

#### 3.04 PROJECT PROGRESS REPORTS - OTHER REPORTS

- A. General Submittal Requirement: Except for "Daily Manpower Status Report", submit all of "Other Reports" into a single bound volume.
- B. Submittal Status Reports:
  1. Document: Submit a written document in table form indicating proposed baseline schedule for submission of submittals to be received, forwarded, and returned from all involved Parties and show schedule of actual status of submittals. Indicate involved Parties of each submittal and dates related to each status category.
  2. Submittal Time: Submit with each Payment Request and updated document with data current to submittal date.
- C. RFI Status Reports:
  1. Document: Submit a written document in table form indicating current status of RFI's. Indicate involved Parties of each RFI and dates related to each status category.
  2. Submittal Time: Submit with each Payment Request and updated document with data current to submittal date.
- D. Change Order (CO) Status Reports:
  1. Document: Submit a written document in table form indicating current accounting status of CO's.
  2. Data: In addition to any other data, following should be incorporated for each line item related to a specific CO.
    - a. Change Order number.
    - b. Related Specification Section number.
    - c. Proposed pending Change Order cost.

- d. Date submitted.
  - e. Date approved.
  - f. Approved Change Order amount.
  - g. Amount paid to date and date paid.
  - h. Unpaid balance.
  - i. Subtotals for each category.
  - j. Total adjusted Contract Sum with included "Approved Change Orders".
  - k. Total adjusted Contract Sum for "potential total Contract Sum" based upon base Contract Sum and "approved" and "pending" Change Orders.
- 3. Submittal Time: Submit with each Payment Request and updated document with data current to submittal date.
- E. Material Status Reports:
  - 1. Document: Submit a written document in table form indicating proposed baseline schedule for ordering and delivery of materials and actual status of orders and delivery dates.
  - 2. Submittal Time: Submit with each Payment Request and updated document with data current to submittal date.
- F. Stored Materials Status Reports:
  - 1. Document: Submit spreadsheet generated by computer software, e.g. Excel or other Architect acceptable software.
  - 2. Submittal Time: Submit with each Payment Request and updated document with data current to submittal date.
  - 3. Format: Provide detailed itemized list. Each line item to be described by related specification number, short description and cost, freight costs, and applicable taxes. Accounting to be coordinated with accounting on "Schedule of Values".
  - 4. Substantiating Data: Submit following.
    - a. Invoices.
    - b. Quantities of stored material.
    - c. Location of Oahu based warehouse(s). Indicate storage facility, address, and phone number.
    - d. Proof of insurance coverage for full replacement value of stored materials.
    - e. Proof that storage facility is bonded.
- G. Daily Manpower Status Reports:
  - 1. Document: Submit spreadsheet generated by Progress Schedule software of daily manpower requirements for each Trade.
  - 2. Submittal Time: Submit with updated documents at end of each work week.

### 3.05 PROJECT PROGRESS SCHEDULES

- A. Documents: Types of Schedules include following.
  - 1. Project Progress Schedule Summary:
  - 2. Project Progress Schedule.
  - 3. Submittal Times: Submit draft of proposed manual within ten (10) working days after Notice to Proceed is given. Adjust format and data categories as required until successful review of documents by Owner and Architect is achieved.
  - 4. Thereafter during Contract Period: Submit updated copies for each application for payment. Project Schedule Summary to comply with requirements for Project Progress Manual.
- B. Progress Schedule - General:
  - 1. Computer Program: Schedule to be generated by computer program, e.g. Primavera Project Planner, or other similar program capable of similar detailed CPM network and other Project schedule analysis and reporting. Other comparable software products to be acceptable to Construction Manager.
  - 2. Basis of Project Progress: First Architect approved submittal to be used as baseline Schedule to track Contractor's progress as shown by required updated Schedule submittals thereafter.
  - 3. Additional Float Time:
    - a. Period: Schedule in an additional float time of 30 calendar days.
    - b. Ownership: Owner to retain ownership of this float time and its use will be at the Owner's discretion.
    - c. Internal float owned by the project. Float consumption is based on first come first serve basis.
- C. Project Progress Schedule Summary:
  - 1. Schedule Type: Horizontal bar type showing Contractor's original base Schedule and actual current Schedule superimposed onto same document.
  - 2. Submittal Time: Incorporate updated copies into Project Progress Manual and submit in accordance with requirements for Project Progress Manual.
- D. Project Progress Schedule:
  - 1. Schedule Type: Detailed CPM (Critical Path Method) Schedule.
  - 2. Submittal Time: Submit three (3) an updated sets at time of each Payment Request in electronic and hard copy format.
  - 3. Three (3) week look ahead schedule to be submitted weekly showing work in progress for the current week and the forecast of 2 weeks ahead. This schedule should be based on actual field condition and in line with current approved schedule.

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. 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’ warrantees.
  - 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. Hardcopy: Submit six (6) sets where not otherwise indicated and additional sets as the Contractor requires for his Work.
2. 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.

C. Requirements for Each Submittal Set: Each set to consist 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. 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.
- 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. Reproductions: Submit one reproducible transparency and five (5) opaque prints.
- 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

- 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.
  - 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.
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 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

## SECTION 01361 - SUSTAINABLE DESIGN REQUIREMENTS - LEED

### PART 1 - GENERAL

#### 1.01 SUMMARY

- A. Section includes general requirements and procedures for compliance with certain USGBC LEED prerequisites and credits needed for Project to obtain LEED-Certified certification based on USGBC's "LEED Versions 2.2 for New Construction & Major Renovations."
1. Other 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.
- Additional LEED prerequisites and credits needed to obtain the indicated LEED certification depend on Architect's design and other aspects of Project that are not part of the Work of the Contract.
- A copy of the LEED Project checklist is attached at the end of this Section for information only.
- Specific requirements for LEED are included in greater detail in other Sections.

#### 1.02 DEFINITIONS

- Recycled Content: The recycled content value of a material assembly shall be determined by weight. The recycled fraction of the assembly is then multiplied by the cost of assembly to determine the recycled content value.
1. "Post-consumer" material is defined as waste material generated by households or by commercial, industrial, and institutional facilities in their role as end users of the product, which can no longer be used for its intended purpose.
- "Pre-consumer" material is defined as material diverted from the waste stream during the manufacturing process. Excluded is reutilization of materials such as rework, regrind, or scrap generated in a process and capable of being reclaimed within the same process that generated it.

#### 1.03 ADMINISTRATIVE REQUIREMENTS

- A. Respond to questions and requests from Architect and the USGBC regarding LEED credits that are the responsibility of the Contractor, that depend on product selection or product qualities, or that depend on Contractor's procedures until the USGBC has made its determination on the project's LEED certification application. Document responses as informational submittals.

#### 1.04 ACTION SUBMITTALS

- A. General: Submit additional LEED submittals required by other Specification Sections.

LEED submittals are in addition to other submittals. If submitted item is identical to that submitted to comply with other requirements, submit duplicate copies as a separate submittal to verify compliance with indicated LEED requirements.

LEED Documentation Submittals:

1. Credit MR 2: Comply with Section 01524 "Construction Waste Management."

Credit MR 4: Product data and certification letter from product manufacturers indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content. Include statement indicating material cost for each product having recycled content.

Credit IEQ 3.1:

- a. Construction indoor-air-quality management plan.

Product data for temporary filtration media.

Product data for filtration media used during occupancy.

Construction Documentation: Six photographs at three different times during the construction period, along with a brief description of the SMACNA approach employed, documenting implementation of the indoor-air-quality management measures, such as protection of ducts and on-site stored or installed absorptive materials.

2. Credit IEQ 3.2:

- a. Signed statement describing the building air flush-out procedures including the dates when flush-out was begun and completed and statement that filtration media was replaced after flush-out.

Product data for filtration media used during flush-out and during occupancy.

Report from testing and inspecting agency indicating results of indoor-air-quality testing and documentation showing compliance with indoor-air-quality testing procedures and requirements.

3. Credit IEQ 4.1: Product data for adhesives and sealants used inside the weatherproofing system indicating VOC content of each product used.

Credit IEQ 4.2: Product data for paints and coatings used inside the weatherproofing system indicating VOC content of each product used.

Credit IEQ 4.4: Product data for products containing composite wood or agrifiber products or wood glues indicating that they do not contain urea-formaldehyde resin.

#### 1.05 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For LEED coordinator.

Project Materials Cost Data: Provide statement indicating total cost for materials used for Project. Costs exclude labor, overhead, and profit. Include breakout of costs for the following categories of items:

Plumbing.

Mechanical.

Electrical.

Specialty items such as elevators and equipment.

Wood-based construction materials.

B. LEED Action Plans: Provide preliminary submittals within 30 days of date established for commencement of the Work indicating how the following requirements will be met:

1. Credit MR 2: Waste management plan complying with Section 01524 "Construction Waste Management."

Credit MR 4: List of proposed materials with recycled content. Indicate cost, post-consumer recycled content, and pre-consumer recycled content for each product having recycled content.

Credit MR 5: List of proposed regional materials. Identify each regional material, including its source, cost, and the fraction by weight that is considered regional.

Credit IEQ 3.1: Construction indoor-air-quality management plan.

C. LEED Progress Reports: Concurrent with each Application for Payment, submit reports comparing actual construction and purchasing activities with LEED action plans for the following:

1. Credit MR 2: Waste reduction progress reports complying with Section 01524 "Construction Waste Management."

Credit MR 4: Recycled content.

Credit MR 5: Regional materials.

## 1.06 QUALITY ASSURANCE

A. LEED Coordinator: Engage an experienced LEED-Accredited Professional to coordinate LEED requirements. LEED coordinator may also serve as waste management coordinator.

## PART 2 - PRODUCTS

### 2.01 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.

## 2.02 RECYCLED CONTENT OF MATERIALS

- A. Credit MR 4: Building materials shall have recycled content such that post-consumer recycled content plus one-half of pre-consumer recycled content for Project constitutes a minimum of 20 percent of cost of materials used for Project.

1. Cost of post-consumer recycled content plus one-half of pre-consumer recycled content of an item shall be determined by dividing weight of post-consumer recycled content plus one-half of pre-consumer recycled content in the item by total weight of the item and multiplying by cost of the item.

Do not include plumbing, mechanical and electrical components, and specialty items such as elevators and equipment in the calculation.

## 2.03 LOW-EMITTING MATERIALS

- A. Credit IEQ 4.1: For field applications that are inside the weatherproofing system, adhesives and sealants shall comply with the following VOC content limits when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Wood Glues: 30 g/L.

Metal-to-Metal Adhesives: 30 g/L.

Adhesives for Porous Materials (Except Wood): 50 g/L.

Subfloor Adhesives: 50 g/L.

Plastic Foam Adhesives: 50 g/L.

Carpet Adhesives: 50 g/L.

Carpet Pad Adhesives: 50 g/L.

VCT and Asphalt Tile Adhesives: 50 g/L.

Cove Base Adhesives: 50 g/L.

Gypsum Board and Panel Adhesives: 50 g/L.

Rubber Floor Adhesives: 60 g/L.

Ceramic Tile Adhesives: 65 g/L.

Multipurpose Construction Adhesives: 70 g/L.

Fiberglass Adhesives: 80 g/L.

Contact Adhesive: 80 g/L.

Structural Glazing Adhesives: 100 g/L.

Wood Flooring Adhesive: 100 g/L.

Structural Wood Member Adhesive: 140 g/L.

Single-Ply Roof Membrane Adhesive: 250 g/L.

Special-Purpose Contact Adhesive (contact adhesive that is used to bond melamine-covered board, metal, unsupported vinyl, rubber, or wood veneer 1/16 inch or less in thickness to any surface): 250 g/L.

Top and Trim Adhesive: 250 g/L.  
Plastic Cement Welding Compounds: 250 g/L.  
ABS Welding Compounds: 325 g/L.  
CPVC Welding Compounds: 490 g/L.  
PVC Welding Compounds: 510 g/L.  
Adhesive Primer for Plastic: 550 g/L.  
Sheet-Applied Rubber Lining Adhesive: 850 g/L.  
Aerosol Adhesive, General-Purpose Mist Spray: 65 percent by weight.  
Aerosol Adhesive, General-Purpose Web Spray: 55 percent by weight.  
Special-Purpose Aerosol Adhesive (All Types): 70 percent by weight.  
Other Adhesives: 250 g/L.  
Architectural Sealants: 250 g/L.  
Nonmembrane Roof Sealants: 300 g/L.  
Single-Ply Roof Membrane Sealants: 450 g/L.  
Other Sealants: 420 g/L.  
Sealant Primers for Nonporous Substrates: 250 g/L.  
Sealant Primers for Porous Substrates: 775 g/L.  
Modified Bituminous Sealant Primers: 500 g/L.  
Other Sealant Primers: 750 g/L.

B. Credit IEQ 4.2: For field applications that are inside the weatherproofing system, paints and coatings shall comply with the following VOC content limits when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Flat Paints and Coatings: VOC not more than 50 g/L.  
Nonflat Paints and Coatings: VOC not more than 150 g/L.  
Dry-Fog Coatings: VOC not more than 400 g/L.  
Primers, Sealers, and Undercoaters: VOC not more than 200 g/L.  
Anticorrosive and Antirust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.  
Zinc-Rich Industrial Maintenance Primers: VOC not more than 340 g/L.  
Pretreatment Wash Primers: VOC not more than 420 g/L.  
Clear Wood Finishes, Varnishes: VOC not more than 350 g/L.  
Clear Wood Finishes, Lacquers: VOC not more than 550 g/L.  
Floor Coatings: VOC not more than 100 g/L.  
Shellacs, Clear: VOC not more than 730 g/L.  
Shellacs, Pigmented: VOC not more than 550 g/L.  
Stains: VOC not more than 250 g/L.



- C. Credit IEQ 4.4: Composite wood, agrifiber products, and adhesives shall not contain urea-formaldehyde resin.

### PART 3 - EXECUTION

#### 3.01 CONSTRUCTION WASTE MANAGEMENT

- A. Credit MR 2: Comply with Section 01524 "Construction Waste Management."

#### 3.02 CONSTRUCTION INDOOR-AIR-QUALITY MANAGEMENT

- A. Credit IEQ 3.1: Comply with SMACNA's "SMACNA IAQ Guideline for Occupied Buildings under Construction."
  - 1. If Owner authorizes use of permanent heating, cooling, and ventilating systems during construction period as specified in Section 01500 "Temporary Facilities and Controls," install filter media having a MERV 8 according to ASHRAE 52.2 at each return-air inlet for the air-handling system used during construction.

Replace all air filters immediately prior to occupancy.

- B. Credit IEQ 3.2: Comply with one of the following requirements:

- 1. Air-Quality Testing:
    - a. Conduct baseline indoor-air-quality testing, after construction ends and prior to occupancy, using testing protocols consistent with the EPA's "Compendium of Methods for the Determination of Air Pollutants in Indoor Air," and as additionally detailed in the USGBC's "Green Building Design and Construction Reference Guide."
- Demonstrate that the contaminant maximum concentrations listed below are not exceeded:
- 1) Formaldehyde: 27 ppb.
- Particulates (PM10): 50 micrograms/cu. m.
- Total Volatile Organic Compounds (TVOC): 500 micrograms/cu. m.
- 4-Phenylcyclohexene (4-PH): 6.5 micrograms/cu. m.
- Carbon Monoxide: 9 ppm and no greater than 2 ppm above outdoor levels.
- b. For each sampling point where the maximum concentration limits are exceeded, conduct additional flush-out with outside air and retest the specific parameter(s) exceeded to indicate the requirements are achieved. Repeat procedure until all requirements have been met. When retesting noncomplying building areas, take samples from same locations as in the first test.

Air-sample testing shall be conducted as follows:

- 1) All measurements shall be conducted prior to occupancy but during normal occupied hours, and with building ventilation

system starting at the normal daily start time and operated at the minimum outside air flow rate for the occupied mode throughout the duration of the air testing.

Building shall have all interior finishes installed including, but not limited to, millwork, doors, paint, carpet, and acoustic tiles. Nonfixed furnishings such as workstations and partitions are encouraged, but not required, to be in place for the testing.

Number of sampling locations varies depending on the size of building and number of ventilation systems. For each portion of building served by a separate ventilation system, the number of sampling points shall not be less than one per 25,000 sq. ft. or for each contiguous floor area, whichever is larger, and shall include areas with the least ventilation and greatest presumed source strength.

Air samples shall be collected between 3 and 6 feet from the floor to represent the breathing zone of occupants, and over a minimum four-hour period.

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 indicates 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.

- 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 six (6) 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.

- 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 CONTROL UNIT(S)

- A. Prior to ordering and/or constructing associated materials, fixtures, appliances, equipment and finishes etc., for the project; provide one control unit each for 1 and 2-bedroom and 3-bedroom unit(s), to demonstrate coordination and identify all conflicts in the following spaces:
  1. FCU in entry soffit with lighting
  2. Kitchen to include cabinets, lighting and appliances
  3. Windows and doors
  4. Master Bathroom
  5. Bedroom and living room valences
  6. Standard door trim/casework
  7. Finishes and transitions
- B. Approved work can be made part of final construction

3.04 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.
  - 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.

3.05 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 3.03 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. Storm drainage.
  - 2. Sanitary facilities, including toilets, wash facilities, and drinking water facilities.
  - 3. Lighting.
- C. Support facilities include, but are not limited to, the following:
  - 1. Storage and fabrication sheds
  - 2. Trash, refuse disposal.
  - 3. Site drainage.
  - 4. Construction aids and miscellaneous service and facilities
  - 5. Offices
- D. Security and protection facilities and measures include, but are not limited to, the following:
  - 1. Environmental protection.
  - 2. Stormwater control.
  - 3. Tree and plant protection.
  - 4. 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. Temporary Water Service: Is available for existing construction trailer. The Contractor will need to put the account under their name and pay the monthly charges for water use at the trailer which includes landscape watering and will need to meter and pay for water use on the site for dust control.
- C. Electric Power Service: Temporary electric shall be applied and constructed by the contractor. The contractor will need to put the account under their name and pay the monthly charges for electrical. Currently there is no service available on the construction site.
- D. Waste Receptacle Bins: Do not use facility's waste receptacle bins

#### 1.03 SUBMITTALS

- A. Temporary Utility Reports: Submit reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.
- B. 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.
- C. Temporary Facility Site/Utility plan, shall be reviewed and approved by Owner prior to installation.

#### 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:
  - 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. Field Offices: Owner Field offices will be in place and separate from contractors, Contractor to provide their own offices, facilities and services/utilities.
  - 1. Contractor to provide all required services for their administration and construction requirements, such as but not limited to:
    - a. Internet
    - b. Phone
    - c. Electric
    - d. Water
    - e. Refuse removal
    - f. Holding tank pumping
- B. Construction Fencing: Existing to be reviewed, repaired and/or replaced to meet Hilton requirements. A dust barricade/fence shall be maintained for the duration of the project at the property line. Assume frequent damage from

strong wind, Contractor may assume use of existing fencing but is required to improve as needed to include replacement to achieve a enclosed and safe site condition.

## 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 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary services.
  - 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: Neither sewers nor drainage facilities are available, provide containers to remove and dispose of effluent off site in a lawful manner.
- C. Water Service for Construction Site: Install water service and distribution piping in sizes and pressures adequate for construction. Contractor will need to meter and pay for eater use on site for dust control.
- 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. Electric Power Service for Construction Site: responsibility of contractor to permit and construct.
- F. 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.
- G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations and traffic conditions.
- H. 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.

### 3.02 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. Site Drainage:
  - 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining property nor endanger permanent Work or temporary facilities.
  - 2. Before connection and operation of permanent drainage piping system, provide temporary drainage where roofing or similar waterproof deck construction is completed.
- 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.
    - 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.

### 3.03 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. Erosion Control
1. During grading operations, maintain the grade to prevent damage to adjoining property from water and eroding soil.
  2. Install temporary berms, cut off ditches and other provisions needed for construction methods and operations. Should there be a question if the temporary measures are insufficient to prevent erosion, the Owner's Representative shall make the final determination.
  3. Construct and maintain drainage outlets and silting basins where shown on the Drawings and when required to minimize erosion and pollution of waterways during construction.
- E. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from construction damage. Protect existing landscaping and tree root systems from damage, flooding, and erosion due to construction activity.

#### 3.04 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.

3.05 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.

3.06 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.

3.07 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.**

## 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

#### 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 Project Manager 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, 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 describing activities to minimize water pollution and soil erosion into County and State waters and/or drainage systems. The BMP shall conform to the requirements of the "Rules Relating to Soil Erosion Standards and Guidelines," for the City and County of Honolulu as adapted for the County of Maui, 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 facilitates 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. Stabilized construction entrance/exit shall be constructed with 1-inch to 3-inch course aggregate, 6-inches minimum thickness over a geotechnical filter fabric.
5. Mulches may be bagasse, hay, straw, fiber mats, netting, wood cellulose, bark, wood chips, or other suitable material acceptable to the Project Manager 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 Project Manager.
- C. Grass shall be a quick growing species (such as Bermuda grass, 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 Project Manager.
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 1.0 acres. The Project Manager 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 Project Manager 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, top-soiled 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 Project Manager at the Contractor's expense without cost to the State.
- 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.

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 Project Manager. 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

## 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.

- 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 Division 1- 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.
- 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 – PRODUCT REQUIREMENTS

### PART 1 - GENERAL

#### 1.01 SUMMARY

- A. Section Includes:
  - 1. General requirements for products.
- B. Related Sections:
  - 1. Division 1 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 name 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.

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 45 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 10 working days. For each item, indicate one of 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. 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 Division 1- 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.

- E. Deviations from Contract Requirements: Refer to Division 1 - 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, are in compliance 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 to 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: 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 to 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

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 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. Division I- Materials & 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.
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 Division 1 – Submittal Procedures Section 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. f 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 in Appendix.

#### 1.04 QUALITY ASSURANCE

- A. Objective: It is up to those making the proposal to 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 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.
- 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.
- 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.

END OF SECTION

## SECTION 01735 – CUTTING AND PATCHING

### PART 1 - GENERAL

#### 1.01 SUMMARY:

- A. Section Includes:
  - 1. Cutting and patching work.
- B. Related Sections:
  - 1. Division 1 Sections, general.
  - 2. Division 1 - Quality Control.

#### 1.02 DEFINITION:

- A. “Cutting and Patching”: The phrase as used herein is defined as follows.
  - 1. Cutting and patching includes cutting into existing construction to provide for the installation or performance of other work and subsequent fitting and patching required to restore surface to their original condition.
  - 2. Cutting and patching is performed for coordination of the work, to uncover work for access or inspection, to obtain samples for testing, to permit alterations to be performed or for other similar purposes.
  - 3. Cutting and patching performed during the manufacture of products, or during the initial fabrication, erection or installation processes is not considered to be “cutting and patching” under this definition. Drilling of holes to install fasteners and similar operations are also not considered to be “cutting and patching”.
  - 4. “Demolition” is recognized as related-but-separate category of work, which may or may not require cutting and patching as defined in this Section.

#### 1.03 SUBMITTALS:

- A. Methods: Notify Architect when any work is limited by requirements stated under “Quality Assurance” paragraphs. If requested, submit methods of cutting and patching for this Work. Do not begin Work, until successful review accomplished.

#### 1.04 QUALITY ASSURANCE:

- A. Structural Work: Do not cut and patch any work in a manner that would result in a reduction of its load-carrying capacity or of its load-deflection ratio.
- B. Operational and Safety Limitations: Do not cut and patch operational elements or safety related components in a manner that would result in a reduction of their capacity to perform in the manner intended, including energy performance, or that would result in increased maintenance, or decreased operational life, or decreased safety.
- C. Matching of Exposed-to-View Surfaces: Patching work should not be evident in final exposed-to-view work. Do not cut and patch work which is exposed-to-view

in the finished Work and which cannot be restored to satisfactorily match the surface in which the cutting and patching is done. Quality of match and final appearance of patched work to be determined by Architect.

## PART 2 - PRODUCTS

### 2.01 MATERIALS:

- A. General: Except as otherwise indicated or as directed by the Architect, use materials for patching that are identical to existing materials. If identical materials are not available, or cannot be used, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials for patching that will result in equal-or-better performance characteristics.

## PART 3 - EXECUTION

### 3.01 INSPECTION:

- A. Examination: Before cutting, examine the surfaces to be cut and patched and the conditions under which the work is to be performed. If unsafe or otherwise unsatisfactory conditions are encountered, take corrective action before proceeding with the work.

### 3.02 PREPARATION:

- A. Temporary Supports: When required, to prevent failure or unsafe conditions, provide temporary supports for work to be cut.
- B. Protection: Protect other work during cutting and patching to prevent contamination and damage. Provide protection from adverse weather conditions for that part of the Project that may be exposed during cutting and patching operations.

### 3.03 PERFORMANCE:

- A. Personnel: Employ skilled workmen to perform cutting and patching work.
- B. Cutting: Cut the work using least destructive but effective methods that are least likely to damage work to be retained or damage the adjoining work. In general, where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut through hard surfaces such as concrete and masonry using a cutting machine such as a saw or core drill to insure a neat cut. Cut holes and slots neatly to size required with minimum disturbance of adjacent work. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces. Temporarily cover openings when not in use.
- C. Patching: Patch and blend work with adjacent surfaces to obscure evidence of work to greatest extent possible.

### 3.04 CLEANING:

- A. General: Thoroughly clean areas and spaces where work is performed or used as access to work. Remove contaminants from all surfaces without damaging finish of contaminated surfaces.

END OF SECTION

## SECTION 01770 – CLOSE-OUT PROCEDURES

### PART 1 – GENERAL

#### 1.01 RELATED DOCUMENTS

Close-Out Procedures shall be made in accordance with DHHL's General Conditions Section 7.31.1 – SUBSTANTIAL COMPLETION.

#### 1.02 SUMMARY

A. This Section outlines the DHHL Close-Out documents requirements. It includes information about the distribution process, the format and quantities of various types of information, and the internal review process for document acceptance. Fulfillment of these requirements is a condition precedent to the Contractor receiving final payment.

1. Project Record Documents.
2. Operation and Maintenance Manuals.
3. Warranties.
4. Instruction for the State's personnel.

#### B. Transmittal Memo

All Close-Out documents will be submitted to the designated Construction Manager with a Transmittal Memo. The Transmittal Memo must include the following information:

- Date of Conveyance
- Project Name
- IFB Number
- Contract Number
- DHHL Project Manager
- Contractor Name
- Contractor Address
- Name/Transmitting Signature of Contractor Agent
- Name/Telephone Number of Document Submitter
- List of documents transmitted

## C. Document Types and Formats

<b>MATERIALS</b>	<b>FORMAT</b>
<b>Transmittal Summary</b>	
Documents Transmittal Memo	Word or Excel*
<b>Project Operations and Maintenance</b>	
Project Manual with Specifications	Searchable PDF*
Operation and Maintenance Manuals	Searchable PDF*
Guaranty / Warranty Materials	PDF*
Testing / Inspection Certifications	PDF*
<b>Record Documents</b>	
Site Survey	CAD & PDF*
Shop Drawings	CAD & PDF*
As-Built Drawings	CAD & PDF*
<b>Scope, Cost and Schedule Data</b>	PDF
Final Cost Summary by account	
Final Schedule of equipment/valves/etc. submitted by General Contractor	
Final Schedule	
Final Chart to provide project description and scope.	
Final Executive Summary	
<b>Other Documents</b>	
Other documents – addenda, change order, project correspondence files, etc.	(As needed) *
Reports, including photographic records	PDF*
Electronic files (photos, scanned documents)	JPEG, PDF*
*See notes on CAD / Electronic documents	

## 1.03 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting a Final Inspection, complete the following in addition to the requirements of the GENERAL CONDITIONS:

1. Advise the Project Manager of pending insurance changeover requirements.
2. Submit specific warranties, final certifications, and similar documents.

3. Arrange to deliver tools, spare parts, extra materials, and similar items to a location designated by the DHHL Project Manager. Label with manufacturer's name and model number where applicable.
4. Complete startup testing of systems.
5. Submit test, adjust, and balance records.
6. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
7. Complete final cleaning requirements, including touch up painting.
8. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
9. Submit the Operation and Maintenance (O&M) Manual(s) for review

#### 1.04 FINAL COMPLETION

A. Preliminary Procedures: Within ten (10) days from the Project Acceptance Date, complete the following items in addition to the requirements of the GENERAL CONDITIONS:

1. Instruct the State's personnel in operation, adjustment, and maintenance of products.

#### 1.05 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Preparation: Submit two (2) copies of any updated and action-taken list. In addition to the requirements of the GENERAL CONDITIONS, include name and identification of each 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.

1. Organize list in sequential order.
2. Include the following information at the top of each page:
  - a. Project Name and Title.
  - b. DHHL IFB No.
  - c. DHHL Contract No.
  - d. Date and page number.
  - e. Name of Contractor.

#### 1.06 PROJECT RECORD DOCUMENTS AND REQUIREMENTS

A. General:

1. Definition: "Project Record Documents", including Record Drawings, shall fulfill the requirements of "Field-Posted As-Built Drawings" listed in the GENERAL CONDITIONS.
2. Do not use Project Record Documents for daily construction purposes. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for Project Manager's reference during normal working hours. Maintain these documents as specified in paragraph entitled "Record Drawings" hereinafter.
3. The Design Consultant, under contract with the State, will update the drawings to show all addendum, Post-Contract Drawing (PCD), and sketch changes. The Contractor will transmit these drawings to the Construction Manager who will send to the Design Consultant to make all "red-line" corrections to these drawings to record the changes depicted on the Contractor's Field Posted Record ("As-Built") by accepted drafting practices as approved by the Project Manager.
4. Where the recorded changes depicted on the Contractor's Field Posted Record ("As-Built") are in the form of shop drawings, the Contractor shall provide those shop drawings in the same material and size as the drawings transmitted to the Contractor. The new drawing sheets shall be titled and numbered to conform to the construction drawings and clearly indicate what information they supersede in the actual construction drawings. For example: a new drawing that replaces drawing C-3, could be numbered C-3a.
5. The Contractor shall bring to the attention of the Construction Manager any discrepancy between the changes made by the Design Consultant and those depicted on addendum, PCD, and sketch changes. The Manager will resolve any conflicts.
6. Submit final Record Documents (Field Posted Record Drawings) within ten (10) days after the Final Inspection Date but no later than the Contract Completion Date, unless the General conditions require an earlier submittal date.
7. The Contractor shall guarantee the accuracy of its final Record Documents. The State will hold the Contractor liable for costs the State incurs as a result of inaccuracies in the Contractor's Record Documents.
8. Prepare and submit construction photographs and electronic files, damage or settlement surveys, property surveys, and similar final record information as required by the Project Manager.
9. Deliver tools, spare parts, extra materials, and similar items to a location designated by the Project Manager. Label with manufacturer's name and model number where applicable.
10. Submit final/corrected Operation and Maintenance Manual(s).



B. Record Drawings:

1. Maintain a duplicate full-size set of Field Posted Record ("As-Built's") Drawings at the job site. Clearly and accurately record all deviations from alignments, elevations and dimensions, which are stipulated on the drawings and for changes directed by the Project Manager that deviate from the drawings.
2. Record changes immediately after they are constructed in place and where applicable, refer to the authorizing document (Addenda, Field Order, Change Order, or Contract Modification). Use red pencil to record changes. Make Field Posted Record Drawings available to the Project Manager at any time so that its clarity and accuracy can be monitored.
  - a. Give particular attention to information on concealed elements that cannot be readily identified and recorded later.
  - b. Accurately record information in an understandable drawing technique.
  - c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
  - d. Mark the contract drawings or the shop drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross-reference on contract drawings.
  - e. Mark important additional information that was either shown schematically or omitted from original Drawings.
  - f. Locate concealed building utilities by dimension from bench marks or permanent structures. Locate site utilities by dimensions, azimuth and lengths from bench marks or permanent structures.
  - g. Note field order numbers, Change Order numbers, Contract Modification numbers, Alternate numbers, post-construction drawing numbers (PCD) and similar identification (RFI numbers) where applicable.
  - h. The Contractor shall initial each deviation and each revision marking.
3. Use the final updated Contract Drawing set plus applicable shop drawings for making the final Field Posted Record Drawings submittal.
4. Certify drawing accuracy and completeness. Label and sign the record drawings.
5. Label the title sheet and on all sheets in the margin space to the right of the sheet number, written from the bottom upward, with the title "FIELD POSTED RECORD DRAWINGS" and certification information as shown below. Provide a signature line and company name line for each

subcontractor that will also certify the respective drawing. Adjust size to fit margin space.

**THESE FIELD POSTED AS-BUILT DRAWINGS ARE ACCURATE AND COMPLETE.**

Certified By: \_\_\_\_\_ Date: \_\_\_\_\_

Company: \_\_\_\_\_

6. Revise the Drawing Index and label the set "FIELD POSTED RECORD DRAWINGS". Include the label "A COMPLETE SET CONTAINS [ ] SHEETS" in the margin at the bottom right corner of each sheet. Quantify the total number of sheets comprising the set.
7. If the Project Manager determines a drawing does not accurately record a deviation or omits relevant information, the State will correct any FIELD POSTED RECORD DRAWINGS sheet. Contractor will be charged for the State's cost to correct the error or omission.
8. Use the final Field Posted Record Drawings sheets to create one electronic version of the set. The set shall be recorded in Adobe Acrobat PDF (Portable Document Format). Create a single indexed, bookmarked PDF file of the entire set of drawings and record on the CD. Submit one set of the final Field Posted Record Drawings sheets and the complete electronic CD set(s).

**1.07 WARRANTIES**

- A. Submittal Time: Submit written manufacturer's warranties at request of the Project Manager for designated portions of the Work where commencement of warranties other than Project Acceptance date is indicated.
- B. Organize manufacturer's warranty documents into an orderly sequence based on the table of contents of the Specifications.
  1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-inch x 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 and prime contractor.
  3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES", Project Name and Title, IFB Number, Contract Number, and name of Contractor.
  4. Use the final submittal of the warranties to create an electronic Adobe Acrobat PDF (Portable Document Format) version of the bound warranty documents files. Each sheet shall be separately scanned, at 600 DPI or

better into a PDF file, indexed and recorded on a recordable compact disc (CD).

- C. Provide three (3) sets of manufacturer's warranties that exceed one year and one CD as part of the closing document submittals. Provide additional copies of each warranty to include in operation and maintenance manuals.

#### 1.08 OPERATION AND MAINTENANCE MANUALS

- A. Assemble complete sets of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. Include operation and maintenance data required in individual Specification Sections and as follows:

The Contractor shall bind and turn over to the Construction Manager three (3) sets of manufacturers' warranties and operating data and/or maintenance manuals of each system, subsystem, and piece of equipment not part of a system, instructions or schedules for all equipment and special materials requiring them, and associated copies of testing reports and certificates. The three (3) binders will categorize and index each piece of equipment and material included using a Construction Specifications Institute (CSI) format to be provided by the DHHL, and shall be clearly marked noting "project specific" equipment, model numbers, and equipment cut sheets, value tag charts, electrical panel charts and other applicable information. As mentioned above, all pages of the manuals must be submitted in digital format. Such manuals will be collected and organized by the Contractor and submitted to the Construction Manager, after review by the Construction Manager, prior to the issuance of the certificate of Substantial Completion. Except for the changes noted in this section, the Contractor will follow the procedure outlined in the Standard General Conditions. Include operation and maintenance data required in individual Specification Sections and as follows:

##### 1. Operation Data:

- a. Emergency instructions and procedures.
- b. System, subsystem, and equipment descriptions, including operating standards.
- c. Operating procedures, including startup, shutdown, seasonal, and weekend operations.
- d. Description of controls and sequence of operations.
- e. Piping diagrams.

##### 2. Maintenance Data:

- a. Manufacturer's information, Material Safety Data Sheets, and a list of spare parts.

- b. Name, address, and telephone number of installer or supplier.
  - c. Maintenance procedures.
  - d. Maintenance and service schedules for preventive and routine maintenance.
  - e. Maintenance record forms.
  - f. Sources of spare parts and maintenance materials.
  - g. Copies of maintenance service agreements.
  - h. Copies of warranties and bonds.
- B. Organize the Operation and Maintenance Manuals into suitable sets of manageable size. Submit two (2) sets prior to final inspection, bound in 8-1/2 x 11-inch text pages. Bind and index data in heavy-duty, "D" type 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Binder color shall be maroon, or if not available red. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL", Project Name and Title include building number when appropriate, DHHL Contract Number, IFB Number, Prepared For: Department of Hawaiian Home Lands, Prepared By: [Contractor] and Volume Number. Each binder is a single volume.
- C. Electronic Format
- 1. Provide all information (narratives, drawings and manual) on a Compact Disc (CD). Provide drawings and plans prepared for the O&M Manuals drawn electronically and saved as a PDF file. Name and index the files for ease of identification and updates.
  - 2. Provide the complete O&M Manual using Adobe Acrobat PDF (Portable Document Format) files. Each sheet shall be separately scanned into a PDF file, indexed, bookmarked, hyperlinked to the table of contents and recorded on a compact disc (CD). Scanned documents shall be scanned at 600 DPI or better. Indexes and bookmarks may be highlighted or colored text. The final submittal shall include written instructions for installing, accessing and retrieving information from the compact disc.
- D. Pre-Final Submittal: Submit two (2) printed sets of Pre-Final Operation and Maintenance Manuals, for review by the DHHL Project Manager, at least five (5) days prior to scheduled final inspection. Manuals shall be marked as Pre-Final. Make any correction noted before submitting the final Operation and Maintenance Manuals.
- 1. The user and the DHHL will each keep one (1) copy of the Pre-Final submittal to operate and maintain the facility from the Project Acceptance Date through submission of the final submittal. Therefore, the submittal

shall contain all the required information that is available at the time of submission.

2. One (1) set will be returned with comments. Additional review comments may include problems discovered during the O&M Manual's review, site validation, and facility start up and will be provided to the Contractor after facility Project Acceptance Date.
- E. Final Submittal: Use the final submittal of the manuals to create the electronic PDF file version of the bound Operation and Maintenance Manuals documents. Include the Submittal (100%) review comments along with a response to each item. Provide six (6) Final sets of the printed manuals and six (6) Final compact discs (CDs) as part of the closing document submittal. Final printed manual and disks shall be marked as Final.

## PART 2 - PRODUCTS

### 2.01 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

## PART 3 - EXECUTION

### 3.01 FINAL CLEANING

- A. General: Execute final cleaning prior to final inspection. Provide final cleaning for each phase of work prior to starting the next phase. In addition to requirements of Article 7 of the GENERAL CONDITIONS conduct cleaning and waste-removal operations to comply with local laws and ordinances and federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Comply with manufacturers written instructions unless noted otherwise. Complete the following cleaning operations before requesting final inspection for entire Project or for a portion of Project:
  1. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
  2. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits resulting from construction activities.
  3. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.

4. Remove tools, construction equipment, machinery, and surplus material from Project site.
  5. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
  6. Remove debris and surface dust from limited access spaces, including: roofs, gutters, downspouts, drainage systems, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
  7. Clean transparent materials, including mirrors and glass in doors and windows. Remove temporary labels, glazing compounds and other noticeable, and vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors, transparent glass, and glossy surfaces, taking care not to scratch surfaces.
  8. Remove labels that are not permanent.
  9. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
    - a. Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
  10. Leave Project clean and ready for occupancy.
- C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the State's property. Do not discharge volatile, harmful, or dangerous materials into drainage and sewer systems or onto State property. Remove waste materials from Project site and dispose of lawfully.
- D. Adjust operation Products and equipment to ensure smooth and unhindered operation.

#### PART 4 – MEASUREMENT AND PAYMENT

##### 4.01 BASIS OF MEASUREMENT AND PAYMENT

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

END OF SECTION

## SECTION 01785 – PROJECT RECORD DOCUMENTS

### PART 1 - GENERAL

#### 1.01 SUMMARY

- A. Section Includes:
  - 1. As-Built Record Documents.
  - 2. Contract Closeout Record Documents.
- B. Related Sections:
  - 1. Division I Sections, General.
  - 2. Division I - Contract Closeout.
  - 3. Division 15 Sections.
  - 4. Division 16 Sections.
  - 5. Other Sections requiring Project Record Documents.

#### 1.02 DEFINITION

- A. As-Built Record Documents: Contractor produced to-scale documents representing an accurate drawing record of (as-built) work existing prior to start of any new Work required to be constructed. These drawings are required where as-built conditions differ from Contract drawn work and where as-built conditions interfere with accomplishing intent of Work.
- B. 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. As-Built Record Documents: Submit one (1) blueprint set.
- B. Contract Closeout Record Documents:
  - 1. Contract Documents: Submit one (1) set hardcopy and 2 CD ROM with all 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 one (1) set hardcopy and 2 CD ROMs.
  - 3. Certification: On transmittal or separate written document, certify that

information provided is complete and accurate. Signature document by Contractor.

4. Distribution: Owner's Representative, Owner, and Operator.
- C. 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 AS-BUILT RECORD DOCUMENTS

- A. When Required: Refer to "Definition" paragraphs herein.
- B. Data Required: Submit accurate to-scale drawings showing pertinent plans, elevations, sections, and details affecting the Contract Work. Draw to scales similar to that used in Contract Drawings for similar kinds of represented work. Utilize same or similar references as Contract Drawings so Architect can



accurately locate and compare data in Contract Documents.

- C. Time of Submission: Notify Architect immediately upon discovering such differences and submit drawings so that issue can be resolved in within a reasonable period as not to delay Project Schedule. Do not proceed with any work which is affected until Architect provides resolution.

### 3.03 CONTRACT CLOSEOUT RECORD DOCUMENTS - CONTRACT DOCUMENTS

- A. Time of Submission: Refer to Division 1 Contract Closeout.
- B. Intent: Update information shown on Contract Drawings and in Project Manual 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 Manual: 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.
- 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 3.03.D.3.c. 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.

3.04 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.

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

## SECTION 02100 – SITE PREPARATION

### PART 1 – GENERAL

#### 1.01 DESCRIPTION

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. Furnish all labor, materials and equipment necessary for this work.

#### 1.02 RELATED DOCUMENTS

##### A. Related Work Described Elsewhere:

Site preparation for paving is specified in Section 02200 - EARTHWORK

#### 1.03 REGULATORY REQUIREMENTS

A. Except as modified herein, all clearing and grubbing shall meet the requirements of the Maui County Code of Ordinances, Title 20, Environmental Protection.

##### B. All work shall be done in accordance with:

Specific sections of the State of Hawai'i, Department of Transportation, Highways Division, Standard Specifications for Road and Bridge Construction, dated 2005, as amended, hereafter referred to as the State DOT Specifications with deletion of subsections relating to measurement and payment in all sections incorporated herein and further modifications to such sections as hereinafter provided.

Specific sections of the County of Maui, Department of Public Works, Standard Specifications for Public Works Construction, dated September 1986, as amended, hereinafter referred to as the County Specifications

### PART 2 – MATERIALS (NOT USED)

### PART 3 - EXECUTION

#### 3.01 GENERAL

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

B. Obvious conditions of the site existing on the date of bid opening 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.

- C. Fires: No burning of fires of any kind will be allowed. Blasting will not be permitted.
- 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 this Section 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. All material resulting from clearing and grubbing shall be disposed of off the site at an approved disposal site. The Contractor will be required to make all necessary arrangements relative to the proposed place of disposal, and file with DHHL written consent of the owner of the property upon which the contractor intends to dispose of the materials, prior to the deposit of any material on said property. Combustible spoil material will not be permitted to accumulate on the property in a manner which will create a fire hazard.

### 3.02 PERMITS, NOTICE, ETC

The Contractor shall apply for and obtain all required permits and certificates from Federal, State, and County agencies that may be required in connection with this work. The Contractor shall pay for all fees.

### 3.03 PROTECTION

Throughout the work, protection shall be provided for all roads, walks, property, trees, etc., and other existing improvements scheduled to remain. Safe working conditions shall be maintained at all times for all personnel.

### 3.04 DEMOLITION AND REMOVAL

- A. All work shall be executed in an orderly and careful manner, with due consideration for all items to remain, and the Contractor shall be strictly responsible for any damage thereto.
- B. Water facilities shall be made available and kept in operating condition at all times, except as agreed to approved in advance by the Project Manager.
- C. Dust shall be suppressed by accepted method(s)
- D. Maintain all bench marks, monuments, and other reference points; if disturbed or destroyed, replace as directed at the Contractor's expense.
- E. The Contractor shall document all existing signs, posts, pavement markings, and other improvements that may be disturbed by this project. The Contractor shall repair or replace the disturbed items at his own expense to the satisfaction of Project Manager.

- F. Protect existing asphaltic concrete pavement and other structures which are indicated to remain from damage; if any damage is caused by this work, the Contractor shall repair damage at Contractor's expense.
- G. Existing utility lines indicated, or locations of which are made known to the Contractor prior to the start of work, and that are indicated to be retained, shall be protected from damage during clearing and grubbing work, and if damaged, shall be repaired at the Contractor's expense. If utility lines are not indicated, or that the Contractor is not aware of, are encountered or damaged, the Construction Manager and the Project Manager shall be notified immediately.

### 3.05 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 Construction Manager and Project Manager of such discovery. The Construction Manager shall then investigate and issue instructions for the preservation or disposition of the unknown line. Authorization for extra work shall be issued by the Project Manager only as he deems necessary.

### 3.06 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.

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 Construction Manager.

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.

### 3.07 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.

Cut heavy growths of grass from areas before stripping and remove with the rest of the cleared vegetative material.

Topsoil shall consist of organic surficial soil found in depth of not less than 6-inches. Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones and other objects over 2-inches in diameter, weeds, roots, and other objectionable material.

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.

### 3.08 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 Construction Manager.

### 3.09 DUST CONTROL

- A. Dust shall be controlled and avoid creating of a nuisance to the surrounding areas in accordance with Hawaii Revised Statutes (HRS) Chapter 342B – Air Pollution Control and Hawaii Administrative Rules (HAR) Title 11, Chapter 59 – Ambient Air Quality Standards and Chapter 60.1 – Air Pollution Control. Use of water will be permitted provided it does not result in, or create, a hazardous condition such as flooding or pollution.

The Contractor shall coordinate the use of water for construction activities with the Project Manager. DHHL will make water available to the Contractor for quantities as approved by the Project Manager. Contractor Monitoring shall be as accepted or directed by the Project Manager

### 3.10 TRAFFIC CONTROL AND ACCESS

- A. The Contractor shall provide traffic control in accordance with MUTCD requirements and conduct operations with minimum interference to streets, driveways, sidewalks, etc.
- B. When necessary, the Contractor shall provide temporary access, erect and maintain lights, barriers, flagmen, etc. as required by traffic and safety regulations with special attention to protection of life.
- C. The Contractor shall provide continuous access to all private properties.

### 3.11 LAYING OUT

- A. The laying out of base lines, establishment of grades and staking out the entire work shall be done by a Professional Land Surveyor (licensed in the State of Hawai'i).



- B. Should any discrepancies be discovered in the dimensions given in the plans, the contractor shall immediately notify the Construction Manager before proceeding any further with the work, otherwise, he will be held responsible for any costs involved in correction of construction placed due to such discrepancies.

### 3.12 CONTRACT AREA LIMITS

- A. The contract area limits extending throughout the peripheral boundary indicate only in general the limits of the work involved. The Contractor, however, is required to perform any and all necessary and incidental work which may fall outside of these demarcation lines. The Contractor is also expected to confine all of his construction activities within the contract area limits and repair all disturbed areas.

END OF SECTION

## SECTION 02200 – 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. Maui County Code of Ordinances, Title 20 – Environmental Protection, Chapter 20.08 – Soil Erosion and Sedimentation Control.
  - 2. Applicable provisions contained in Hawaii Administrative Rules (HAR):
    - Title 11, Chapter 46 – Community Noise Control for Oahu;
    - Title 11, Chapter 54 – Water Quality Standards;
    - Title 11, Chapter 55 – Water Pollution Control;
    - Title 11, Chapter 60.1 – Air Pollution Control,
  - 3. NPDES Individual Permit Coverage for the project.
  - 4. Specific sections of the State of Hawai'i, Department of Transportation, Highways Division, Standard Specifications for Road and Bridge Construction, dated 2005, as amended, hereafter referred to as the State DOT Specifications with deletion of subsections relating to measurement and payment in all sections incorporated herein and further modifications to such sections as hereinafter provided.
  - 5. Specific sections of the County of Maui, Department of Public Works, Standard Specifications for Public Works Construction, dated September 1986, as amended, hereinafter referred to as the County Specifications.
  - 6. Soils report, "Geotechnical Investigation, Ho'olehua Veteran and Homestead Resident's Center", DHHL, Ho'olehua, Moloka'i, Hawai'i by Hirata & Associates, Inc., dated 01/23/18
- B. Grading shall be carried to the lines and grades as shown on the drawings or as directed by the Construction Manager.
- C. On-site material should be screened of oversized materials and conditioned per the recommendations in the soils report.

D. Non-expansive granular fill material should consist of crushed basalt or coral

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and shall conform to the recommendations in the soils report.

### 1.03 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 – PRODUCTS

### 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 RESPONSIBILITIES

- A. The Soils Engineer, when designated, is the Contractor's earthwork representative on the project. For the purpose of these specifications, inspection by the Soils Engineer includes that monitoring and testing performed by any person or persons employed by and responsible to, the licensed Engineer who is the contractor's representative to ensure compaction and other requirements are met by the contractor.
- B. 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.
- C. The presence of the Contractor's Soils Engineer will be for the purpose of providing observation and 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.
- D. 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.

- E. 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.
- F. 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.
- G. It is the responsibility of the Soils Engineer to promptly notify the Contractor, Project Manager and the Construction Manager 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 and meet the requirements of the Soils Report. 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, and the Soils Report.
- D. In areas to be filled and at finished subgrade elevation in cut or excavated areas, the exposed surface shall be proof-rolled and compacted, under observation of the soils engineer, to check for soft areas due to poorly compacted fill, loose surface soils, or the presence of near surface cavities within the coralline formation.
- 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. When the embankment is to be constructed on an existing slope exceeding five-to-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.

- H. The in-situ soils below structural footings, slabs on grade, pavements, below select borrow material, shall be scarified to a depth of 8-inches and moisture conditioned to 2% above the optimum moisture content, and compacted to 90% relative compaction per the Soils Report.

### 3.03 COMPACTED FILLS

- A. Material used in the construction of the structural fills which underlie structures, footings, slabs on grade or pavements shall be evenly spread; moisture conditioned to 2% above optimum moisture content and compacted in approximately level lifts not exceeding 8-inches in loose thickness to at least 90% of its maximum dry density as determined by ASTM D 1557-78. Non-structural fills for landscaping and general fill areas shall be compacted to at least 85% of its maximum dry density as determined by ASTM D 1557-78.
- 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 re-compaction of the material by the Contractor at the Contractor's expense.
- C. Any areas to receive fills under structures, footings, slabs on grade, or pavements should be scarified to a depth of 8-inches, moisture conditioned to 2% above the optimum moisture content, and compacted to at least 90% of the maximum density as determined by ASTM D1557.
- D. 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.
- E. 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.
- F. Fill material placed within 24-inches of the final roadway grade or subgrade shall be compacted to 90% of the maximum density as determined by ASTM D1557.
- G. 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.
- H. 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.
- I. 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, Sub-section 3.06 Clearing and Grubbing, and per the Soils Report requirements.
- B. Subgrade materials that are determined to be unsuitable or unsatisfactory for its intended use shall be over-excavated 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 County Specifications, the Maui County Code of Ordinances, Title 20 – Environmental Protection relating to grading, 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. Over excavation or overcutting of the slope due to the Contractor's negligence shall be corrected to the satisfaction of the Owner 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 Project Manager, Construction Manager 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, or per Plan.
- C. Where failing tests occur or other field problems arise, the Contractor and the Construction Manager 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% relative compaction, proof-rolled and tested in accordance with the recommendations in the Soils Report. The base and subbase material including minimum thickness requirements of the roadway pavement shall be as recommended in the Soils Report and as required by the County Specifications. The base and subbase material shall be placed and compacted as recommended in the Soils Report and as required by the County Specifications. The in-situ subgrade soils should be scarified to a minimum depth of 8-inches and moisture conditioned to 2% above the optimum moisture content, and recompact to no less than 90% compaction.

### 3.07 SLABS ON GRADE

- A. Cap the on-site expansive soils with minimum of 12-inches of non-expansive select granular fill below the slab cushion material.

### 3.08 FINISHING

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 0.05-feet for the road areas and 0.10-feet for other areas.

### 3.09 BENCHMARKS

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

### 3.10 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 Project Manager and Construction Manager shall be notified immediately.

### 3.11 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 and Soils Engineer in advance and ascertaining their requirements.
- C. 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.
- D. Contractor shall exercise extreme care while working between the burial plots and grave sites and markers/headstones.

END OF SECTION



## SECTION 02280 - TERMITE CONTROL

### PART 1 - GENERAL

#### 1.01 SUMMARY

- A. Section includes:
  - 1. Chemical soil treatment against subterranean termite infestation.
  - 2. Metal mesh barrier system at all slab joints and penetrations.
- B. Related sections
  - 1. Section 03300 - CAST-IN-PLACE CONCRETE.
  - 2. Section 06070 – WOOD TREATMENT

#### 1.02 PERFORMANCE REQUIREMENTS

- A. Service Life of Soil Treatment: Soil treatment by use of a termiticide that is effective or not less than five years against infestation of subterranean termites.

#### 1.03 SUBMITTALS

- A. Product submittals: Follow Section 01330 SUBMITTAL PROCEDURES.
  - 1. Product data: Include label for the proposed chemicals and metal mesh system
  - 2. Include the EPA-Registered Label for termiticide products.
  - 3. Manufacturer's application instructions and metal mesh installation manual.
  - 4. Product Certificates: For termite control products, signed by product manufacturer.
  - 5. Shop Drawings: Shop drawings of the metal mesh barrier system installation at all joint, edge and penetration conditions.
  - 6. Samples: 4-inch square sample of stainless steel mesh.
- B. Soil Treatment Application Report: After application of termiticide is completed, submit report for Owner's record information, including the following:
  - 1. Date and time of application.
  - 2. Moisture content of soil before application.
  - 3. Brand name and manufacturer of termiticide.
  - 4. Quantity of undiluted termiticide used.
  - 5. Dilutions, methods, volumes, and rates of application used.
  - 6. Areas of application.
  - 7. Water source for application.

- C. Warranty: Warranty specified in this Section.

#### 1.04 QUALITY ASSURANCE

- A. Use only an experienced pest control operator who has been in the business at least three years and is licensed by the Hawaii State Pest Control Board in Branch #3 and certified as a commercial applicator under the Hawaii Pesticide Law by the Hawaii State Department of Agriculture in Category 7b.
- B. Regulatory Requirements: Formulate and apply termiticides according to the EPA-Registered Label.
- C. Notify the Architect at least one day before application of chemicals.
- D. In addition to requirements of these specifications, comply with manufacturer's instructions and recommendations for work including preparation of substrate and application.

#### 1.05 DELIVERY, STORAGE AND HANDLING

- A. Store in a dry location at temperatures specified by manufacturer.
- B. Store products with proper security to insure against misuse and theft.

#### 1.06 JOB CONDITIONS

- A. Do not apply soil treatment solution until excavation, filling and grading operations are completed, except as otherwise required in construction operations.
- B. To insure penetration, do not apply soil treatment to excessively wet soils or during inclement weather. Comply with handling and application instructions of the soil toxicant manufacturer.

#### 1.07 COORDINATION

- A. Coordinate soil treatment application with excavating, filling, grading, and concreting operations. Treat soil under footings, grade beams, and ground-supported slabs before construction.
- B. Coordinate metal mesh system installation with concrete installation

#### 1.08 WARRANTY

- A. Chemical Treatment: Furnish a written warranty stating the following:
  - 1. Application was made at the concentration, rates, methods, and locations specified.
  - 2. Effectiveness of the treatment against subterranean termite infestation is warranted for a period of not less than two years from the date of substantial completion.
  - 3. If damage by subterranean termites occurs within a period of one year from the date of Substantial Completion, necessary building repairs to termite

caused damage, up to a total of \$50,000 will be made at no additional expense.

4. If subterranean termite infestation occurs through the treated area within the warranty period, the Contractor will re-treat the soil to exterminate all infestation, at no additional expense as follows:
  - a. Remove floor covering as required.
  - b. Drill 1/2- or 9/16-inch diameter holes through interior concrete ground floor slabs, not more than 18 inches apart, along both sides of partitions and walls, at each plumbing and utility penetration and at cracks and expansion joints.
  - c. Drill one hole per block along one course above adjacent grade of concrete unit masonry walls which extend below grade.
  - d. Treat at a rate consistent with pesticide label directions at working pressures applicable and safe under the conditions at the site.
  - e. Perform corrective treatment to at least ten feet from each visible subterranean termite activity.
  - f. Patch drill holes with cement/concrete to full depth of slab thickness. Refinish as necessary to prevent backflow and to restore original appearance.
  - g. Re-install finishes as applicable. Use a competent commercial carpet installer to re-install carpets.
  - h. Replace finishes and finish materials which are contaminated by spilled chemicals.
  - i. Treat above-ground areas infested with subterranean termites as appropriate with a proven, effective insecticide to eliminate those termites.

**B. Metal Mesh System**

1. Contractor's Warranty: Installation contractor's five (5) year written warranty against infestations or re-infestation by subterranean termites of the building renovated under this contract to commence from the date of Substantial Completion. Perform annual inspections of the building. If live subterranean termite infestation or damage is discovered during the warranty period and building conditions have not been altered in the interim, Contractor shall:
  - a. Correct defective stainless-steel mesh installation and perform other treatment as may be necessary for the elimination of subterranean termite infestation.
  - b. Repair damage caused by termite infestation.
  - c. Re-inspect the building approximately 180 calendar days after the repair.
2. Manufacturer's Warranty: Provide Manufacturer's ten (10) year warranty against penetration of the metal mesh barrier system by subterranean

termites due to faulty materials to commence from the date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.01 MATERIALS

- A. Asbestos Prohibition: No asbestos containing materials or equipment are permitted at the jobsite. The contractor shall ensure that materials proposed for the project are asbestos free
- B. Chemicals: Aqueous solution of Dursban TC, Torpedo, Dragnet, Demon TC or Prevail FT specially formulated to prevent infestation by termites. Fuel oil is not an acceptable diluent.
- C. Equipment:
  - 1. Metering equipment: Totalizing meter to determine application rates and to indicate the total volume of pesticide applied in U.S. gallons. Do not allow distance from meter from the applicator to exceed five feet.
  - 2. Pumping equipment: Type normally used, capable of pumping the working solution in a manner accepted and practiced by the pest control industry.
- D. Metal Mesh: ASTM A 478 and ASTM A 580; Type A1AA marine grade 316 stainless steel mesh of 0.007-inch diameter wire with mesh openings of 0.026 x 0.018 inches.
- E. Accessories: Parging adhesives, bonding cement. High grade stainless steel clamps, ties and other accessories as recommended by system manufacturer.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Examine the surfaces and conditions under which work of this section will be performed with Applicator present, for compliance with requirements for moisture content of soil, interfaces with earthwork, slab and foundation work, landscaping, and other conditions affecting performance of termite control. Do not proceed until unsatisfactory conditions detrimental to timely and proper completion of the work have been corrected.

### 3.02 PREPARATION

- A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's written instructions for preparation before beginning application of termite control treatment. Remove all extraneous sources of wood cellulose and other edible materials such as wood debris, tree stumps and roots, stakes, formwork, and construction waste wood from soil within and around foundations.
- B. Remove foreign matter which could decrease effectiveness of treatment on areas to be treated.

- C. Loosen, rake, and level soil to be treated, except previously compacted areas under slabs and foundations.
- D. Toxicants may be applied before placement of compacted fill under slab, if recommended by manufacturer.

### 3.03 APPLICATION

#### A. Chemical Treatment

- 1. Use chemicals in accordance with the product labels and provisions related to the use of those pesticides as adopted by the Hawaii Pesticide Law, Chapter 149A, HRS, and the Federal Insecticide, Fungicide and Rodenticide Act.
- 2. Apply the soil treatment solution as follows:
  - a. Apply not more than 24 hours before placing concrete over the affected area, whenever possible.
  - b. Apply under slabs after backfill has been completed and rough plumbing and other utility lines have been installed and just prior to the placement of the moisture barrier.
  - c. Apply to dry material whenever possible. Do not apply chemicals under conditions during which the soil does not readily absorb the solution.
  - d. Apply uniformly and at the rates indicated on the label for the chemical being used for both horizontal application and vertical barriers indicated on product label.
- 3. Reapply soil treatment solution to areas disturbed by subsequent excavation and other construction following application.

#### B. Metal Mesh Systems

- 1. Strictly follow the manufacturer's installation instructions published in Manufacturer's Installation Instruction Manual.
  - a. Fit mesh tightly around all pipe or other penetrations and terminate at perimeters as described in the installation manual .
  - b. Install mesh under the perimeter of concrete slab edges and all joints after vapor barrier and reinforcing steel are in place, and comply with manufacturer's written installation methods

### 3.04 PROTECTION

- A. Post signs warning that soil poisoning has been applied. Protect persons and property from injury or damage from soil treatment operations.
- B. The install metal mesh system, attachments and accessories shall be protected before during and after the work of all trades as required by the system supplier or directed by the Contracting Officer.
- C. In the event following trades on the site move, or damage the mesh, clamps or

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parging mix, immediately contact the mesh installer, for recommendations of necessary repairs.

END OF SECTION

## SECTION 02302 – TRENCHING, EXCAVATION, AND BACKFILLING FOR UTILITIES

### PART 1 - GENERAL

#### 1.01 DESCRIPTION OF WORK

- A. This item shall consist of trenching, excavating, and backfilling for utilities and their appurtenances complete.

#### 1.02 RELATED DOCUMENTS

- A. Except as specified otherwise herein, the work shall be in accordance with Section 02200 – EARTHWORK.
- B. All work shall be in accordance with County of Maui, Department of Public Works, Standard Specifications for Public Works Construction, 1986; including but not limited to:

SECTION 11 – Trench Excavation and Backfill

SECTION 12 – Roadway Excavation

### 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, or ¾-inch minus, well-graded granular material below the utility pipe inverts.
  - 2. 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, or ¾-inch minus, well-graded granular materials.
  - 3. For the intermediate lift from 12 inches above the pipe barrel to the proposed subgrade, the backfill shall be either approved native material or structural fill material, which consists of well-graded granular materials of 6 inches in maximum dimension with sufficient fines to prevent the occurrence of voids in the compacted mass.

### 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

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% relative compaction.

- 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 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.
- D. Compaction of trench backfill shall not be less than 90% relative compaction. The compaction requirement of the trench backfill within 3-feet of the finished grade shall be a minimum of 95% 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 Contracting Officer 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 SCOPE OF WORK

- A. The extent of the water system work is indicated on the drawings.
- B. The work covered by this Section consists of furnishing and installing water lines, valves, flow meters, appurtenances as indicated by the CONTRACT documents.

#### 1.02 RELATED DOCUMENTS

- A. Water System Standards, 2002, for the Department of Water Supply, County of Maui.

### PART 2 – SUBMITTALS

#### 2.01 APPLICABLE DOCUMENTS

Contractor shall submit plans, reports, certificates of compliance, manufacture data, shop drawings, manufacturer installation instructions, modeling analysis, and operator manuals for the following materials and testing to be furnished under this Contract:

1. Construction Phasing plan/schedule including water system/service interruptions, advance notification of water system customers and Molokai Fire Department of system service interruptions and use restrictions.
2. Pipe and fittings
3. Gate valves
4. Flow/Pressure regulators
5. Pressure gages
6. Reports for testing including certified bacteriological tests as called for by the contract documents.
7. Reports for pressure testing as called for by the contract documents.

#### 2.02 MATERIALS

- A. Water system to include but not limited to pipes, valves, fittings, corporation stops, cocks, nuts/bolts, etc. shall conform to the Water System Standards, 2002, Department of Water Supply, County of Maui, and all subsequent amendments and additions unless otherwise indicated herein and on the drawings.

- B. Material shall be new. Materials shall be free of defects from manufacturing, storage, or handling.
- C. Material required to complete the water system work shall be furnished by the Contractor.
- D. Gate Valves 4-Inches and larger shall be resilient-seated per the Maui County, Department of Water Supply requirements in the Water System Standards. Valves smaller than 4-inches shall be as indicated on the drawings and per the requirements of the Maui County, Department of Water Supply, Water System Standards. Valves shall be provided with hand wheels or two-inch operating nuts as indicated on the drawings as approved by the Construction Manager.
- E. All nuts and bolts for pipes, tapping sleeves, fittings including couplings, valves etc. shall be stainless steel in accordance with the Maui County, Department of Water Supply, Water System Standards
- F. Concrete Work shall conform to Sections 302.22 and 303.03 of the Maui County, Department of Water Supply, Water System Standards.

### PART 3 - EXECUTION

#### 3.01 WATER SYSTEM

##### A. General Requirements:

Construction of water mains, valves, and appurtenances shall be in accordance with the Water System Standards. The Contractor shall perform all work including but not limited to excavation, backfill, connections, cleaning/flushing, pressure/leakage testing, chlorination, and concrete work.

##### B. Maintenance of Water Supply and Service:

Water supply and service shall be maintained at all times unless otherwise approved by the Construction Manager. Interruption of service shall be coordinated in advance with the Construction Manager. Operation of existing valves will be by the DHHL water system staff as authorized by the Construction Manager

##### C. Cleaning and Painting of Pipes and Fittings:

Exposed surfaces to include nuts and bolts shall be cleaned with a wire brush to remove foreign and loose material to include dirt, dust, rust and coatings. Cleaning shall then follow with sanding to provide a clean and smooth surface for the paint adherence. Existing coating remaining and final cleaned surfaces shall be accepted by the Construction Manager before painting.

Painting for ductile iron shall be with a coat of asphaltum paint. A second coat shall be applied as directed by the Construction Manager.

Painting for Galvanized steel pipe and galvanized nuts and bolts shall be with a coat of RUST-OLEUM cold applied galvanizing compound or approved equivalent. A second coat shall be applied as directed by the Construction Manager.

PVC, copper, brass or bronze surfaces and gaskets shall not be cleaned and painted except as specified herein. Copper piping and tubing exposed to the elements and straps and anchors shall be painted with two field coats of exterior latex paint. Painting is to mask the copper material from observation. Paint color shall be gray approximately matching concrete color. Painting shall be done in a neat manner with minimal over painting.

D. Construction Phasing:

Contractor shall notify coordinate in advance of any interruption or restrictions as a result of the Contractor's work or operations to water service and flow with the Molokai Fire Department as accepted by the Construction Manager.

E. Permits, Notice, Etc.:

The Contractor shall prepare, distribute, and pay for all Public notices in newspapers and via mail regarding the project. The Contractor shall notify the owners of private properties at least one (1) week prior to impacting their property.

END OF SECTION

## 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.

#### 1.02 RELATED DOCUMENTS

- A. Related Work Described Elsewhere:

Asphalt Concrete Paving is specified in Section 02740 – ASPHALT CONCRETE PAVING

- B. Specific sections of the State of Hawai'i, Department of Transportation, Highways Division, Standard Specifications for Road and Bridge Construction, dated 2005, as amended, hereafter referred to as the State DOT Specifications with deletion of subsections relating to measurement and payment in all sections incorporated herein and further modifications to such sections as hereinafter provided.
- C. Specific sections of the County of Maui, Department of Public Works, Standard Specifications for Public Works Construction, dated September 1986, as amended, hereinafter referred to as the County Specifications; including but not limited to:

SECTION 39 – Portland Cement Concrete

SECTION 41 – Concrete Curb and Gutter

SECTION 42 – Concrete Sidewalk

SECTION 43 – Concrete Blocks, Cradles and Jackets

SECTION 44 – Cement Rubble Masonry

### PART 2 – PRODUCTS

#### 2.01 MATERIALS

- A. Materials, construction and installation shall conform to the applicable sections of the County Specifications and the State DOT Specifications.

PART 3 – EXECUTION

- 3.01 Construction and installations shall conform to the applicable sections of the State DOT Specifications, and the County Specifications.

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

END OF SECTION

## SECTION 02731 – SANITARY SEWER SYSTEM

### PART 1 – GENERAL

- 1.01 GENERAL CONDITIONS: The General Conditions and Special Provisions preceding these specifications shall govern this section of the work.
- 1.02 WORK INCLUDED: Furnish all labor, materials, tools, equipment and related items necessary to complete, in place, the sewer system in conformity with the dimensions, profiles, sections, and details shown on the plans. Work relating to the sewer system shall be governed by the following sections of the Standard Specifications:
- PVC Sewer Pipe and Appurtenances ..... Section 21
- Connection to Existing Sewer and Connecting Cesspool in
- Direct Line of Sewer ..... Section 22
- Sewer Manholes..... Section 23

### PART 2 – PRODUCTS

#### 2.01 MATERIALS

- A. Sewer Pipe: Sewer Pipe and Appurtenances shall meet County Standards.
- B. Sewer Manholes: As specified in Section 23 - Sewer Manholes of the "Standard Specifications."
- C. Materials for the sewer system shall be in accordance with the sections of the Standard Specifications noted hereinafter.

### PART 3 – EXECUTION

- 3.01 Install the sewer system in accordance with the sections of the Standard Specifications noted hereinbefore.
- 3.02 The Contractor shall be responsible for precisely laying out the sewer line shown on the contract plans. The location shown on the contract plans of the various existing utility lines which the new lines are to cross over or under or connect to were determined on the basis of the best information available; however, no assurance can be provided that the actual locations will be precisely as shown on the contract plans.
- 3.03 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

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operations shall be immediately repaired and restored as directed by the Engineer at the Contractor's expense.

- 3.04 The installation of sewer pipes and testing and acceptance shall be governed by the DPW Standard Specifications.

END OF SECTION



## SECTION 02740 – ASPHALT CONCRETE PAVING

### PART 1 – GENERAL

#### 1.01 DESCRIPTION OF WORK

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.

Work under this section consists of spraying weed killer on the prepared roadway subgrade prior to the installation of the base course and where called for on the drawings and also on existing growth prior to application of asphalt in the case of resurfacing jobs.

#### 1.02 RELATED DOCUMENTS

##### A. Related Work Described Elsewhere:

Site preparation for paving is specified in Section 02520 – PAVING, ROADWAY AND MISCELLANEOUS WORK

Pavement striping is specified in Section 02760 – PAVEMENT MARKING AND SIGNAGE.

##### B. All work shall be done in accordance with:

Specific sections of the State of Hawai'i, Department of Transportation, Highways Division, Standard Specifications for Road and Bridge Construction, dated 2005, as amended, hereafter referred to as the State DOT Specifications with deletion of subsections relating to measurement and payment in all sections incorporated herein and further modifications to such sections as hereinafter provided.

Specific sections of the County of Maui, Department of Public Works, Standard Specifications for Public Works Construction, dated September 1986, as amended, hereinafter referred to as the County Specifications; including but not limited to:

SECTION 33 – Asphalt Surface Treatment

SECTION 34 – Asphalt Concrete Pavement

SECTION 35 – Asphalt Concrete Resurfacing

SECTION 36 – Adjustment of Existing Utility Structures to Finished Grade

SECTION 37 – Restoring Pavements and Other Improvements

### 1.03 SOILS TESTING AND ANALYSES

A Geotechnical Engineer or technician, provided by the Contractor, 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 Geotechnical 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 Construction Manager notified.

### 1.04 SUBMITTALS

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

Submit material product data and Material Safety Data Sheets.

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 roads and parking areas, walkways, and other foot traffic areas shall be in accordance with the appropriate Sections of State DOT Specifications. Paragraphs concerning Measurements and Payments in the sections are not applicable. Where recycled glass is available at a cost no greater than that of the equivalent aggregate, the aggregate base course and subbase course shall contain recycled glass as specified in Section 717 of the State DOT Specifications

Use Mix No. IV for parking areas and Mix No. IV for private driveways.

### 2.02 HERBICIDES

A. Pre-Paving Vegetation Destruction: "Casoron 4G", "Norosac 4G", for under asphalt application on new or rebuilt pavement, and shall be "Hyvar X", "Roundup" for application to existing weeds for resurfacing jobs.

B. Pre-Emergence Control: Herbicide shall be Treflan by Elanco Products Company or accepted equivalent.

## PART 3 – EXECUTION

### 3.01 SURFACE PREPARATION

The subgrade shall be prepared and compacted in accordance with the requirements of the appropriate Sections of the State DOT Specifications. Soil

tests shall be made at the subgrade level and the final pavement structure verified or modified as necessary.

Mix the under asphalt weed killer and uniformly spread using calibrated application equipment at the maximum rates permitted for under asphalt use. Install base course material as soon as possible after applying the weed killer to preclude loss of germination inhibiting action.

In treatment of existing growth on resurfacing jobs, mix the weed killer and uniformly spray.

Retreat nut grass and weeds two (2) days after initial application and again if growth still exists.

Notify the Construction Manager 24 hours before application of weed killer.

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

The base course shall be constructed in accordance with the appropriate Sections of the State DOT Specifications. Field density tests shall be made by the Soils Engineer to verify that the compaction obtained meets the Specifications.

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 the appropriate Sections of the State DOT Specifications.

B. Provide a prime coat over newly constructed base course where the longitudinal grade of the pavement is 8% or more, or where the asphaltic concrete pavement thickness is less than 4-inches.

Where a prime coat is provided, control runoff and protect adjacent work, property, utilities, waterways, and other areas against damage.

C. 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.

D. Surface Tolerance. The finished surface of the asphalt concrete pavement shall be within 0.02-feet above or below the theoretical grade.

April 21, 2018

OWNER'S SAMPLE DESIGN  
NOT FOR CONSTRUCTION

#### 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

A. Related Work Described Elsewhere:

1. Roadway asphalt paving and subgrade preparation are specified in Section 02740 – ASPHALT CONCRETE PAVING.
2. Pavement striping is specified in Section 02760 – PAVEMENT MARKING AND SIGNAGE.

B. All work shall be done in accordance with:

Specific sections of the State of Hawai'i, Department of Transportation, Highways Division, Standard Specifications for Road and Bridge Construction, dated 2005, as amended, hereafter referred to as the State DOT Specifications with deletion of subsections relating to measurement and payment in all sections incorporated herein and further modifications to such sections as hereinafter provided.

Specific sections of the County of Maui, Department of Public Works, Standard Specifications for Public Works Construction, dated September 1986, as amended hereinafter referred to as the County Specifications; including but not limited to:

SECTION 36 – Adjustment of Existing Utility Structures to Finished Grade

SECTION 37 – Portland Cement Concrete Paving

SECTION 38 – Restoring Pavements and Other Improvements

SECTION 39 – Portland Cement Concrete

SECTION 41 – Concrete Curb and Gutter

SECTION 42 – Concrete Sidewalk

SECTION 46 – Reinforced Concrete Driveway Aprons

SECTION 48 – Reinforcing Steel

Work within DHHL property will follow the State DOT Specifications, while work within the County Right-of-Way will conform to the County Specifications. Where potential conflicts in requirements arise, the State DOT Specifications shall take precedence with the Construction Manager's approval.

## 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.

Work under this section consists of spraying weed killer and herbicide on the prepared roadway subgrade prior to the installation of the base course and where called for on the drawings and also on existing growth prior to paving in the case of resurfacing jobs.

## 1.03 SOILS TESTING AND ANALYSES

A Geotechnical Construction Manager or technician, provided by the Contractor, 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 Geotechnical Construction Manager 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 Construction Manager notified.

## 1.04 SUBMITTALS

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

Submit manufacturer's certificates of conformance or materials submittals for the class, aggregate, admixtures, slump, water content, and for the job mix formula.

Submit material product data and Material Safety Data Sheets.

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.
6. 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 Construction Manager prior to commencing any concrete work. All fees for concrete sampling and testing are to be paid by the Contractor.

7. Submit three (3) compressive strength 28-day tests for each day's pour as needed and resampling and testing shall be borne by the Contractor.

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 Construction Manager upon completion of the concrete placement work.

## PART 2 – PRODUCTS

### 2.01 PORTLAND CEMENT CONCRETE PAVEMENT MATERIALS

- A. Materials for Portland cement concrete pavement shall be in accordance with the below-listed sections of the appropriate Sections of the State DOT Specifications except as amended in the plans and/or specifications herewith. Paragraphs concerning Measurements and Payments in the sections are not applicable.

### 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: "Casoron 4G", "Norosac 4G", for under pavement application on new or rebuilt pavement
- B. Resurfacing Vegetation Destruction: "Hyvar X", "Roundup" for application to existing weeds for resurfacing jobs.
- C. Pre-Emergence Control: Herbicide shall be Treflan by Elanco Products Company or accepted equivalent.

## PART 3 – EXECUTION

### 3.01 SURFACE PREPARATION

The subgrade shall be prepared and compacted in accordance with the requirements of the appropriate Sections of the State DOT Specifications. Soil tests shall be made at the subgrade level and the final pavement structure verified or modified as necessary.

Mix the under pavement weed killer and uniformly spread using calibrated application equipment at the maximum rates permitted for under pavement use. Install base course material as soon as possible after applying the weed killer to preclude loss of germination inhibiting action.

In treatment of existing growth on resurfacing jobs, mix the weed killer and uniformly spray. Retreat nut grass and weeds two (2) days after initial application and again if growth still exists.

Notify the Construction Manager 24 hours before application of weed killer.

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 the appropriate Sections of the State DOT 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 the appropriate Sections of the State DOT Specifications. Field density tests shall be made by the Soils Engineer to verify that the compaction obtained meets the Specifications.

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

### 3.04 PORTLAND CEMENT CONCRETE PAVEMENT

- A. Side forms shall be placed in accordance with the appropriate Sections of the State DOT 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 appropriate Sections of the State DOT Specifications. Reinforcing steel shall be installed as indicated.



- C. Curing and Protection: Curing and protection shall be as specified in the appropriate Sections of the State DOT Specifications.

### 3.05 JOINTS

- A. Joint construction shall be in accordance with the appropriate Sections of the State DOT Specifications, 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 appropriate Sections of the State DOT Specifications.
- B. Surface Finish: Surface finish shall be in accordance with the appropriate Sections of the State DOT Specifications.
- C. Concrete Stain: Concrete stain shall be applied in accordance with the manufacturer's recommendations.
  - 1. The number of coats applied shall be adjusted accordingly to obtain the same color as in the sample accepted for the Project.
- D. All concrete pavements shall have a uniform color and surface texture, which shall be subject to acceptance by the Construction Manager.

### 3.07 PATCHING

- A. Within three (3) days after stripping formwork, fill and patch surface defects such as rock pockets, honeycombs, cracks, and holes. The Construction Manager 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 Department'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

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

### 3.09 PAVEMENT STRIPING

Pavement striping shall be as specified in Section 02760 – PAVEMENT MARKING AND SIGNAGE.

END OF SECTION

## SECTION 02760 – PAVEMENT MARKING (PAINT) AND SIGNAGE

### PART 1 – GENERAL

#### 1.01 RELATED DOCUMENTS

- A. Specific sections of the State of Hawai'i, Department of Transportation, Highways Division, Standard Specifications for Road and Bridge Construction, dated 2005, as amended, hereafter referred to as the State DOT Specifications with deletion of subsections relating to measurement and payment in all sections incorporated herein and further modifications to such sections as hereinafter provided.
- B. These specifications shall amend Section 629 – Pavement Markers, Striping and Markings of the DOT Standard Specifications.
- C. These specifications shall amend Section 621 – Destination, Directional, Regulatory and Warning Signs of the DOT Standard Specifications.
- D. These specifications shall amend Section 755 – Pavement Marking Materials of the DOT Standard Specifications.
- E. Related Work Described Elsewhere:

Roadway paving is specified in Section 02740 – ASPHALT CONCRETE PAVING.

Signage is specified in Section 10440 - SIGNAGE

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 roadway stripping, pavement markers and signage on the Drawings and as specified herein.

#### 1.03 SUBMITTALS

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 phase "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 DOT Specifications.
- B. Adhesive: Provide standard set type or rapid set type pavement marker adhesive compatible with roadway surface in compliance with the State DOT Specifications.
- C. Adhesive solvent: Provide manufacturer's recommended solvents to remove excess adhesive from roadway or marker.

## 2.03 SIGNS

Signs shall conform to the requirements of the Manual on Uniform Traffic Control Devices (MUTCD) for Streets and Highways, 2009 Edition, as amended, by the U.S. Department of Transportation, Federal Highway Administration (USDOT-FHWA).

## 2.04 SIGN POSTS

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 State of Hawaii Department of Transportation Standard Specifications 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 Construction Manager, 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 Construction Manager 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 State DOT Specifications.
- 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°. On curves exceeding 1°, 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 Owner at the Contractor's expense. For all misted areas, drip and spattered paint and excess markings shall be removed to the satisfaction of the Owner. 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

The Contractor shall submit to the Construction Manager test specimens as requested. Test markings shall be applied to a suitable plane rigid surface. The 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 State DOT Specifications, at the approximate locations shown on the plans and in accordance with the mounting details indicated. Final locations shall be approved by the Project Manager.
- 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

## SECTION 02830 – FENCES AND GATES

### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS

A. Related work described elsewhere.

1. Section 05500 – METAL FABRICATION.

#### 1.02 SCOPE

A. Proved galvanized steel cattle gate, in place, complete.

#### 1.03 SUBMITTALS

A. Submit complete, dimensioned shop drawings showing post sizes, frame post sizes, post heights, gate details, diagonal bracing and protection from concrete contact.

B. Submit manufacturer's certification that materials have been treated as specified herein.

### PART 2 - PRODUCTS

#### 2.01 MATERIALS FOR PIPE GATES

A. All materials shall be of galvanized steel.

B. Posts, top rails and gate frames shall be Schedule 40 galvanized steel pipe.

C. Gate post and rail sizes shall be as indicated on drawings.

D. Concrete strength shall be 2,500 psi

E. Coating for post bases shall be paste consistency asphalt mastic.

F. Gates shall have drop rod devices for single gates, and drop rod devices for double swing gates, for both the open and closed positions.

### PART 3 - EXECUTION

#### 3.01 INSTALLATION

A. Gates and frames shall be assembled by welding.

B. Gate height and width, and fence height shall be as indicated on the drawings.

END OF SECTION

## DIVISION 3 - CONCRETE

### 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. Product Data:
  - 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.
- B. Design Mixes: For each concrete mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.
  - 1. Indicate amounts of mix water to be withheld for later addition at Project site.
- C. 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.
- D. 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. Repair materials.

##### 1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.



- B. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.
  - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
- C. 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.
- D. 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"

## PART 2 - PRODUCTS

### 2.01 FORM-FACING MATERIALS

- A. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- B. 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 1 inch to the plane of the exposed concrete surface.
  - 2. Furnish ties that, when removed, will leave holes not larger than 1 ½ inches in diameter in concrete surface.
  - 3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

### 2.02 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed, unless otherwise noted on the drawings.
- B. Galvanized Plain-Steel Welded Wire Fabric: ASTM A 185, fabricated from galvanized steel wire into flat sheets.

### 2.03 REINFORCEMENT ACCESSORIES

- A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place that will not puncture the vapor retarder. Use plastic straps or brightly colored tie wires to secure reinforcing. Manufacture bar supports according to CRSI's "Manual of

Standard Practice” from steel wire, plastic, or precast concrete or fiber-reinforced concrete of greater compressive strength than concrete.

- B. Joint Dowel Bars: Plain-steel bars, ASTM A 615/A 615M, Grade 60. Cut bars true to length with ends square and free of burrs.

#### 2.04 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I
- B. Pozzolans
  - 1. Fly Ash: ASTM C 618, Class C or F.
- C. Normal-Weight Aggregate: ASTM C 33, uniformly graded, and as follows:
  - 1. Class: Moderate weathering region, but not less than 3M.
  - 2. Aggregate Size: No. 57 (1 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: Potable and complying with ASTM C 94 or non potable meeting ASTM C-94 Acceptance Criteria for Questionable Water Supply. Use only potable water for job site mixing.

#### 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 C 260.
- C. Water-Reducing Admixture: ASTM C 494, Type A.
- D. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.
- E. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E.
- F. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.

#### 2.06 CURING MATERIALS AND EVAPORATION RETARDERS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Solvent-Borne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.
- F. Epoxy-Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class and grade to suit requirements, and as follows:
  - 1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
- G. Sleeves:
  - 1. Schedule 40 pipe, galvanized per ASTM A53.
  - 2. Schedule 40 PVC Pipe.

## 2.07 REPAIR MATERIALS

- A. 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 C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
  - 2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
  - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
  - 4. Compressive Strength: Not less than 5500 psi (39 MPa) at 28 days when tested according to ASTM C 109/C 109M.

## 2.08 CONCRETE MIXES

- A. Prepare design mixes 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 and Foundation Walls: Proportion normal-weight concrete mix as follows:
  - 1. Compressive Strength (28 Days): 3000 psi.
- C. Slab-on-Grade: Proportion normal-weight concrete mix as follows:

1. Compressive Strength (28 Days): 4000 psi.
- D. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
  1. Fly Ash: 25 percent.
- E. Maximum Water-Cementitious Materials Ratio: 0.55
- F. 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.

## 2.09 FABRICATING REINFORCEMENT

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

## 2.10 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94, and ASTM C 1116 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 C 94. Mix concrete materials in appropriate drum-type batch machine mixer.
  1. For mixer capacity of 1 cu. yd./0.76 cu. m or less, continue mixing at least one and one-half minutes, but not more than five minutes after all ingredients are in mixer, before any part of batch is released.
  2. For mixer capacity larger than 1 cu. yd./0.76 cu. m, increase mixing time by 15 seconds for each additional 1 cu. yd./0.76 cu. m.
  3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, 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.

## 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.
  - 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 D, 1 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 1 vertical. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal.
    - 1. 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 retarder 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. Chamfer exterior corners and edges of permanently exposed concrete.
  - I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
  - J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
  - K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
  - L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.
- 3.02 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.

1. Install anchor bolts, accurately located, to elevations 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: Do not embed conduits larger than one inch (nominal pipe size) diameter vertically. Place conduits in the middle of the wall and space a minimum of 10 times their outside diameter. Do not embed conduits horizontally in wall lengthwise. Provide sleeve for conduits passing through walls.
  2. 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.
- C. Obtain Contracting Officer's approval to install conduit or pipe penetrations that may unduly impair the strength of the structural member (for example, multiple pipe penetrations near the face of a column).

### 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 deg F (10 deg C) 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, for beam soffits, joists, slabs, and other structural elements, that supports weight of concrete in place until concrete has achieved the following:
1. At least 70 percent of 28-day design compressive strength (minimum requirement).
  2. 28-day design compressive strength.
  3. Determine compressive strength of in-place concrete by testing representative field or laboratory-cured test specimens according to ACI 301.

4. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- 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 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 Contracting Officer.

### 3.04 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. Support slab reinforcing bars and welded wire fabric (WWF) as follows:

BAR SIZE	MAXIMUM DISTANCE BETWEEN SUPPORTS
#3	2 feet
#4	3 feet
#5	4 feet
#3 at 15" E.W.	4'-6" o.c. each way
WIRE FABRIC SHEETS	MAXIMUM DISTANCE BETWEEN SUPPORTS
6 x 6 – W1.4/W1.4	2'-0" o.c. each way

- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire fabric in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

### 3.05 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 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. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
  - 3. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
  - 4. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
  - 5. 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. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8 inch wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

### 3.06 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 one day notification to Contracting Officer for each scheduled pour.
- B. Before placing concrete, water may be added at Project site, subject to limitations of ACI 301. Up to two gallons of water per cubic yard of concrete may be added at the jobsite provided the approved design mix accommodates the additional water.
  - 1. Do not add water to concrete after adding high-range water-reducing 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 insure 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 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 and complete embedment of reinforcement and other embedded items without causing mix constituents to segregate.
  - 3. Make construction joints only where located on Drawings unless otherwise approved by Contracting Officer. Plan pours to continuously place concrete from one construction joint to another.
- F. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
  - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
  - 2. Maintain reinforcement in position on chairs during concrete placement.
  - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
  - 4. Slope surfaces uniformly to drains where required.
  - 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, 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 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
  - 2. 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.

### 3.07 CONCRETE SLABS ON GRADE

- A. For exterior areas, unless specified elsewhere, place concrete floor slabs directly over granular fill and reinforce slabs as shown on the drawings. Provide isolation and contraction joints where detailed and, at intersections, corners and at abutments. Place contraction joints not more than 40 feet apart, unless detailed otherwise.
  1. Finish concrete true to grade, section and cross slope for sloped or crowned walks at 1.5% (1% minimum and 2% maximum). Round edges to 1/8" radius except saw-cut joints. Finish steps in connection with walks with same finish as walks.

### 3.08 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.

### 3.09 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.
  1. 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.
  1. 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 and measure surface so gap at any point between concrete surface and an unlevelled freestanding 10-foot-long straightedge, resting on two high spots and placed anywhere on the surface, does not exceed the following:
    - a. 1/4 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 platforms, steps, and ramps, and elsewhere as indicated.
1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Contracting Officer before application.
- G. Swirled Finish: Apply a swirl finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated. Immediately after second troweling, and when concrete is still plastic, work the surface with a float in semi-circular or fan-like motion.

### 3.10 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply 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. If removing forms before end of curing period, continue curing by one or a combination of the curing methods listed in paragraph 3.14.D.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces, by one or a combination of the following methods:
1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

- a. Water.
    - b. Continuous water-fog spray.
    - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
  2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
    - a. Moist cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
    - b. Moist cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
    - c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer 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 three hours after initial application. Maintain continuity of coating and repair damage during curing period.
  4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three 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.
- 3.11 CONCRETE SURFACE REPAIRS
- A. Defective Concrete: Repair and patch defective areas. Remove and replace concrete that cannot be repaired and patched to Contracting Officer's approval.
  - B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16(1.2-mm) 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 [1 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 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.
  6. Repair defective areas, except random cracks and single holes [1-inch] or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least 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 [1-inch] or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Contracting Officer's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Contracting Officer's approval.

### 3.12 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 C 172 shall be performed according to the following requirements:
  - 1. Testing Frequency: Obtain at least one composite sample for each [100 cu. yd.] (76 cu. m) or fraction thereof of each concrete mix placed each day.
    - a. When frequency of testing will provide fewer than five compressive strength tests for each concrete mix, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
  - 2. Compressive-Strength Tests: ASTM C 39; test two laboratory-cured specimens at 7 days and two at 28 days.
    - a. Test two field-cured specimens at 7 days and two at 28 days.
    - b. A compressive-strength test shall be the average compressive strength from two 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 three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi/3.4 MPa.
- E. Test results shall be reported in writing to 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 Contracting Officer but will not be used as sole basis for approval or rejection of concrete.
- G. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that 4 compressive strengths, or other requirements have not been met, as directed by Contracting Officer. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Contracting Officer.

December 26, 2018

OWNER'S SAMPLE DESIGN  
NOT FOR CONSTRUCTION

END OF SECTION

## DIVISION 4 – MASONRY

### 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. Mortar and grout.
3. Reinforcing steel.
4. Masonry joint reinforcement.
5. Ties and anchors.
6. Miscellaneous masonry accessories.

##### 1.02 DEFINITIONS

A. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

##### 1.03 SUBMITTALS

A. 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.

B. 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."

C. Qualification Data: For firms and persons specified in "Quality Assurance" Article.

D. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:

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 the compressive strength in IBC Table 2103.12
3. Each material and grade indicated for reinforcing bars.

E. Test Reports:



Manufacturer's tests shall be in accordance with ASTM C140 for conformance with the requirements of ASTM C90.

- F. Quality Control Inspection Documents: Provide one copy of the following industry documents for use by contracting officer.
  - 1. NCMA TEK 8-2A (1998): Removal of Stains from Concrete Masonry Walls

#### 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.
  - 1. 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 318-02 Table 4.4.1.
- 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.

#### 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.
  - 1. When ambient temperature exceeds 90 deg F 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 square-edged units for outside corners, unless indicated as bullnose.
- B. Concrete Masonry Units: ASTM C-90 and as follows:
  - 1. Unit Compressive Strength: Provide load bearing units with minimum average net-area compressive strength of 1900 psi.
  - 2. Size (Width): Manufactured to the following dimensions within variations in dimensions only as permissible per ASTM C-90:
    - a. 8 inches nominal; 7-5/8 inches actual.
    - b. 12 inches nominal; 11-5/8 inches actual.

### 2.02 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type II. Provide natural color or white cement as required to produce mortar color indicated.
- B. Mortar Cement: ASTM C 1329.
- C. Masonry Cement: ASTM C 91
- D. Aggregate for Mortar: ASTM C 144.
- E. Aggregate for Grout: ASTM C 404.
- F. Water for use in mixing Mortar and Grout: Potable and complying with ASTM C 94. 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.

### 2.03 REINFORCING STEEL

- A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M; ASTM A 616/A 616M, including Supplement 1; or ASTM A 617/A 617M, deformed, Grade 60 unless otherwise indicated on the drawings or specified herein.

#### 2.04 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 A 82; with ASTM A 153, Class B-2 coating.
- C. Stainless-Steel Wire: ASTM A 580/A 580M, Type 316.
- D. Stainless-Steel Sheet: ASTM A 666, Type 316.

#### 2.05 MISCELLANEOUS ANCHORS

- A. Unit Type Inserts in Concrete: Cast-iron or malleable-iron inserts of type and size indicated.
- B. Dovetail Slots: Furnish dovetail slots with filler strips, of slot size indicated, fabricated from [0.0336-inch] (20 gauge), galvanized steel sheet.
- C. Anchor Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153, Class C; of diameter and length indicated and in the following configurations:
  - 1. Headed bolts.
  - 2. Non-headed bolts, bent in manner indicated.

#### 2.06 MISCELLANEOUS MASONRY ACCESSORIES

- A. 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 two loops or four 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.

#### 2.07 MASONRY CLEANERS

- A. Job-Mixed Detergent Solution: Solution of ½-cup dry polyphosphate and ½-cup dry measure laundry detergent dissolved in 1-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.

## 2.08 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
1. Do not use calcium chloride in mortar or grout.
- 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.
  3. Prepare Mortar Mix Designs 2 through 5 strictly in accordance with the admixture manufacturer's instructions. Place mortar within 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 by manufacturer of plasticizer additive:
1. Mortar Mix 1;
 

Type M Mortar	
1 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 1 bag	powdered plasticizer additive (7 pound bag)
6 cu. ft.	mortar aggregate
  3. Mortar Mix 3;
 

Type M Mortar:	
1 sack	portland cement
3 ounces	liquid plasticizer additive
2-1/4 to 2-3/4 cu. ft.	mortar aggregate

4. Mortar Mix 4;
 

Type S Mortar:	
2 sacks	portland cement
1 bag	powdered plasticizer additive (7 pound bag)
9 cu. ft.	mortar aggregate
  
5. Mortar Mix 5;
 

Type S Mortar	
1 sack	portland cement
3 ounces	liquid plasticizer additive
2-1/2 to 3 cu. ft.	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 2,500 psi 28-day compressive strength per ASTM C 1019 unless noted otherwise on drawings.
  2. Use plasticizers additives for below grade foundation walls scheduled to be grouted to ensure full dispersal of mix.
  
- F. Grout Mixes: conform to ASTM C476 for grout mixed on-site. Prepare and uniformly mix grout in the following proportion:
  1. Fine Grout
 

1 part	Portland cement
Fine Aggregate:	2-1/4 to 5 times the sum of the volumes of the cementitious materials
  2. Ready-mix Grout: Conform to ASTM C-476 for grout designed by ready-mix suppliers.

## 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.
  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. (Source: Reinforced Concrete Masonry Construction Inspector's Handbook, Fourth Edition, paragraph 12.3.4)
- 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 the national concrete masonry association Specification for Structures ACI 530-02/ASCE 6/TMS 602 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 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.

### 3.04 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.
  - 1. 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, wet clay masonry units lightly if required, 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, place a layer of metal lath in the joint below and rod mortar or grout into core.
- I. Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated or directed.
- J. Fill cores in hollow concrete masonry units with grout for foundation walls and below grade walls up to underside of floor slab unless otherwise indicated.

### 3.05 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, and where adjacent to cells or cavities to be filled with grout.
  3. For starting course on footings where cells are not grouted, spread out full mortar bed, including areas under cells.
  4. Bed cross webs.
- B. Lay solid brick-size masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Lay horizontal-cell units with full bed joints, unless otherwise indicated. Keep drainage channels, if any, free of mortar. 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.
- D. Maintain joint thicknesses indicated, except for minor variations required to maintain bond alignment. If not indicated, lay walls with [1/4- to 3/8-inch] thick joints.
- E. Where epoxy-mortar pointed joints are indicated, rake out setting mortar to a uniform depth of 1/4-inch and point with epoxy mortar to comply with epoxy-mortar manufacturer's written instructions.
- 3.06 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 1-inch/ 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 o.c. vertically and 36 inches o.c. horizontally.
- 3.07 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.
- 3.08 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 ACI 530 Sec 3.4/ASCE 6/TMS 602.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist grout pressure.
1. Comply with requirements of ACI 530 Sec. 3.5/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.

### 3.09 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application.
- 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 masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.

December 26, 2018

OWNER'S SAMPLE DESIGN  
NOT FOR CONSTRUCTION

6. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2 applicable to type of stain on exposed surfaces.

END OF SECTION

## SECTION 05500 – METAL FABRICATIONS

### PART 1 - GENERAL

#### 1.01 SUMMARY

- A. Metal fabrications include items made from iron and steel shapes, 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. Steel Access Ladders.
  - 2. Rough hardware.
  - 3. Miscellaneous framing and supports.
  - 4. Grating at elevator sump pit
  - 5. Elevator Hoist beams
  - 6. ***Stair Nosings***
- D. Related Work Described Elsewhere:
  - 1. Section 05120 - STRUCTURAL STEEL

#### 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 SYSTEM PERFORMANCES

- A. General: Engineer systems to withstand structural loads indicated, determine allowable design working stress of materials based on the following:
  - 1. For Cold-Formed Structural Steel: AISI "Specification for Design of Cold-Formed Steel Structural Members".
  - 2. For Aluminum: AA 30 "Specifications for Aluminum Structures".

### PART 2 - PRODUCTS

#### 2.01 MATERIALS

- A. 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. Structural Steel Wide Flanges Shapes: ASTM A 992/ A 992M
  - 4. Steel Pipe: ASTM A 53; Type and grade (if applicable) as selected by fabricator and as required for design loading; galvanized finish, G90; standard weight (schedule 40), unless otherwise indicated.
  - 5. Steel tubing as follows:
    - a. Cold-Formed Steel Tubing: ASTM A 500.
    - b. Hot-Formed Steel Tubing: ASTM A 501
      - i. For exterior installations and where indicated, provide tubing with hot-dip galvanized coating per ASTM A 53.
  - 6. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.
  - 7. Gray-Iron Castings: ASTM A 48, Class 30
  - 8. Malleable-Iron Castings: ASTM A 47, Grade 32510 (ASTM A47M, Grade 22010).
  - 9. Cast-in Place Anchors in Concrete: Anchors of type indicated below, fabricated from corrosion-resistant materials capable of sustaining, without failure, the load imposed with a safety factor of 4, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
    - a. Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A 47, or cast steel, ASTM A 27. Provide bolts, washers and shims as required, hot-dip galvanized, ASTM A 153.

10. Welding Rods and Bare Electrodes: Select according to AWS specification for the metal alloy to be welded.

B. Fasteners:

1. General: Provide zinc-coated fasteners for exterior and interior use. Select fasteners for the type, grade and class required.
2. Bolts and Nuts: Regular hexagon head type, ASTM A 307, Grade A, except where specified of stainless steel.
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. Expansion Anchors: CID A-A-1924 of Group II, Type 4, Class 1. Provide embedment as required by manufacturer.
6. Toggle Bolts: ANSI B18.2.1 as required.
7. Lock Washers: Helical spring type carbon steel, ANSI B18.21.1.

- C. 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.

D. Paint:

1. Shop Primer for Ferrous Metal: Fast-curing, abrasion-resistant, rust-inhibitive primer selected for compatibility with substrates and with types of finish paint systems indicated, and for capability to provide a sound foundation for field-applied topcoats despite prolonged exposure; complying with material and performance requirements of Section 09900 - PAINTING.
2. Galvanizing Repair Paint: High zinc dust content paint for reglazing welds in galvanized steel, complying with SSPC-Paint-20.

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. 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.
- C. Weld corners and seams continuously, complying with AWS recommendations. At exposed connections, grind exposed welds smooth and flush to match and blend with adjoining surfaces.

- D. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flathead (countersunk) screws or bolts.
- E. Provide for anchorage of type shown, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.
- F. Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware and similar items.
- G. 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.
- H. Fabricate joints which will be exposed to weather in a manner to exclude water or provide weep holes where water may accumulate.
- I. Shop Painting: Apply shop primer to surfaces of metal fabrications except those which are galvanized or as indicated to be embedded in concrete or masonry, unless otherwise indicated, and in compliance with requirements of SSPC-PA1 "Paint Application Specification No. 1" for shop painting.
- J. Stripe paint all edges, corners, crevices, bolts, welds and sharp edges.
- K. 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.

## 2.05 METAL LADDERS

A. General:

1. Comply with ANSI A14.3 unless otherwise indicated.
2. For elevator pit ladders, comply with ASME A17.1.

B. Steel Access Ladders: Side bars, rungs and bracket sizes as detailed on the Drawings. Rungs shall not exceed 12 inches on center. Fit rungs in centerline of side rails; plug-weld and grind smooth on outer rail faces:

1. Provide nonslip surfaces on top of each rung, either by coating rung with aluminum-oxide granules set in epoxy-resin adhesive or by using a type of manufactured rung filled with aluminum-oxide grout.
2. Secure ladders top, bottom and at 48-inches on center maximum.
3. Galvanize ladders, including brackets and fasteners.
4. Finish as specified in Section 09900 – PAINTING.

## 2.06 METAL BAR GRATINGS

A. Manufacturers: Subject to compliance with requirements, [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. All American Grating
2. IKG Industries; a division of Harsco Corporation.
3. Ohio Gratings, Inc.

B. Welded Steel Grating @ Elevator sump pit:

1. Bearing Bar Spacing: 1-3/16 inches o.c.
2. Bearing Bar Depth: 3/4 inch.
3. Bearing Bar Thickness: 1/8 inch.
4. Crossbar Spacing: 4 inches o.c.
5. Traffic Surface: Plain.
6. Steel Finish: Hot-dip galvanized with a coating weight of not less than 1.8 oz./sq. ft. of coated surface.

C. Grating Frames and Supports: Fabricate from metal shapes, plates, and bars of welded construction to sizes, shapes, and profiles indicated and as necessary to receive gratings. Miter and weld connections for perimeter angle frames. Cut, drill, and tap units to receive hardware and similar items.

1. Unless otherwise indicated, fabricate from same basic metal as gratings.

2. Equip units indicated to be cast into concrete or built into masonry with integrally welded anchors. Unless otherwise indicated, space anchors 24 inches o.c. and provide minimum anchor units in the form of steel straps 1-1/4 inches wide by 1/4 inch thick by 8 inches long.
- D. Finishes: Finish gratings, frames, and supports after assembly. Hot-dip galvanized items to comply with ASTM A 153 for steel and iron hardware and with ASTM A 123 for other steel and iron products.

## 2.07 STAIR NOSINGS

- A. Cast-Metal Units: Cast aluminum, with an integral-abrasive, as-cast finish consisting of aluminum oxide, silicon carbide, or a combination of both. Fabricate units in lengths necessary to accurately fit openings or conditions. **Provide single length at all exterior stair nosings.**
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. American Safety Tread Co., Inc; Style 801 with wing anchors.
    - b. or approved equal.
- B. **Concrete Nosings: Cross-hatched units, 4 inches wide with 1/4-inch lip, for casting into concrete steps**
- C. **Wood Stair Nosings: Aluminum channel with 1 inch tapered back, abrasive filler consisting of aluminum oxide and/or silicon carbide in an epoxy-resin binder. Design based on Babcock-Davis, Inc.; Model BSTRB, black with photoluminescent**

## PART 3 - EXECUTION

### 3.01 PREPARATION

- A. 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.
- B. 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

- 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. 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.

- C. Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch-up shop paint coat. Do not weld, cut or abrade the surfaces of units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.
- D. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work.

### 3.03 INSTALLING NOSINGS

- A. Center nosings on tread widths unless otherwise indicated.
- B. For nosings embedded in concrete steps or curbs, align nosings flush with riser faces and level with tread surfaces.
- C. Seal thresholds exposed to exterior with elastomeric sealant complying with Section 07920 - SEALANTS to provide a watertight installation.

### 3.04 GRATING INSTALLATION

- A. General: Install gratings to comply with recommendations of ANSI / NAAMM Metal Bar Grating Manual as applicable to grating types and bar sizes indicated, including installation clearances and standard anchoring details.
- B. Attach removable units to supporting members with type and size of clips and fasteners indicated or, if not indicated, as recommended by the referenced metal bar grating standards for type of installation conditions shown.
- C. Attach non-removable units to supporting members by welding where both materials are same; otherwise, fasten by bolting as indicated above

### 3.05 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

## SECTION 05720 - GUARDRAILS AND HANDRAILS

### PART 1 - GENERAL

#### 1.01 SUMMARY

##### A. Section Includes:

1. Aluminum handrails
2. Aluminum picket guardrails.
3. Miscellaneous attachments, anchors, and fasteners as indicated on the drawings or as required to conform to 2006 IBC as amended.

#### 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

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

1. ASTM B 209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
2. ASTM B 221 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bar, Rods, Wire, Profiles, and Tubes.
3. ASTM B 429 Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube
4. ASTM C 1048 Standard Specification for Heat Treated Flat Glass – Kind HS, Kind FT Coated and Uncoated Glass
5. ASTM C 1172 Standard Specification for Laminated Architectural Flat Glass
6. ASTM E 2358 Standard Specifications for the Performance of Glass in Permanent Glass Railing Systems, Guards and Balustrades

##### D. American Welding Society

1. AWS D1.2 - Structural Welding Code, Aluminum

##### E. NAAMM Metal Finishes Manual; National Association of Architectural Metal Manufacturers

#### 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.

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.
- 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. For each type of guardrail and handrail system, all component and fittings for that system shall be furnished by the same manufacturer.
- D. 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.
- E. Qualifications of Welders: Only welders certified in the arc welding process shall perform work in connection with the work in this Section.

#### 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 railing and handrail 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.
- D. Structural Analysis: For each type of guardrail system, submit structural calculations showing that the guardrails meet the performance requirements set forth in this section. Calculation shall be stamped and signed by an practicing engineer licensed in the State of Hawaii.
- E. Samples: Submit samples of the following in the quantity indicated:
  1. Three (3) 3-inch by 5-inch finish color
  2. One assembled sample of each type of railing systems, made from full-size components, including top rail, post, handrail, and infill. Show method of finishing members at intersections. Sample need not be full height.

#### 1.05 SYSTEM PERFORMANCES

- A. Delegated Design: Design railings, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:

1. Aluminum: The lesser of minimum yield strength divided by 1.65 or minimum ultimate tensile strength divided by 1.95.
- C. Structural Performance of Guardrails and Railings: Provide handrails and railings capable of withstanding structural loads required by the 2006 International Building Code as amended and ASTM E 985 but not less than the following structural loads without exceeding allowable design working stress of materials for handrails, railings, anchors, and connections based on testing performed in accordance with ASTM E 894 and ASTM E 935:
  1. Top Rail of Guards: Capable of withstanding the following loads applied as indicated:
    - a. Concentrated load of 200 pounds applied at any point and in any direction.
    - b. Uniform load of 50 pounds per linear foot applied horizontally and concurrently with uniform load of 100 pounds per linear foot applied vertically downward.
    - c. Concentrated and uniform loads above need not be assumed to act concurrently.
  2. Handrails Not Serving as Top Rails: Capable of withstanding the following loads applied as indicated:
    - a. Concentrated load of 200 pounds applied at any point and in any direction.
    - b. Uniform load of 50 pounds per linear foot applied in any direction.
    - c. Concentrated and uniform loads above need not be assumed to act concurrently.
  3. Infill Area of Guards: Capable of withstanding a horizontal concentrated load of 50 pounds applied to 1 square foot at any point in system, including panels, intermediate rails, balusters, or other elements composing infill area.
    - a. Load above need not be assumed to act concurrently with loads on top rails in determining stress on guard.
  4. Wind Loads: Design guardrails to withstand wind loads as determined by Chapter 6 of ASCE/SEI 7 "Minimum Design Loads for Buildings and Other Structures."
    - a. Exposure Category: Exposure C
    - b. Basic Wind Speed: 105 mph in 3-second gusts
    - c. Importance Factor: 1.0
- D. Thermal Movements: Provide handrails and railings that 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): 40 degrees F, ambient; 120 degrees F, material surfaces.
- E. Seismic Design Criteria: As determined by 2006 IBC.

1.06 PRODUCT HANDLING

- A. Protection: The Contractor shall use all means necessary to protect metal handrail and railing work before, during and after installation and to protect the installed work and materials of all other trades.
- B. 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.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Aluminum Bar and Tube: ASTM B 221, Alloy 6063-T5, 6063-T6, and 6063-T52.
- B. Aluminum Extruded Structural Pipe and Tube: ASTM B 429, Alloy 6063-T5, 6063-T6 and 6063-T52.
- C. Aluminum Plate and Sheet: ASTM B 209, Alloy 6061-T6.
- D. Aluminum Castings: ASTM B 26, A356-T6.

2.02 WELDING MATERIALS, FASTENERS, AND ANCHORS

- A. Welding Electrodes and Filler Metal: Provide type and alloy of filler metal and electrodes as recommended by producer of metal to be welded, complying with applicable AWS specifications, and as required for color match, strength, and compatibility in fabricated items.
- B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of the type, grade, and class required to produce connections that are suitable for anchoring railings to other types of construction indicated and capable of withstanding design loadings.
- C. Fasteners for Interconnecting Railing Components: Use fasteners of same basic metal as the fastened metal, unless otherwise indicated. Do not use metals which are corrosive or incompatible with materials joined.
  - 1. Provide concealed fasteners for interconnection of handrail and railing components and for their attachment to other work, except where otherwise indicated.
- D. Anchors and Inserts: Provide anchors of type, size as indicated in the Drawings, fabricated from corrosion-resistant materials, capable of sustaining without failure, a load equal to 6 times the load imposed when installed in unit masonry and equal 4 times the load imposed when installed in concrete, as determined by testing per ASTM E 488, conducted by a qualified, independent testing agency. Use expansion bolt devices for drilled-in-place anchors.

2.03 FABRICATION

- A. General: Fabricate handrails and railing systems to design, dimensions and details shown. Provide handrail and railing members in sizes and profiles indicated, with supporting posts and brackets of size and spacing shown, but not

less than required to comply with requirements indicated for structural performance.

1. The materials shall be fabricated as indicated on the contract drawings and as specified herein unless indicated otherwise by ADAAG Section 505 requirements. Where there is a discrepancy between the contract documents and ADAAG requirements, the Contractor shall immediately notify the Architect for direction, clarification and/or corrective measures. Standard products of manufacturers specializing in similar work will be considered insofar as they fulfill the requirements and do not violate governing codes for building and standards of good construction work.
- B. Machine joint edges smooth and plane to produce hairline seams when site assembled; supply concealed sleeve connectors for joints.
- C. 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.
- D. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain profile of member throughout entire bend without buckling, twisting, or otherwise deforming exposed surfaces of handrail and railing components..
- E. Welded Connections for Aluminum Pipe: Fabricate aluminum pipe handrails and railing systems for interconnection of members by concealed internal welds, which eliminate surface grinding, using manufacturer's standard system of sleeve and socket fittings.
- F. Nonwelded Connections: Fabricate railing systems and handrails for interconnection of members by means of railing manufacturer's standard concealed mechanical fasteners and fittings unless otherwise indicated. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
  1. Fabricate splice joints for field connection using epoxy structural adhesive where this represents manufacturer's standard splicing method.
- G. Brackets, Flanges, Fittings, and Anchors: Provide manufacturer's standard wall brackets, flanges, miscellaneous fittings, and anchors for interconnection of handrail and railing members to other work, unless otherwise indicated.
- H. Furnish inserts and other anchorage devices for connecting handrails and railing systems to concrete or masonry work. Fabricate anchorage devices which are capable of withstanding loadings imposed by handrails and railing systems. Coordinate anchorage devices with supporting structure.
- I. Screw base plate to bottom of posts from the underside of the plate into extruded screw-spline of the posts inner wall.
- J. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items
- K. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns, unless clearance between end of rail and wall is 1/4 inch or less.

- L. Provide weep holes, or another means to evacuate entrapped water in hollow sections of railing members that are exposed to exterior or to moisture from condensation or other sources. Fill voids below weep level with self leveling sealant to assure utility of weep holes.
- M. Fabricate joints that will be exposed to weather in a manner to exclude water.:
- N. Use materials of size and thickness shown or, if not shown, of required size and thickness to produce strength and durability in finished product. 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.
- O. Miscellaneous Framing and Supports:
  - 1. Provide miscellaneous framing and supports as required to complete railing and handrail 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.

#### 2.04 ALUMINUM FINISH

- A. Aluminum 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 two 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. Colors: To be selected by Architect

### PART 3 - EXECUTION

#### 3.01 PREPARATION

- A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as sleeves, concrete inserts, 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 all metal handrail and railing items.
- D. Examine the areas and conditions under which metal handrail and railing items 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. Install guardrail systems in accordance with manufacturer's recommended installation instructions and approved shop drawings.
- B. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing railings and handrails 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 railings and handrails. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels.
  - 1. Do not weld or abrade surfaces of handrails and railing 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.
  - 2. Set posts plumb within a tolerance of 1/4" inch in 12 feet.
  - 3. Align rails so that variations from level for horizontal members, parallel for aligned members, and rake for steps, ramps, and sloped members shall not exceed 1/4-inch in 12-feet.
- E. Field Welding: Comply with the following requirements:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing, and welded surface match contours of adjoining surfaces.
- F. Corrosion Protection: Coat concealed surfaces of aluminum, which will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint or zinc chromate primer.
- G. Adjust handrails and railing systems prior to anchoring to ensure matching alignment at abutting joints. Space posts at interval indicated but not less than that required by design loadings.

### 3.03 RAILING CONNECTIONS

- A. Non-welded Connections: Use manufacturer's standard mechanical or adhesive joints for permanently connecting railing components. Use wood blocks and padding to prevent damage to railing members and fittings. Seal recessed holes of exposed locking screws using plastic filler cement colored to match finish of handrails and railing systems.
- B. Welded Connections: Use fully welded joints for permanently connecting railing components by welding. Cope or butt components to provide 100 percent contact or use manufacturer's standard fittings designed for this purpose.



- C. Expansion Joints: Install expansion joints at locations indicated but not further apart than required to accommodate thermal movement. Provide slip joint internal sleeve extending 2 inches beyond joint on either side; fasten internal sleeve securely to one side; locate joint within 6 inches of post.

#### 3.04 ANCHORING POSTS

- A. Anchored Posts to Wood\_: Screw base plate to bottom of posts from the underside of the plate into extruded screw-spline of the posts inner wall. Bolt post and base plate assembly to wood structure with lag screws of size and type capable of attaining the structural performance required by these specifications and review and approved structural analysis .
- B. Coat base plate and portion of post to be covered by concrete topping with a heavy coat of bituminous paint. Paint coating on post to the height level with the finish height of the topping so as not to be visible after topping is in place.
- C. Anchor posts to metal surfaces with manufacturer's standard fittings designed for this purpose unless otherwise indicated.

#### 3.05 ATTACHING HANDRAILS TO WALLS

- A. Attach handrail to walls with wall brackets and end fittings. Provide bracket with 1-1/2-inch clearance from inside face of handrail to finished wall.
- B. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
- C. Secure wall brackets and wall return fittings to building construction as follows:
  - 1. For wood stud partitions, use hanger or lag bolts set into wood backing between studs. Coordinate with carpentry work to locate backing members.

#### 3.06 ADJUSTING AND CLEANUP

- A. Touch-Up Painting: Cleaning and touch-up painting of field welds, bolted connections, and abraded areas of shop paint is specified in Division 9 of these specifications.
- B. For galvanized surfaces: Clean field welds, bolted connections, and abraded areas and apply galvanizing repair paint to comply with ASTM A 780.

#### 3.07 PROTECTION

- A. Protect finishes of railing systems and handrails from damage during construction period by use of temporary protective coverings approved by railing 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.

#### 3.08 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. From time to time, 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

August 9, 2019

## DIVISION 6 - WOOD AND PLASTICS

### SECTION 06070 - WOOD TREATMENT

#### PART 1- GENERAL

##### 1.01 SUMMARY

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

##### 1.02 RELATED SECTIONS

- A. SECTION 06100 - ROUGH CARPENTRY: Lumber products needed to receive preservative and insecticide treatment of lumber products.

##### 1.03 REFERENCES

- A. American Wood-Preservers' Association
  - 1. AWPAP5: Standard for Waterborne Preservatives.
  - 2. AWPAP9: Standards for Solvents and Formulations for Organic Preservative Systems.
  - 3. AWPAPU1: Use Category System: User Specification for Treated Wood.
  - 4. AWPAPT1: Use Category System: Processing and Treatment Standard
  - 5. AWPAPM4-02: Care of Preservative-Treated Wood Products.

##### 1.04 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.
- E. Warranty: Submit written warranty as specified in paragraph entitled "WARRANTY" herein below.

1.05 REGULATORY REQUIREMENTS

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

1.06 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.

1.07 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.

1.08 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 Project Acceptance (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 Project Acceptance date.

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. Treating Solutions:
  - 1. Copper azole, Type A (CBA-A).
  - 2. Inorganic boron (SBX).
- B. Treatment Methods:
  - 1. General:
    - a. All water-borne treatment methods require incising of lumber of nominal 2-inch thickness (1-1/2 inches actual dimension).

- b. Choice of treatment method and conditions of use of each treating solution shall conform to the treatment schedule contained in Part 3.
- 2. CBA-A: Treatment methods, depth of penetration and treating solution retention shall conform to AWPA U1.
- 3. SBX: Treatment method shall conform to AWPA U1. Treating solution retention shall be a minimum of 0.28 pounds per cubic foot (equivalent to 0.42 DOT).
- C. Drying:
  - 1. Before Treatment:
    - a. CBA-A Treatment: Wood shall be air dried or kiln-dried before treatment to an average moisture content of 28 percent or less per AWPA standards.
    - b. SBX Treatment: Wood having a moisture content higher than 28 percent is acceptable when treating with SBX.
  - 2. After Treatment: All one-inch and 2-inch lumber and all plywood shall be dried to a moisture content of 19 percent or less after treatment.

#### 2.03 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 AWPA hydrocarbon solvent Type C, Standard P9, Paragraph 3.1.
  - 2. For interior application use low odor mineral spirits as solvent.
- B. Treatment Methods: Treated wood shall attain the following net retention requirements: 0.0175 pounds of Chlorpyrifos per cubic foot of wood, 0.035 pound of 3-iodo-2 propynyl butyl carbamate per cubic foot of wood.
- C. Drying:
  - 1. Before Treatment: All wood treated with oil-borne preservatives shall be kiln-dried to an average moisture content of 12 percent to 15 percent per AWPA standards.
  - 2. After Treatment: Wood shall be thoroughly dried and virtually odor-free prior to installation.

#### 2.04 PRESERVATION BY DIP TREATMENT

- A. Treating Solution:
  - 1. Any of the Oil-Borne Preservatives listed above.
  - 2. A solution of one-quart chlopyrifos in 55 gallons of a 0.50 percent IPBC solution.
- B. Treatment Methods:
  - 1. Immersion treat for a minimum period of 15 minutes.

2. Do not incise lumber scheduled to be left unpainted or receive a clear finish.
- C. Drying After Treatment: Wood shall be thoroughly dried and virtually odor-free prior to installation.

## 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-A treatment which is acceptable for hem-fir species only.
- B. Application:
  1. Pressure Treatment:
    - a. General: Unless otherwise stipulated, all lumber and plywood shall be pressure treated.
    - b. Hardwood flooring and exposed lumber 1-1/2 inch (net thickness) and over that will be unpainted or receive a clear finish shall be and pressure treated with oil-borne preservative. Do not incise lumber.
    - c. SBX treated wood shall not be used in areas exposed to direct precipitation (e.g. exterior deck sub-framing, trellises, fencing, etc.) unless painted or covered with a finish material. SBX treatment shall not be used for exposed exterior wood decking.
  2. Dip Treatment: All finish lumber under 1-1/2-inch net thickness (except hardwood flooring); doors (solid wood and solid-core flush wood doors); finish plywood; and mill work items, such as for cabinet work, shelving and similar wood work that will be exposed to view in the finished work.
  3. Field Cuts: Treat end cuts, notches and penetrations into treated lumber or plywood. Exception: Cuts and penetrations made in SBX treated wood 2-inches or less in nominal thickness need not be field treated.

END OF SECTION

DIVISION 6 – WOOD AND PLASTICS

SECTION 06100 – ROUGH CARPENTRY

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in SECTION 01019 – GENERAL SPECIFICATIONS.

1.02 GENERAL REQUIREMENTS

Provide all rough carpentry, complete, including but not limited to wall studs, eave framing, roof rafters, rough bucks, blocking, furring strips, performance rated wood I-Joists, metal framing anchors, and rough hardware.

1.03 QUALITY ASSURANCE

- A. Grading Marks: Factory mark each piece of lumber 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.
- B. Wood Preservative Treatment: In accordance with SECTION 06311 – PRESERVATIVE TREATED LUMBER.

1.04 SUBMITTALS

- A. 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.
- B. 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.
- C. Product data and ICC Evaluation Reports: Engineered wood products, underlayments, insulating sheathing, air-infiltration barriers, metal framing anchors, and construction adhesives.
- D. Shop Drawings and Calculations: For Wood I-Joists submit shop drawings and structural calculations prepared by or under the supervision of a qualified professional engineer. Show fabrication and installations details for wood I-Joists.
  - 1. Shop drawings shall show location, pitch, span configuration, and spacing for each type of wood I-Joists required.
    - a. Indicated sizes, stress grades, and species of lumber.
  - 2. For installed products indicated to comply with design loads, include



structural analysis data signed and sealed by the qualified professional engineer currently licensed in the State of Hawaii responsible for their preparation.

- a. Structural analysis shall include joist hanger calculations indicating type and size.

#### 1.05 PRODUCT HANDLING

Delivery and Storage: Keep materials dry at all times. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber and provide air circulation within stacks.

#### 1.06 JOB CONDITIONS

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

### PART 2 - PRODUCTS

#### 2.01 MATERIALS

##### A. Lumber, General:

Factory-mark each piece of lumber with type, grade, mill and grading agency, except omit marking from surfaces to be exposed with transparent finish or without finish.

Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by PS 20, for moisture content specified for each use.

1. Provide dressed lumbers, S4S, unless otherwise indicated.
2. Provide seasoned lumber with 15% maximum moisture content at time of dressing.

##### B. Framing Lumber:

1. Light Framing Lumber: 2 inches through 4 inches thick, less than 6 inches wide, such as studs, plates, blocking, rough bucks, furring, etc., provide Construction grade, Douglas Fir/Larch.
2. For structural framing 2 inches through 4 inches, less than 6 inches and wider, provide No.1 grade, Douglas Fir, (WCLB or WWPA).
3. For exposed structural 4 x 12 or 4 x16 members for fascias and security trellis, provide Select Structural Grade Douglas Fir, rough sawn, including all exposed edges and faces.

4. For exposed 3 inch x 3inch net Doulgas Fir members, provide Select Grade, vertical grain, resawn.
- C. Structural Members: For rafters, provide No. 1 Grade, Douglas Fir/Larch for 6 inches and wider beams and other members, provide No. 1 grade.
- D. Composite Decking: Termite resistant spaced decking for exterior decks. Mechanical clip to floor framing below, revise/provide joist spacing as needed per decking manufatuer reccomendations. Design based on Resysta or approved equal
- F. Glue Laminated Beams:
  1. All Glue Laminated (GLULAM) beams shall be douglas fir 2400F Series, with exterior type adhesive.
  2. All concealed beams shall be industrial grade. All exposed beams shall be appearance grade.
  3. All GLULAM beams shall display an AITC quality stamp certifying compliance with voluntary product standard PS-56.
  4. All GLULAM beams shall be provided with a standard camber based on a 2400 foot radius, unless noted otherwise.
- G. Plywood:
  1. Plywood roof Sheathing: PS 1, Grade Structural I, with T&G edges for thicknesses 3/4" or greater; thickness as shown on drawings.
  2. Softwood Plywood: Comply with U.S. Product Standard PS I-74 for softwood plywood, Group 1, Douglas Fir, Exterior Grade only.
    - a. A-B Grade: Where on one side only.
    - b. C-C Grade: Where used at gutters, or fully concealed.
    - c. Provide rough sawn Douglas Fir plywood where shown, Grade A-C.
- H. Miscellaneous Materials:
  1. Fasteners and Anchorages: Provide size, type, material and finish as indicated and as recommended by applicable standards, complying with applicable Federal Specifications and ANSI for nails, staples, screws, bolts, nuts, washers and anchoring devices. Provide metal hangers and framing anchors of the size and type recommended by the manufacturer for each use including recommended nails. Provide all fasteners and anchorages with hot-dip zinc coating (ASTM A 153).
  2. Moisture Barrier: 30-lbs. roofing felt, asphalt saturated, ASTM D 226.

3. Bronze Wire Cloth: 14 x 14 mesh, 0.020 inch wire thickness; for continuous soffit vents.
4. I-Joist Hangers: U-shaped joist hangers with 2-inch long seat and 1-1/4-inch wide nailing flanges full depth of joist. Nailing flanges provide lateral support at joist top chord. Manufactured by Simpson Strong Tie.
  - a. Metal thickness: As required to meet structural loading and performance

## 2.02 WOOD TREATMENT

Treat all rough lumber in accordance with SECTION 06311 – PRESERVATIVE TREATED LUMBER.

## 2.03 FIRE RETARDENT TREATMENT

As specified in SECTION 06311 - PRESERVATIVE TREATED LUMBER.

# PART 3 - EXECUTION

## 3.01 INSTALLATION

- A. General: Discard units of 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 joints arrangement.

1. Set carpentry work accurately to required levels and lines with members plumb and true and accurately cut and fitted.
2. Securely attach carpentry work to substrate by anchoring and fastening as shown as required by recognized standards. Countersink nail heads on exposed carpentry work and fill holes.
3. 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 of wood; predrill as required.

- B. Wood Framing, General:

1. Provide framing members of sizes and on spacings shown, and frame openings as shown, or if not shown, comply with recommendations of 'Manual for House framing' of National Forests Products Association. Do not splice structural members between supports.
2. Anchor and nail as shown, and to comply with 'Recommended Nailing Schedule' of 'Manual for House Framing' and other recommendations of the N.F.P.A..

3. Provide moisture barrier below all wood plates resting on concrete or masonry.
- C. Wood Blocking, Rough Bucks, and Furring Strips: Provide wherever shown and where required for attachment of other work. Form to shapes as shown and cuts as required for true line and level of work to be attached. Coordinate location with other work involved. Attach substrates as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise shown.
- E. Retreat cut and penetrated lumber in accordance with SECTION 06311 – PRESERVATIVE TREATED LUMBER.

END OF SECTION

## 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. All finish carpentry work, blocking, etc.
  - 2. Interior wood trim.
  - 3. Millwork.
  - 4. Rough hardware.
  - 5. Exterior wood trims
  - 6. Install wood doors, finish hardware, built-in equipment, and any other items specified to be installed under this section but furnished under other sections of these specifications.
- B. Related Work Specified Elsewhere:
  - 1. Section 06070 – WOOD TREATMENT - Preservative treatment.
  - 2. Section 06100 - ROUGH CARPENTRY - Wood blocking and concealed framing.
  - 3. Section 07460 – FIBER CEMENT SIDING for exterior trims
  - 4. Section 09652 – RESILIENT FLOORING for interior floor base trim
  - 5. Section 09900 - PAINTING.

#### 1.02 REFERENCES

- A. Architectural Woodwork Standards: 2014 AWI, AWMAC, WI – “Architectural Woodwork Standards, 2<sup>nd</sup> Edition” (AWS).

#### 1.03 QUALITY ASSURANCE

- A. Architectural Woodwork Standards: Unless otherwise indicated, comply with 2014 AWI, AWMAC, WI – “Architectural Woodwork Standards, 2<sup>nd</sup> Edition” 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. 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.

- D. Hardwood Lumber Standard: Comply with National Hardwood Lumber Association (NHLA) rules.
- E. Plywood Standards: Comply with U.S. Department of Commerce PSI for softwood plywood; PS 51 for hardwood plywood.
  - 1. Manufacture plywood panels with an exterior-type adhesive complying with ASTM D 2559 and containing no urea formaldehyde.
- F. Qualifications of Manufacturer: Millwork used in work of this section shall be produced by manufacturers or custom millwork shops regularly engaged in manufacturing of similar items and with a minimum 5-year history of successful production acceptable to the Architect.
- G. Qualifications of Installers: Use adequate number of skilled workmen who are thoroughly trained and experienced in necessary crafts and who are completely familiar with specified requirements and methods needed for proper performance of work of this section.

#### 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.
- 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, 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
  - 3. Submit shop drawings for the following:
    - a. Millwork.
    - b. Exterior wood trim
- D. Samples: Submit samples of the following:
  - 1. Hardwood trim (provide half of each piece with finish as specified under Section 09900 - PAINTING).
  - 2. 12-inch long sample for each exterior wood trim with specified finish.
- 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. Material Safety Data Sheet (MSDS): Submit MSDS for each material.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Protect finish carpentry materials during transit, delivery, storage and handling to prevent damage, soiling and deterioration.
- B. 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.
- C. Store materials away from threat of termite or other insect infestation.

1.06 PROJECT CONDITIONS

- A. Field measurements: Where millwork 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 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. Interior Finish Carpentry:
    - a. Do not install finish carpentry until required temperature and relative humidity have been stabilized and will be maintained in installation areas.
    - b. Condition spaces for a minimum of 48 hours within occupant usage temperature and humidity ranges during the remainder of work.
  - 2. Exterior Finish Carpentry:
    - a. Weather Limitations: Proceed with installation only when existing and forecast weather conditions permit work to be performed and at least one coat of specified finish can be applied without exposure to rain or dampness.
    - b. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.
      - 1) Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
      - 2) Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

## PART 2 - PRODUCTS

### 2.01 MATERIALS

#### 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.

#### B. Exterior Finish Carpentry:

1. Exterior Wood Fascia and Trims: Treated Douglas-fir, Prime grade; surfaced NLGA, WCLIB, or WWPA in sizes as indicated.
  - a. Finish: Painted finish as specified in Section 09900 – PAINTING under Exterior Painting, Painted Finish Wood. Provide samples for each sheen (Satin and Semi-Gloss) for selection and approval by Architect prior to finishing.

#### C. Interior Finish Carpentry

1. Solid lumber shall be milled to profiles indicated of hardwood.
2. Hardwood, FAS, kiln dried plain sawn poplar or birch for painted finish.
3. Finish Plywood: As scheduled, minimum Grade A-C (plugged) where one face exposed and Grade A-A where both faces exposed, book matched veneer.

#### D. 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.

#### E. 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.

#### F. Wood Treatment: Treat lumber in accordance with Section 06070 – WOOD TREATMENT.



- G. 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.

## 2.02 FABRICATION

- A. Millwork shall be fabricated at the mill shop in accordance with detailed drawings, in as large units as practicable for shipment and introduction into permanent position in an orderly arrangement for neat and rigid field assembly. All units when erected in place shall be straight, square, plumb, level and free from damage and tool marks. All joints shall be made up with waterproof glue. Nails and screws shall be placed in concealed surfaces to the maximum extent possible. Particleboard core shall not be used.

## 2.03 FINISHING

- A. Wood Scheduled for Paint finish: Leave in paint ready condition to be field finished in accordance to Section 09900 – PAINTING.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

- 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 1/16-inch maximum offset in flush adjoining 1/8-inch maximum offsets in revealed adjoining surfaces.
- C. Scribe and cut work to fit adjoining work, and refinish cut surfaces or repair damaged finish at cuts.
- D. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum lengths of lumber available) to the greatest extent possible. Stagger joints in adjacent and related members. Cope at returns, miter at corners, to produce tight fitting joints with full surface contact throughout length of joint. Use scarf joints for end-to-end joints. Sand smooth for imperceptible joints. Make exterior joints water-resistant by careful fitting.
- E. 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.

3.02 ADJUSTMENT, CLEANING, FINISHING AND PROTECTION

- A. 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.
- B. Clean millwork on exposed and semi-exposed surfaces. Touch-up shop-applied finishes to restore damaged or soiled areas.
- C. Protection: Installer of architectural casework shall advise Contractor of procedures required to protect architectural casework during remainder of construction period to ensure that work will be without damage or deterioration at time of acceptance.

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. Finished Hardwood Casework
- B. Related Work Specified Elsewhere:
  - 1. Section 06100 - ROUGH CARPENTRY - Wood blocking and concealed framing.
  - 2. Section 06200 – FINISH CARPENTRY
  - 3. Section 06600 – SOLID SURFACING COUNTERTOPS for countertops and window stools
  - 4. Section 09900 – PAINTING

#### 1.02 REFERENCES

- A. Architectural Woodwork Standards: 2014 AWI, AWMAC, WI – “Architectural Woodwork Standards, 2<sup>nd</sup> Edition” (AWS).
- B. "2010 ADA Standards for Accessible Design"

#### 1.03 QUALITY ASSURANCE

- A. Architectural Woodwork Standards: Unless otherwise indicated, comply with 2014 AWI, AWMAC, WI – “Architectural Woodwork Standards, 2<sup>nd</sup> Edition 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. 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.
- D. Hardwood Lumber Standard: Comply with National Hardwood Lumber Association (NHLA) rules.
- E. Plywood Standards: Comply with U.S. Department of Commerce PS 1 for softwood plywood; PS 51 for hardwood plywood.
- F. 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.

- G. 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.
- H. 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 Quality Standards for the quality indicated to include materials, tolerances, and types of construction.
- C. Shop Drawings: Submit shop drawings showing all fabricated 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. Shop drawing casework items shall be clearly cross-referenced to casework items located on the project drawings. Shop drawings shall include a color schedule of all casework items to include all countertop, exposed, and semi-exposed cabinet finishes to include finish material manufacturer, pattern, and color.
- D. Samples: Submit samples of the following:
  - 1. Hardwood trim provide half of each piece with finish as specified in this section
  - 2. For each type of plastic laminate submit (3) 12-inch square samples.
  - 3. Exposed cabinet hardware, one unit of each type and finish.
  - 4. Cabinet liner.
- E. Material Safety Data Sheet (MSDS): Submit MSDS for each material.

#### 1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Protect finish carpentry materials during transit, delivery, storage and handling to prevent damage, soiling and deterioration.
- 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 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 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.
- B. Solid lumber stock: Comply with AWS Section 3 - Lumber for grading rules.
  - 1. Softwood for concealed structures and supports: Custom Grade, western pine.
  - 2. Exposed hardwood for transparent/stained finish:

- a. Species cut and finish as scheduled on the Interior Design Drawings.
- C. Plywood
  - 1. Softwood plywood for concealed structures and supports: AWS Section 4.2b, Grade A; Douglas Fir.
  - 2. Veneer-Faced Panel Products (Hardwood Plywood) for panels: HPVA HP-1, AWS Section 4.2a, grade as specified:
    - a. Species cut and finish as scheduled on the Interior Design Drawings.
  - 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 for Flush Cabinet Doors: ANSI A208.2, Grade MD made with binder containing no urea formaldehyde.
- E. Hardboard: AHA A135.4.
- F. Laminate for Semi-Exposed Surfaces of Cabinets: Plastic laminates shall meet the requirements of NEMA LD 3 and ANSI A161.2 for high-pressure decorative laminates.
  - 1. Interior surfaces of cabinets, drawer sides, backs and door backs shall be CLS cabinet liner grade where indicated. Cabinet liner standard grade plastic laminate shall be 0.020 inches in thickness.
  - 2. Drawer Bottoms: Tempered Hardboard.
- G. Concealed Backs of Panels with Exposed Laminate Surfaces: High-pressure decorative laminate, Grade BKL.
- H. 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.
- I. 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.

## 2.02 CASEWORK; HARDWOOD

- A. Quality standard: Comply with AWS Section 10 - "Casework".
- B. Wood casework for Plastic Laminate finish: simulated wood stained finish
  - 1. Grade: Custom grade.
  - 2. Construction: Flush overlay.
- C. Exposed surfaces: Plastic Laminate, unless otherwise noted.
  - 1. Drawer Fronts: Plastic Laminate

- D. Semi-Exposed Surfaces: Cabinets shall have CLS cabinet liner grade.

## 2.03 HARDWARE

- A. Submit one sample of each cabinet hardware item specified to include hinges, pulls, and drawer glides. All hardware shall conform to ANSI/BHMA A156.9, unless otherwise noted, and shall consist of the following components:
- B. Door Hinges
  - 1. Self-closing type, BHMA No. B01602.
- C. Cabinet Pulls
  - 1. Wire type, BHMA No. B02011.
- D. Drawer Slide
  - 1. Side mounted self-closing type, BHMA No. B05051 with full extension and a minimum 75-pound load capacity. Slides shall include an positive stop to avoid accidental drawer removal. Cabinet Hardware: stainless steel bar or loop pulls.

## 2.04 FABRICATION

- A. Cabinet Grade: Unless otherwise indicated, provide Custom-grade cabinets complying with AWS Section 10 - "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. Ease edges to radius indicated for the following:
  - 1. Corners of Cabinets and Edges of Solid-Wood (Lumber) Members and Rails: 1/16 inch.
- 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.
  - 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.

## 2.05 CABINET FABRICATION

### A. Door Construction:

#### 1. Flush Doors

- a. Core: 3/4-inch medium density fiberboard.
- b. Finish: Plastic Laminate

### B. Drawer Construction

#### 1. Drawer Fronts:

- a. Hardwood Cabinets: 3/4-inch- medium density fiberboard with plastic laminate on both faces with matching wood veneer edge banding.
- 2. Sides, back and sub-front: 1/2-inch medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1 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:

- a. Hardwood Cabinets: 3/4-inch thick plywood overlaid on exposed faces with high pressure plastic laminate with matching wood veneer 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 marine grade plywood overlaid with high pressure plastic laminate with PVC edge banding.

### E. Shelves: Marine grade 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 marine grade plywood overlaid with high pressure plastic laminate with PVC edge banding.

### G. Cabinet Bases:

- 1. Hardwood Cabinets: Constructed from 3/4-inch thick hardwood plywood.
- 2. Heights as indicated on the Drawings.

### H. Filler and Soffit Panels:



1. Hardwood Cabinets: Constructed from 3/4-inch thick hardwood plywood.

## 2.06 FACTORY FINISHING OF INTERIOR ARCHITECTURAL WOODWORK

- A. General: The entire finish of interior architectural woodwork is work of this section, regardless of whether factory-applied or applied after installation.
  1. Factory finishing: To the greatest extent possible, finish architectural woodwork at factory. Defer only final touch-up, cleaning and polishing for time after delivery and installation.
- B. Preparations for finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing of concealed surfaces and similar preparations for finishing of architectural woodwork, as applicable to each unit of work.

## 2.07 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 (Selected from Manufacturers standard colors to match Corian Fossil): Products described in this Section are products of 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, or Corian Fossil for counters.
  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.
    - a. Height: As indicated on the Drawings.
    - b. Top-Edge-Detail: As Detailed.
  6. Joint Adhesive: Manufacturer's standard one- or two-part adhesive kit to create inconspicuous, nonporous joints.
  7. Sealant: Manufacturer's standard mildew-resistant, FDA-compliant, NSF 51-compliant (food zone — any type), UL-listed silicone sealant in colors matching components.

## 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. Comply with AWS Section 10 - "Casework".
  - 1. Grade: Custom.
- B. 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.
- C. Scribe and cut woodwork to fit adjoining work. Refinish cut surfaces or repair damaged finish at cuts.
- D. 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.
- E. 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.
- F. 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 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.
- 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 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. SAFB and Thermal batt insulation for exterior walls and underside of roof.
  - 2. Acoustical batt insulation for interior partitions and ceilings

#### 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. Underside of Roof: Shall have a minimum R-value of 30.
  - 2. Exterior Walls: Shall have a minimum R-value of 13.
- C. Acoustical Wall & Ceiling 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. Noise Reduction Coefficient (NRC) shall be not less than 0.90 for 2-1/2 inch stud cavity, and not less than 1.05 for 3-1/2 inch stud cavity unless partitions ratings indicate otherwise. NRC values as determined in accordance with ASTM C 423.
  - 1. Minimum Thicknesses and Weight:
    - a. Wall Assemblies: 3-1/2-inches minimum
    - b. Ceiling Assemblies: 5-1/2-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 0.90 for 2-1/2-inch stud cavity, and not less than 1.05 for 3-1/2 inch stud cavity unless partitions ratings indicate otherwise. NRC values as determined in accordance with ASTM C 423.

1. Acceptable Manufacturer:
  - a. 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:
- F. Rock Wool: 75 percent slag
- G. 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.

### 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 07250 - WEATHER BARRIERS

### PART 1 - GENERAL

#### 1.01 SUMMARY

- A. Section Includes:
  - 1. Weather Barrier membrane and accessories.
  - 2. Flexible flashing.
- B. Related Requirements:
  - 1. Section 07460 – FIBER CEMENT SIDING
  - 2. Section 07910 – FAÇADE SEALANTS
  - 3. Section 09220 – CEMENT PLASTER

#### 1.02 PERFORMANCE REQUIREMENTS

- A. Weather barrier shall be capable of performing as a continuous vapor-permeable air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.
- B. Weather barrier shall be joined in an airtight and flexible manner to the air barrier material of adjacent systems, allowing for the relative movement of systems due to thermal and moisture variations and creep.
- C. Weather barrier shall have an air permeability not to exceed 0.004 cfm/sq. ft. under a pressure differential of 0.3 in. water. (1.57 psf) (equal to 0.02L/sq. m @ 75 Pa), when tested in accordance with ASTM E 2178.
- D. Water Vapor Permeance, ASTM E96: Not less than 15 perms
- E. Water Resistance, ICC AC 38: Pass.

#### 1.03 SUBMITTALS

- A. Product Data: Include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; and tested physical and performance properties of weather barrier.
- B. Shop Drawings: Show locations and extent of weather barrier. Include details for substrate joints and cracks, counterflashing strip, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
  - 1. Include details of interfaces with other materials that form part of weather barrier.
  - 2. Include details of mockups.



- C. Product Certificates: For weather barriers, certifying compatibility of weather barrier and accessory materials with Project materials that connect to or that come in contact with weather barrier; signed by product manufacturer.
- D. Qualification Data: For Applicator.
  - 1. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for weather barriers.
- E. Samples: Weather Barrier membrane, minimum 12 inches square.
- F. Quality Assurance Submittal: Provide manufacturer's written installation instructions.
- G. Evaluation Reports: For water-resistive barrier and flexible flashing, from ICC-ES.

#### 1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications
  - 1. Weather barrier systems shall be manufactured and marketed by a firm with a minimum of 20 years' experience in the production and sales of waterproofing, air and weather barriers.
  - 2. Manufacturers proposed for use, but not named in these specifications shall submit evidence of ability to meet all requirements specified and include a list of projects of similar design and complexity completed within the past five years.
- B. Installer Qualifications
  - 1. Installer shall have minimum five (5) years experience with installation of similar weather barrier assemblies under similar conditions.
  - 2. Installation shall be in accordance with manufacturer's installation guidelines and recommendations.
  - 3. Source Limitations: Provide weather barrier and accessory materials produced by single manufacturer.
- C. Single source responsibility: Obtain materials for weather barrier membrane systems from either a single manufacturer or from manufacturers approved by the system manufacturer as being compatible with other system components.
- D. Preconstruction Coordination:
  - 1. Requirement: Coordinate installation of work of this Section with installation of work with primary overlayment material, flashing, sheet metal and base substrate installers. Secure written documentation of the method of anchorage through underlayment agreeable to all installers.
  - 2. Penetration Coordination: Underlayment Manufacturer to accept standard fastening requirements of each overlayment material of each Manufacturer as a condition of their Bid for this Project. Preconstruction coordination is to confirm standard anchorage required for Project, limitation of anchorage only when specified performances are not jeopardized, and agreement to fastening for non-standard conditions.



- E. Mockups: Before beginning installation of weather barrier, provide weather barrier work for exterior wall assembly mockups, incorporating backup wall construction, external cladding, window, door frame and sill, insulation, and flashing to demonstrate surface preparation, crack and joint treatment, and sealing of gaps, terminations, and penetrations of air barrier membrane.
  - 1. Coordinate construction of mockup to permit inspection by the Architect before cladding system is installed.
  - 2. If the Architect determines mockups do not comply with requirements, reconstruct mockups and apply weather barrier until mockups are approved.
- F. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work. Pre-installation conference shall include the Owner or Owner's Representative, Contractor, Installer, Architect, and system manufacturer's field representative.

#### 1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver weather barrier materials and components in manufacturer's original, unopened, undamaged containers with identification labels intact.
- B. Store weather barrier materials as recommended by system manufacturer.
- C. Protect from damage from sunlight, weather, excessive temperatures and construction operations. Remove damaged material from the site and dispose of in accordance with applicable regulations

#### 1.06 PROJECT CONDITIONS

- A. Environmental Limitations: Apply weather barrier within the range of ambient and substrate temperatures recommended by weather barrier manufacturer. Protect substrates from environmental conditions that affect performance of weather barrier. Do not apply weather barrier to a wet substrate or during rain, fog, or mist.

#### 1.07 SCHEDULING

- A. Review requirements for sequencing of installation of weather barrier assembly with installation of windows, doors, louvers and flashings to provide a weather-tight barrier assembly.

#### 1.08 WARRANTY

- A. Submit manufacturer's warranty that weather barrier and accessories are free of defects at time of delivery and are manufactured to meet manufacturer's published physical properties and material specifications.
- B. Warranty Period: Five years from the Project Acceptance date of the weather barrier membrane installation.
- C. The Surety and the Contractor shall not be held liable beyond two years from the Project Acceptance date.

## PART 2 - PRODUCTS

### 2.01 WATER-RESISTIVE BARRIER

- A. A self-adhered membrane consisting of a breathable carrier film with a specially designed adhesive, which permits the transfusion of water vapor and provides superior protection against the damaging effects of air and water ingress on building structures. Provide primer for adjoining concrete or masonry surfaces to receive underlayment.
1. Products: Subject to compliance with requirements, provide the following:
    - a. Blueskin VP160, Henry Company.
    - b. Perm-A-Barrier VPS; Grace Construction Products.
    - c. 705 VP; Carlisle Coatings and Waterproofing
    - d. Sopraseal Stick VP; Soprema
    - e. or approved equal.
  2. Membrane Physical Properties:
    - a. Weather barrier shall have an air permeability not to exceed 0.004 cfm/sq. ft. under a pressure differential of 0.3 in. water. (1.57 psf) (equal to 0.02L/sq. m @ 75 Pa), when tested in accordance with ASTM E 2178
    - b. Water vapor permeance for this material shall not be less than 10 perms when tested in accordance with ASTM E 96 (Method A)
    - c. Water Resistance: No water penetration when tested in accordance with ICC AC 38.
  3. Allowable UV Exposure Time: Not less than three months.

### 2.02 MISCELLANEOUS MATERIALS

- A. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 20 mils.
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. Blueskin VP160, Henry Company
    - b. Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Perm-A-Barrier Detail Membrane.
    - c. 705 VP; Carlisle Coatings and Waterproofing
    - d. Soprema; Sopraseal Stick 1100T
- B. Primer for Flexible Flashing: Product recommended by manufacturer of flexible flashing for substrate.

- C. Weather Barrier Sealant: Joint sealant (**JS-02**) as specified in Section 07910 – FAÇADE SEALANTS for use with weather barrier membranes.

### PART 3 - EXECUTION

#### 3.01 EXAMINATION

- A. Verify that substrates and conditions are ready to accept the Work of this section. Notify the Contracting Officer in writing of any discrepancies. Commencement of the Work or any parts thereof shall mean acceptance of the prepared substrates.
- B. All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar or other contaminants detrimental to the adhesion of the membranes. Fill voids, gaps and spalled areas in substrate to provide an even plane. Strike masonry joints full-flush.

#### 3.02 SURFACE PREPARATION

- A. Refer to manufacturer's literature for requirements for preparation of substrates. Surfaces shall be 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 that are acceptable to manufacturer of the weather barrier assembly.
- B. Masonry Substrates: Apply weather barrier over concrete block with smooth trowel-cut mortar joints, struck full and flush. Fill all voids and holes, particularly in the mortar joints, with a lean mortar mix, non-shrinking grout or parge coat.
- C. Treat construction joints and install all flashings and accessories that interface with the weather barrier membrane as detailed and recommended by manufacturer.
- D. Clean, prepare, treat, and seal substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air barrier application.
- E. Remove excess mortar from masonry ties, shelf angles, and other obstructions.
- F. At changes in substrate plane, apply sealant at sharp corners and edges to form a smooth transition from one plane to another.
- G. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for weather barrier.

#### 3.03 WEATHER BARRIER MEMBRANE INSTALLATION

- A. Install weather barrier membrane in accordance with the membrane manufacturer's recommendations and installation instructions to achieve a continuous weather barrier.
- B. Install weather barrier membrane as follows:

1. Install weather barrier to dry surfaces at air and surface temperatures of 40°F and above in accordance with manufacturer's recommendations, at locations indicated on Construction Documents.
2. Prime substrate to receive weather barrier membrane as required per manufacturers written instructions.
3. Precut pieces of weather barrier into easily handled lengths.
4. Remove release linear and position membrane carefully before placing against the surface.
5. Begin installation at the base of the wall placing top edge of membrane immediately below any masonry reinforcement or ties protruding from substrate.
6. When properly positioned, place against surface by pressing firmly into place. Roll membrane with extension-handled countertop roller immediately after placement.
7. Overlap adjacent pieces 2-inches and roll seams.
8. Subsequent sheets of membrane applied above shall be positioned immediately below masonry reinforcement or ties. Bottom edge shall be slit to fit around reinforcing wires or ties, and membrane shall overlap the membrane sheet below by 2-inches. Roll firmly into place.
9. Seal around masonry reinforcing or ties and all penetrations with penetration & termination sealant.
10. Coordinate the installation of air barrier with roof installer to ensure continuity of membrane with roof air barrier.
11. At end of each working day seal top edge of weather barrier to substrate with termination sealant.
12. Do not expose weather barrier membrane to sunlight for more than 150 days prior to enclosure.
13. Inspect installation prior to enclosing and repair punctures, damaged areas and inadequately lapped seams with a patch of the membrane sized to extend 6-inches in all directions from the perimeter of the affected area.

#### 3.04 FLEXIBLE FLASHING AND TRANSITION MEMBRANE INSTALLATION

- A. Install flashing strips, transition membrane, and auxiliary materials according to weather barrier manufacturer's written instructions to form a seal with adjacent construction and maintain a continuous weather barrier. Install all transition membrane only after application of weather barrier.
- B. Apply primer to substrates to receive transition membrane at required rate and allow to dry. Limit priming to areas that will be covered by transition tape in same day. Re-prime areas exposed for more than 24 hours.
- C. Prime glass-fiber-surfaced exterior gypsum sheathing not covered with weather barrier membrane material with number of prime coats needed to achieve required bond, with adequate drying time between coats.

- D. Connect and seal exterior wall weather barrier membrane continuously to roofing membrane, concrete below-grade structures, floor-to floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.
- E. At end of each working day, seal top edge transition membrane to substrate with termination sealant.
- F. Apply joint sealants forming part of weather barrier assembly within sealant manufacturer's recommended application temperature ranges. Consult sealant manufacturer when sealant cannot be applied within these temperature ranges.
- G. Wall Openings: Prime concealed perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition membrane so that a minimum of 3 inches of coverage is achieved over both substrates.
- H. Transition Membrane: Roll firmly to enhance adhesion.
- I. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, and doors, and miscellaneous penetrations of air barrier membrane sealant.
- J. Repair punctures, voids, and deficient lapped seams in transition membrane. Slit and flatten fish-mouths and blisters. Patch with transition membrane extending 6 inches beyond repaired areas in strip direction.

### 3.05 CLEANING AND PROTECTION

- A. Protect weather barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.
- B. Protect weather barrier from exposure to UV light and harmful weather exposure as required by manufacturer. Remove and replace weather barrier membrane exposed for more than 150 days.
- C. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended by manufacturer of affected construction.
- D. Remove masking materials after installation.

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 06100 – ROUGH CARPENTRY
  - 2. Section 07322 – CONCRETE ROOF TILES
  - 3. Section 07541 – TPO MEMBRANE ROOFING
  - 4. Section 07600 – FLASHING AND SHEET METAL

#### 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 2006 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. Project Wind Speed: 105 mph in 3-second gusts, Exposure B.

2. Topographic Factor: 1.20
3. Wind Directionality Factor: 0.75
4. Importance Factor: 1.0
- 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 6.24 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: The system shall be capable of withstanding thermal movement based on a temperature range of 10 degrees F below design low air temperature and 180 degrees F.

### 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. Field roll forming of roof panels, however, shall be performed by the manufacturer's own crews.
  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.

- 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 of 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 Architect's review and acceptance. Demonstrate proposed junctions of roofing system with various roof elements and related accessories indicated on the Drawings. At Architect's 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 Architect's acceptance is obtained. Match accepted mockup in subsequent installations. At the Architect's 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 Architect 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.
  - b. Calculations that are wet stamped by a duly licensed professional engineer. 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.
  - 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 uplift forces.
3. Samples: Furnish 12-inch long samples of full width panel materials and samples of all other materials to be used to Architect for approval.
4. Test Reports: Provide test data demonstrating structural capacity, wind uplift and resistance to water infiltration performance as specified.
5. Manufacturer's Technical Representative's Reports: Submit copies of all reports to the Architect.
6. Warranty: Submit warranty as noted under paragraph entitled "WARRANTY".

#### 1.05 WARRANTY

- A. Special Warranty: Manufacturers standard form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane 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: 20 years from 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 manufacturers 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 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.

#### 1.06 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.

## PART 2 - PRODUCTS

### 2.01 MANUFACTURERS

- A. Basis of Design Product: The product indicated in this Section and on the drawings is Custom Lock 2 Mechanical Lock Architectural Standing Seam Metal Roof Panel as manufactured by HPM Custom Metal Roofing.
- B. Subject to compliance with requirements and Architect's approval comparable products from the following manufacturers may be substituted:
  - 1. Custom-Bilt Metals; CB-2000
  - 2. PAC-CLAD Petersen Aluminum; Tite-Loc
  - 3. 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 architectural standing seam roofing with concealed fasteners. Pan width shall be 12-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, 16 gauge, with movement allowance of 3-inch.

### 2.03 FLASHING AND CLOSURES

- A. Flashing and Trim: Flashing shall be formed from the same material type and finish as the roof panel, but the temper may be reduced to facilitate forming. 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.

- B. 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: 0.032-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".
- C. Downspouts: Fabricate round 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.
- D. 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: Match HPM Custom Metal Roofing; Sand Green, verify with 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 MISCELLANEOUS MATERIALS

- A. Fasteners: Fasteners shall be 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, nonsag, nontoxic, nonstaining 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 backing; cold applied. Provide primer when recommended by underlayment manufacture.
  - 1. Clad-Gard SA; Firestone Building Products
  - 2. Palisade SA-HT; SDP Advanced Polymer Products Inc.
  - 3. Rainproof 40; Protecto-Wrap Company
  - 4. Sharkskin Ultra SA; Kirsch Building Products, LLC
- 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.

## 2.06 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 manufacturer provides 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 acceptable 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 Architect 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 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.

### 3.05 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 indicated or, if not otherwise indicated, types recommended by panel manufacturer. Refer to Section 07920 - 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.

### 3.06 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.
- 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.

### 3.07 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.

### 3.08 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

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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 07460 – FIBER CEMENT SIDING

### PART 1 - GENERAL

#### 1.01 SUMMARY

- A. This Section includes the following:
  - 1. Fiber-cement siding.
    - a. Vertical Panel Siding and accessories
    - b. Horizontal Lap Siding and accessories
  - 2. Fiber-cement trims.
- B. Related Sections include the following:
  - 1. Section 06100 – ROUGH CARPENTRY.
  - 2. Section 07250 - WEATHER BARRIERS
  - 3. Section 07600 –FLASHING AND SHEET METAL for flashing and other sheet metal work.
  - 4. Section 07910 – FAÇADE SEALANTS
  - 5. Section 09900 - PAINTING

#### 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 509-09 – Voluntary Test and Classification Method of Drained and Back Ventilated Rain Screen Wall Cladding Systems.
- C. ASTM – American Society for Testing and Materials
  - 1. ASTM C 518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
  - 2. ASTM C 1185 - Standard Test Methods for Sampling and Testing Non-Asbestos Fiber Cement.
  - 3. ASTM C 1186 – Standard Specification for Flat Fiber-Cement Sheets
  - 4. ASTM E 84 - Standard Test for Surface Burning Characteristics of Building Materials.
  - 5. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
  - 6. ASTM E 228 - Standard Test Method for Linear Thermal Expansion of Solid Materials with a Vitreous Silica Dilatometer.

7. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
  8. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
  9. ASTM G 23 - Standard Practice for Operating Light-Exposure Apparatus (Carbon-Arc Type) with and without Water for Exposure of Nonmetallic Materials, Replaced by G152 and G153.
- D. NFPA - National Fire Protection Association
1. NFPA 285 - Fire Test Method for Exterior Wall Assemblies Containing Combustible Material.
  2. NFPA 268 – Ignition Resistance of Exterior Wall Assemblies

#### 1.03 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Verification: For each type, color, texture, and pattern required.
  1. 12-inch- long-by-actual-width Sample of siding.
  2. 12-inch- long-by-actual-width Sample of trim.
- C. Product Certificates: For each type of siding signed by product manufacturer.
- D. Product Test Reports and Code Compliance: Documents demonstrating product compliance with local building code, such as test reports or Evaluation Reports from qualified, independent testing agencies.

#### 1.04 PERFORMANCE REQUIREMENTS

- A. General Performance: Fiber Cement Panel System shall comply with performance requirements without failure due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Structural Performance: Fiber Cement Panel System and its anchorage and related components shall be designed with adequate strength and stiffness to withstand the loads as determined by the 2006 IBC and ASCE 7 "Minimum Design Loads for Buildings and Other Structures".
  1. Design parameters:
    - a. Exposure: Exposure B
    - b. Basic Wind Speed: 105 mph in 3-second gusts
    - c. Importance Factor:1.0
  2. Design corners for simultaneous positive (inward) design pressures on both surfaces, and simultaneous negative (outward) design pressure on both surfaces.
- 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. Air Infiltration: Air-Infiltration rate shall not exceed 0.06 cfm/ft<sup>2</sup> 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.
- 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 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: Fiber Cement Panel System shall have no water penetration as defined by the test method when tested in accordance with ASTM E331 at inward static pressure differential of note less than 6.0 psf and not more than 12.0 psf.
  4. Dynamic Water Penetration: Fiber Cement 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.

#### 1.05 QUALITY ASSURANCE

- A. Source Limitations: Obtain siding including related accessories, through one source from a single manufacturer.
- B. Manufacturer Qualifications: Fiber cement panel manufacturer shall have a minimum 10 years' experience in fabricating and supplying fiber cement cladding systems.
- C. Installer Qualifications: Installer of fiber cement panel system shall have a minimum of 5 years' experience of installing systems equivalent to those specified in the Section.
- D. Field-Constructed Mock-Up: Prior to installation of siding systems, erect mock-ups for each form of wall construction, including typical joints and finish required to verify selections made under sample submittals. Include outside corner on one end of mock-up. Build mock-ups to comply with the following requirements, using materials indicated for final work:
1. Locate mock-ups on site in location and of size indicated or, if not indicated, as directed by the Architect.

2. Obtain the Architect's acceptance of mock-up's visual qualities before start of final work.
  3. Mockups may be incorporated into the work. If not, retain mock-ups during construction as standard for judging completed siding. When directed, demolish mock-ups and remove from site.
- E. Pre-Installation Conference: Before beginning work of this Section, conduct conference at site to comply with requirements of applicable Division 01 Sections.
1. Required Attendees:
    - a. Owner or Owner's Representative
    - b. Architect
    - c. General Contractor, including supervisor
    - d. Siding installer, including supervisor
    - e. Rough framing and wood sheathing installer, including supervisor.
  2. Minimum Agenda
    - a. Review Contract Document requirements.
    - b. Review approved submittals.
    - c. Review installation procedures, including, but not limited to, following:
      - 1) Handling, storing and protecting products.
      - 2) Evaluation of substrates on which work will be applied.
      - 3) Fabrication and placement of flashings.
      - 4) Installation and attachment of siding and accessories, including sealant requirements.
      - 5) Cleaning installed work.
    - d. Review forecasted weather conditions and procedures for coping with unfavorable conditions.
    - e. Tour layered exterior wall mock-up and 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.

#### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store materials in a dry, well-ventilated, weathertight place.
- B. If panels are exposed to water or water vapor prior to installation, allow to completely dry before installing.

- C. Panels must be carried on edge. Do not carry or lift panels flat. Improper handling may cause cracking or panel damage.

#### 1.07 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with siding installation only if substrate is completely dry and if existing and forecasted weather conditions permit siding to be installed according to manufacturer's written instructions.

#### 1.08 SEQUENCING

- A. Coordinate installation with flashings and other adjoining construction to ensure proper sequencing.

#### 1.09 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace siding that does not comply with requirements or that fails within specified warranty period. Failures include, but are not limited to, cracking, deforming, or otherwise deteriorating beyond normal weathering.
  - 1. Warranty Period: 50 years from date of Substantial Completion.

#### 1.10 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. Furnish full lengths of siding and trim in a quantity equal to 2 percent of amount installed.

### PART 2 - PRODUCTS

#### 2.01 MANUFACTURERS

- A. Basis-of-Design Product: The design for each siding and trim is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.

#### 2.02 SIDING

- A. Fiber-Cement Siding: Siding made from fiber-cement board that does not contain asbestos fibers; complies with ASTM C 1186, Type A, Grade II; is classified as noncombustible when tested according to ASTM E 136; and has a flame-spread index of 25 or less when tested according to ASTM E 84.
  - 1. Panels and planks made from Portland cement, ground sand, cellulose fibers, additives, and water; formed under pressure to required profile.
- B. Vertical Siding:



1. Basis-of-Design Product: HardiePanel Smooth vertical siding and HardieTrim Smooth trims and battens as manufactured by James Hardie Inc. or a comparable product by one of the following:
    - a. Allura of PlyCem
    - b. Cemplank, Inc.
    - c. Nichiha USA, Inc.
    - d. Or approved equal.
  2. Panel Size: 5/16-inch thick panels in 48-inch widths; smooth.
  3. Trim Size: 5/4 thick boards in 10 foot lengths of widths as indicated on the Drawings.
  4. Battens: 4/4 thick in 12-foot lengths and 2-1/2-inches wide.
  5. Finishes:
    - a. Factory Priming: Manufacturer's standard acrylic primer.
    - b. Integral color option: As able to match final approved colors by Kapolei DAB/Marriott International reviews-approvals.
- C. Horizontal Lap Siding:
1. Basis-of-Design Product: HardiPlank Smooth lap siding and HardieTrim Smooth trims as manufactured by James Hardie Inc. or a comparable product by one of the following:
    - a. Allura of PlyCem
    - b. Cemplank, Inc.
    - c. Or approved equal
  2. Plank Size: 7-1/4-inch wide for 6-inch exposure in 12 foot lengths.
  3. Trim Size: 5/4 thick boards in 10 foot lengths of widths as indicated on the Drawings.
  4. Finishes:
    - a. Factory Priming: Manufacturer's standard acrylic primer.
    - b. Integral color option: As able to match final approved colors by Kapolei DAB/Marriott International reviews-approvals.

## 2.03 ACCESSORIES

- A. Flashing: Provide Metal flashing complying with Section 07600 – FLASHING AND SHEET METAL at window and door heads, horizontal joints and where indicated.
- B. Elastomeric Joint Sealant: Single-component silicone joint sealant complying with requirements in Section 07910 – FAÇADE SEALANTS for Use NT (nontraffic) and for Uses M, G, A, and, as applicable to joint substrates indicated, O joint substrates.
- C. Fasteners:

1. For fastening to wood, fastener of type described in Table No. 2 in National Evaluation Service Report No. NER-405. for the conditions of the Project but not less than 6d common nail of sufficient length to penetrate a minimum of 3/4 inch into wood framing.

### PART 3 - EXECUTION

#### 3.01 PREPARATION

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of siding. Proceed with installation only after unsatisfactory conditions have been corrected.
  1. Ensure that sub-wall is plumb, straight and flat within 1/8-inch in 10 feet.
  2. Check to see that building wrap is installed of substrate as specified in Section 07250 – WEATHER BARRIERS and that all required flashings are installed and in serviceable condition.
- B. Clean substrates of projections and substances detrimental to application.

#### 3.02 INSTALLATION, GENERAL

- A. Comply with siding manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.
- B. Provide 1-2 inches of vertical clearance between roofing, paths, steps driveway or decking material and bottom edge of siding or as recommended by roofing manufacturer
- C. Maintain clearance between siding and adjacent finished grade as required by 2006 IBC.
- D. Wind Resistance: Where a specified level of wind resistance is required siding is installed to framing members and secured with fasteners described in Table No. 2 in National Evaluation Service Report No. NER-405.
- E. Nailing:
  1. Drive fasteners perpendicular to siding and framing. Fasteners heads should fit snug or flush against siding.
  2. Do not over drive nails or drive nails at an angle.
  3. If fastener is countersunk, caulk nail hole and add a nail.
  4. For lap siding using blind nailing method for installation.
- F. At jamb openings for windows and doors seal joint between the back of the siding and the weather barrier with weather barrier sealant (**JS-02**).

#### 3.03 INSTALLATION, VERTICAL SIDING

- A. Block framing between studs where panel siding horizontal joints occur.
- B. Install metal Z flashing and provide a 1/4 inch gap at horizontal panel joints.

- C. Place fasteners no closer than 3/8-inch from panel edges and 2-inches from panel corners.

#### 3.04 INSTALLATION, LAP SIDING

- A. Begin first course with 1/4-inch thick lath starter strip to establish proper plank angle. Use starter strips where required at window and door head conditions to maintain plank angle.
- B. Locate plank butt joints over stud framing.
  - 1. Make joints tight against one another with no perceivable gaps.
- C. Locate splices at least 12-inches away from window and door openings.
- D. Place fasteners no closer than 3/8-inch from panel edges and 2-inches from panel corners.

#### 3.05 INSTALLATION, TRIMS AND BATTENS

- A. Fasten through trim into structural framing or plywood sheathing. Fasteners must penetrate minimum 3/4-inch or full thickness of sheathing. Additional fasteners may be required to ensure adequate security.
- B. Place fasteners no closer than 3/4-inch and no further than 2 inches from side edge of trim board and no closer than 1 inch from end. Fasten maximum 16 inches on center.
- C. Trim inside corner with a single board trim both sides of corner.
- D. Outside Corner Board: Attach trim on both sides of corner with 16 gage corrosion resistant finish nail 1/2-inch from edge spaced 16-inches apart, weather cut each end spaced minimum 12-inches apart.
- E. Allow 1/8-inch gap between trim and siding. Seal gap with high quality, paint-able caulk.
- F. Shim frieze board as required to align with corner trim.
- G. Use appropriate size trim as detailed. DO NOT rip trims to width.
- H. Apply primer to all cut ends.

#### 3.06 ADJUSTING AND CLEANING

- A. Remove damaged, improperly installed, or otherwise defective siding materials and replace with new materials complying with specified requirements.
- B. Clean finished surfaces according to siding manufacturer's written instructions and maintain in a clean condition during construction.

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, gutters and downspouts, steep-slope and low-slope flashing, and other related work as shown on drawings and as specified herein.
- B. All edge flashing and coping (where TPO membrane roofing is installed under coping or terminated with edge flashing) shall be provided by the TPO membrane roofing manufacturer and included in the TPO membrane roofing system warranty.
  - 1. Edge flashings and copings shall be provided by the roofing contractor performing the work specified in Section 07541 – TPO MEMBRANE ROOFING.

#### 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 flashing and counter-flashing that complies with the following:
  - 1. 2006 IBC Chapter 16 and ASCE 7 Chapter 6 for require wind forces:
    - a. Exposure Category: Exposure B
    - b. Basic Wind Speed: 105 mph in 3 second gusts
    - c. Importance Factor: 1.0
  - 2. Metal edge flashings and copings of low-slope roofs shall comply with the requirements set forth by ANSI/SPRI ES-1.
- 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.
- 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 Owner, 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.
- 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 regard 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 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 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 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. Copper Sheet: ASTM B 370, cold-rolled copper sheet, H00 or H01 temper.
  - 1. Non-Patinated Exposed Finish: Mill.
- D. Solder: For Copper; ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.
- E. 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.
- F. 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.
- G. 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.
- H. Sealants and Sealant Tape: Comply with the requirements of Section 07910 – FAÇADE 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, non-sag, non-toxic, non-staining 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.
- I. 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.
- J. 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. Stucco Type: Provide with upturned fastening flange and extension leg of length to match thickness of applied finish materials.
  - 4. Siding Type: Provide with upturned fastening flange and extension leg of length to match thickness of applied finish materials.
  - 5. 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.
  - 6. 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 SMACNA's "Architectural Sheet Metal Manual" for application but not less than thickness of metal being secured.

## 2.03 GUTTERS AND DOWNSPOUTS

- A. Hanging Gutters: Fabricate to cross section indicated, complete with end pieces, outlet tubes, and other accessories 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 recommended by SMACNA but not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers and gutter accessories from same metal as gutters.
  1. Gutter Profile: As indicated
  2. Fabricate hanging gutters from 0.040-inch aluminum sheet.
  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"
- B. Downspouts: Fabricate round downspouts 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: As detailed.
  2. Fabricated downspouts from 0.032-inch aluminum sheet.
- C. Provide aluminum wire ball downspout strainer at each outlet for aluminum gutters and copper wire ball downspout strainer at each outlet for copper gutters.

## 2.04 LOW SLOPE ROOF FLASHING

- A. Roof-Edge Flashing: Metal roof edge fascia with continuous coated steel waterdam. The system shall be watertight, maintenance free, not requiring exposed fasteners. Joints shall be a butt type with concealed splice plates.
  1. Fabricate fascia cover from 0.040-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. Waterdam: Shall be continuous 24 gauge, pre-punched, Kynar coated steel waterdam in standard lengths of 12-feet. Mechanically fastened as indicated and detailed.
  4. Fasteners: 1-1/4-inch Type 316 stainless steel ring shank roofing nails.
  5. Manufacturers:
    - a. Firestone Building Products; UNA-Edge DE
    - b. Carlisle-Syntec; SecurEdge 3000
    - c. GAF; EverGuard Drip Edge

- d. Or approved equal
- B. Copings: Metal coping cap with coated steel anchor/support cleats. The system shall be watertight, maintenance free, not requiring exposed fasteners. Joints shall be a butt type with concealed splice plates. Perma-Tite Tapered Coping, as manufactured by Metal-Era.
  - 1. Fabricate copings cover from 0.040-inch. aluminum in minimum lengths of 96-inch and not exceeding 12-foot long sections. Vertical face and back leg lengths as detailed.
  - 2. Concealed Splice Plates: Fabricate concealed splice plates in 8-inch widths of same thickness as copings.
  - 3. Anchor/Cleats: 22-gauge, pre-punched Kynar coated steel cleat with stainless steel spring mechanically locked to cleat 12-inches wide at 3-feet on center. Mechanically fastened as indicated and detailed.
  - 4. Fasteners (Wood Substrate): #9 x 1½" stainless steel fasteners with provided drivers. No exposed fasteners shall be permitted. Fasteners shall be electrolytically compatible.
  - 5. Fasteners (Concrete Substrate): 1/4-inch diameter by 1-1/4-inch long Tapcon fasteners.
- C. Base and Counter Flashings: to be fabricated from aluminum sheet of the following thicknesses:
  - 1. Base Flashing – 0.040-inch.
  - 2. Counter Flashing – 0.032-inch.

## 2.05 STEEP SLOPE ROOF FLASHING

- A. Metal Flashing for concrete tile roofs specified in Section 07322 – CONCRETE ROOF TILES:
  - 1. Apron, Step, Cricket, and Backer Flashing: Fabricate from 0.032-inch aluminum sheet.
  - 2. Valley Flashing: Fabricate from 0.032-inch aluminum sheet.
  - 3. Eave, Rake, Pan and Drip Edge Flashing: Fabricate from 0.032-inch aluminum sheet.
- B. Metal flashing for standing seam metal roofs, fabricate from same material as metal roofing panels specified in Section 07410 – STANDING SEAM METAL ROOF PANELS

## 2.06 LANAI EDGE FLASHING

- A. Drip Edge Flashing: Fabricate in minimum lengths of 96-inches, but not exceeding 10 feet from 0.062-inch aluminum sheet.

## 2.07 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 head and sill flashing with 2-inch high end dams.
  - 1. Aluminum Windows and Doors: Fabricate from 0.062-inch aluminum sheet.
  - 2. Steel Doors: Fabricate from 0.034-inch aluminum-zinc coated steel sheet.
  - 3. Color to match color of window or door trim.

## 2.01 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: 2,000 hours.
  - 2. Salt-Spray Resistance: 2,000 hours.
  - 3. Color:
    - a. Gutters, Downspouts, Conductor Heads 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 Joint flashing
      - 1) Custom color to match wall 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 – FAÇADE 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 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.

- C. Downspouts: Join sections with 1-1/2-inch telescoping joints. Provide fasteners and hangers designed to hold downspouts securely to walls. Locate downspout hangers at top and bottom of downspout and at each floor line provided distance is no greater than 10 feet on center.

### 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. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints a minimum of 4 inches and bed with sealant. Secure in a waterproof manner by means of anchor and washer at 36-inch centers unless otherwise indicated.
- D. Steep Slope Roof Flashing: Install in accordance with Section 07322 – CONCRETE ROOF TILES and Section 07410 – STANDING SEAM METAL ROOF PANELS.

### 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.

### 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 07920 - SEALANTS

### PART 1 - GENERAL

#### 1.01 SUMMARY

- A. Section Includes: All sealants not covered in Section 07910 – FAÇADE SEALANTS. Completely close with sealant all joints indicated or specified to be sealed to a watertight condition.
- B. Related Sections:
  - 1. Section 07910 – FAÇADE SEALANTS

#### 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.

#### 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 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.

#### 1.04 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 occasioned 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, non-absorptive material as recommended for compatibility with sealant by the sealant manufacturer to control the joint depth for sealant placement, to break bond of sealant at bottom of joint, to form optimum shape of sealant bead on back side, and to provide a highly compressible backer which will minimize the possibility of sealant extrusion when joint is compressed. Do not use oakum or other types of absorptive materials as backstops.
- 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:
  1. At Interior Vertical and Overhead Moving Joints (**JS-03**) except at tile joints: One-part polyurethane-based sealant, conforming to ASTM C 920, Type S, 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-04**): 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-05**): 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. Urexpam NR-300; Type HM; Pecora Corp.
  - d. SL-2; Sonneborn.
4. Silicone Sealant (**JS-06**): 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-07**): 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) Sheetrock Acoustical Sealant; USG
  - b. Non-Rated Concealed Joints (**JS-08**): 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.

### 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 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.
- B. Joint Priming: Prime joint substrates where indicated or where recommended by joint sealer manufacturer based on preconstruction joint sealer-substrate tests or prior experience. Apply primer to comply with joint sealer manufacturer's

recommendations. Confine primers to areas of joint sealer bond, do not allow spillage or migration onto adjoining surfaces.

- C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces which otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

### 3.04 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 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.
- 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.
- H. Showers: Apply sealant to all penetrations through the finish materials, at flanges, eschusions and cover plates.

### 3.05 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.

### 3.06 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, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealers immediately and reseal joints with new materials to produce joint sealer installations with repaired areas indistinguishable from original work.

END OF SECTION

## DIVISION 08 – OPENINGS

### SECTION 08110 – STEEL DOORS AND FRAMES

#### PART 1 - GENERAL

##### 1.01 SUMMARY

A. Section Includes:

1. Standard steel frames for exterior doors, interior and exterior steel doors as indicated and scheduled on drawings.

B. Related Work Described Elsewhere:

1. Steel door frames scheduled for Guest Rooms and Public Spaces as specified in Section 08115 – PREFINISHED STEEL DOOR FRAMES.
2. Finish hardware is specified in Section 08710 - FINISH HARDWARE.
3. Field applied painting is specified in Section 09900 - PAINTING.

##### 1.02 QUALITY ASSURANCE

- A. Provide doors and frames complying with ANSI/SDI 100 “Recommended Specifications for Standard Steel Doors and Frames” and as herein specified.
- B. 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.
- C. Hardware Mounting Heights: The Contractor shall be responsible to coordinate all mounting heights of various finish hardware with all project requirements.

##### 1.03 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. Schedule: Provide schedule of doors and frames using same reference numbers for details and openings as those on contract drawings.

- F. 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.

#### 1.04 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.

### PART 2 - PRODUCTS

#### 2.01 MATERIALS

- A. Galvanized Steel Sheets: Zinc coated commercial quality carbon steel. Comply with ASTM A 653 coating designation A60 at all doors and frames.
- B. Sheet Steel:
  - 1. Cold-rolled, commercial quality carbon steel, Type B; suitable for exposed applications, complying with ASTM A 1008.
  - 2. Hot-rolled, commercial quality carbon steel, Type B; free of scale, pitting, or surface defects, pickled and oiled, complying with ASTM A 1011.
- C. Supports and Anchors: Fabricate of not less than 18-gauge galvanized sheet steel.
- D. 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. Post-Installed Expansion Type for In-Place Concrete: Minimum 3/8-inch-diameter bolts with expansion shields or inserts. Provide pipe spacer from

frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

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. 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.
  - b. Compression Type: Not less than two anchors for each jamb.
  - c. Post-installed Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.
6. Floor Anchors: Angle clip type:
  - a. 16 gauge minimum.
  - b. To receive 2 fasteners per anchor.
  - c. Welded to the bottom of each jamb.
- E. 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.
- F. 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

## 2.03 FABRICATION, GENERAL

- A. Fabricate steel doors and frame units to be rigid, neat in appearance and free from defects, warp or buckle.
- B. Fabricate frames, concealed stiffeners, reinforcement, edge channels, and moldings from either cold-rolled or hot-rolled steel (at fabricator's option).
- C. Fabricate all doors and frames from galvanized sheet steel.
- D. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."

- E. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat Phillips heads for exposed screws and bolts.
- F. 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 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. Mortised Hinges: 10 gauge.
    - b. Surface Closers: 14 gauge.
  - 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 Americans with Disabilities Act and Architectural Barriers Act Accessibility Guidelines (ADA-ABA) Section 404.2.7.
- G. 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 finish paint.

## 2.04 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: Doors shall be of the types and sizes shown on approved shop drawings and shall have a 1-3/4 thick core of stiffen cold rolled steel face sheets with continuous vertical steel sections.



## 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: Welded construction.
  - 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.

## 2.06 LOUVERS

- A. Provide louvers for interior doors, where indicated, that comply with SDI 111C, with blades or baffles formed of 0.020-inch-thick, cold-rolled steel sheet set into 0.032-inch-thick steel frame.
  - 1. Sight-proof Louver: Stationary louvers constructed with inverted V-shaped or Y-shaped blades
  - 2. Provide louvers for exterior doors fabricated with galvanized steel sheet.

## 2.07 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 INSTALLATION

- A. General: Install standard steel doors and frames and fixed acoustical windows 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. Door and frames in acoustic rated walls: Pack frames with mineral wool fiber.
- 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

### 3.02 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 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.

### 3.03 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.

December 26, 2018

OWNER'S SAMPLE DESIGN  
NOT FOR CONSTRUCTION

- 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 08115 – PREFINISHED STEEL DOOR FRAMES

### PART 1 - GENERAL

#### 1.01 SUMMARY

- A. Section Includes: Prefinished steel door frames as scheduled for interior doors for Guest Rooms and Public Spaces.
- B. Related Work Described Elsewhere:
  - 1. Section 06100 – ROUGH CARPENTRY
  - 2. Section 08110 – STEE DOOR AND FRAMES
  - 3. Wood Doors as specified in Section 08210 – WOOD DOORS
  - 4. Finish hardware is specified in Section 08710 - FINISH HARDWARE.

#### 1.02 QUALITY ASSURANCE

- A. Provide frames complying with ANSI/SDI 100 “Recommended Specifications for Standard Steel Doors and Frames” and as herein specified.
- B. 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 10 C ‘Positive Pressure Fire Tests of Door Assemblies” and NFPA 252 “Standard Methods of Fire Tests of Door Assemblies” by a nationally recognized independent testing and inspection agency acceptable to authorities having jurisdiction.
- C. Hardware Mounting Heights: The Contractor shall be responsible to coordinate all mounting heights of various finish hardware with all project requirements.

#### 1.03 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 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. Schedule: Provide schedule of doors and frames using same reference numbers for details and openings as those on contract drawings.

- E. 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.

#### 1.04 DELIVERY, STORAGE AND HANDLING

- A. Deliver steel frames cartoned or crated to provide protection during transit and job storage.
- B. Inspect steel frames 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 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.

### PART 2 - PRODUCTS

#### 2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements of this section, provide products from one of the following:
  - 1. Basis of Design: Timely Industries and Division of SDS Industries, Inc.
  - 2. Comparable product acceptable to the Architect.

#### 2.02 MATERIALS

- A. Frame Material: Cold-rolled, commercial quality carbon steel, electro-galvanized, 20 gauge minimum.
- B. Frame Profile: For all frames provide "S" (Standard) profile.
- C. Frame Casings: Wood as specified in Section 06200 – FINISH CARPENTRY and detailed on the Drawings.
- D. Accessories:
  - 1. Corner connectors
  - 2. Hardware Reinforcements for closers, hinges, exit devices and door guards; 14 gauge.
  - 3. Silencers: TA-5 vinyl, 2 per frame, clears stick-on type. Silencers not required on Kerfed frames or frames scheduled to receive stop mounted gasket or weather-strip.

- E. Fasteners: Types required by Manufacturer for each fastening condition. Provide stainless steel fasteners for exposed framing and corrosion resistant types for interior locations.
- F. Touch-up Paint: Manufacturer's provide touch-up paint; color to match the color of the frame requiring touch-up.

## 2.03 FABRICATION

- A. General: Fabricate units using Manufacturers standard production methods as required to comply with the Project design intent as fully submitted and successfully reviewed by Architect.
- B. Finishes:
  - 1. Steel Units:
    - a. Electro-galvanized Coating: G60 minimum.
    - b. Paint Coating: Standard impact resistant, baked-on polyester enamel finish in custom color as scheduled or to be selected by Architect.
    - c. Other Components: Manufacturer's standard finishes; except all components scheduled for exterior framing to be Manufacturer's high corrosion resistant finish even when concealed within framing.
- C. Provide full width head channel for ceiling height units

## PART 3 - EXECUTION

### 3.01 COORDINATION

- A. Coordinate the installation of the frames with the finish hardware installation specified in Section 08710 – FINISH HARDWARE and wood doors as specified in Section 08210 – WOOD DOORS.

### 3.02 INSTALLATION

- A. General: Install prefinished steel 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. Install fire-rated frames in accordance with NFPA 80.

3.03 ADJUST AND CLEAN

- A. Factory Coat Touch-up: Touch-up 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.

3.04 SCHEDULE

- A. General: Unless otherwise indicated, provide prefinished steel door frames as specified herein wherever wood doors as specified in Section 08210 – WOOD DOORS are scheduled. Where steel doors are scheduled with steel frames, provide steel frames as specified in Section 08110 –STEEL DOORS AND FRAMES.

END OF SECTION

## SECTION 08210 - WOOD DOORS

### PART 1 - GENERAL

#### 1.01 SUMMARY

- A. Types of doors required include flush and custom stile and rail wood doors.
  - 1. Fire-rated doors
  - 2. Non-rated doors
- B. Related Work Described Elsewhere:
  - 1. Wood door frames and other woodwork in connection with wood doors are specified in Section 06200 - FINISH CARPENTRY.
  - 2. Steel door frame as specified in Section 08115 – PREFINISHED STEEL DOOR FRAMES.
  - 3. Fielding Painting for wood doors as specified in Section 09900 – PAINTING.

#### 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. Submit certificates issued by an independent testing agency stating that doors scheduled to be acoustically rated, in fact meet the specified STC ratings when tested in accordance to ASTM E 90 and ASTM E 413.
- E. Samples: Request wood and finish samples from Architect for species of wood and types of finish. 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.
- C. Fire-Rated Wood Doors: Provide wood doors which are identical in materials and construction to units tested in door and frame assemblies per NFPA 252 "Standard Method of Fire Tests of Door Assemblies", and UL 10C, "Positive Pressure Fire Tests of Door Assemblies", and which are labeled and listed for ratings indicated by UL, Warnock Hersey or other testing and inspection agency acceptable to authorities having jurisdiction. Labels shall be metal with raised letters and shall bear the rating followed by the letter "S", name and file number of the door manufacturer and the service conducting the inspection. Labels shall not be painted.
- 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.

#### 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 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: Five years
  3. Stile and Rail Interior Doors: Five years
- 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 WOOD FLUSH DOORS

- A. Basis-of-Design: The flush wood doors products indicated in this section and on the drawings are products of Lynden Door, Inc. Subject to compliance with requirements and Architect's approval products from the following manufacturers may be substituted:
1. Eggers Industries
  2. Marshfield Door Systems
  3. Simpson Door Company
  4. VT Industries, Inc.
- B. 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: AWS Custom: As scheduled on the Interior Design Drawings)
    - a. Stiles: Applied wood-veneer edges of same as faces and covering edges of faces.
  4. Metal Louver:
    - a. Blade Type: Vision-proof inverted V or inverted Y.
    - b. Metal Finish: Hot-dip galvanized steel, 0.040 inch thick, with powder coated finish.
  5. Finish: Finish as specified in Section 09900 – PAINTING for Stained Wood Finish.
  6. Fire Rated Doors:
    - a. Rating: As indicated on the schedule
    - b. Construction and core specified above for type of face indicated or manufacturer's standard mineral-core construction as needed to provide fire rating indicated.

- c. Blocking: For mineral-core doors, provide composite blocking with improved screw-holding capability approved for use in doors of fire ratings indicated as needed to eliminate through-bolting hardware.
- d. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile matching face veneer, and laminated backing at hinge stiles for improved screw-holding capability and split resistance.

## 2.02 WOOD STILE AND RAIL DOORS

- A. Manufacture: Subject to compliance with requirements and Architect's approval custom wood doors from the following manufacturers may be substituted:
  - 1. Eggers Industries
  - 2. Maiman Company
  - 3. Marshfield Door Systems, Inc.
  - 4. TruStile Doors LLC
  - 5. VT Industries, Inc
- B. Stile and Rail Doors (Stained): Comply with the following requirements:
  - 1. Stile and Rail Construction: Solid clear lumber; may be edge glued for width. Select lumber and veneer for similarity of grain and color, and arrange for optimum match between adjacent pieces.
    - a. Species: As scheduled on the Interior Design Drawings
  - 2. Grade: AWS Custom, WDMA Custom or Select.
  - 3. Wood Panels: Minimum 3/4-inch thick, flat panel, moisture resistant MDF or Veneer core with wood veneer or HPDL faces, complying WDMA I.S.6-A custom grade.
    - a. Wood Veneers: As scheduled on Interior Design Drawings
  - 4. Configuration: As shown in the Drawings.
  - 5. Finish: Factory finish.

## 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 construction. Blind mortise and tenon shall be sized for a drive fit. Tenon shall be set in adhesive. Alternative methods of joinery are acceptable provided the meet or exceed the structural performance and appearance of the joinery method described above.
- C. Openings: Cut and trim openings through doors in factory.
  - 1. Louvers: Factory install louvers in prepared openings.

- D. 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.
- E. 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".
- B. As required for fire-rated doors treat solid wood and wood cores with fire retardant in accordance with Section 06070 – WOOD TREATMENT

#### 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. Transparent finish for open grain woods: Comply with requirements indicated below for filling, staining, finish and sheen.
  - 1. Fill open grain wood with filler compatible with the finishes indicated, match color and tone of the wood being filled.
- D. Finish: As scheduled.
- E. Staining: As scheduled.

### 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 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. Manufacturer's Instructions:
  - 1. Install wood doors to comply with manufacturer's instructions and of referenced AWI and WDMA standard SD1-105 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. Fitting Clearances for Fire-rated Doors: Comply with the more restrictive requirements of NFPA 80 and 2006 IBC as amended.
  - 3. Bevel non-rated doors 1/8 inch in 2 inches at lock and hinge edges.
  - 4. Bevel fire-rated doors 1/8 inch in 2 inches in lock edge; trim stiles and rails only to extent permitted by labeling agency.

### 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

Section Includes: 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 as specified herein. Mechanical and electrical contractors shall furnish locations and numbers of required access doors to General Contractor.

#### 1.02 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.

#### 1.03 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 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. 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.

- C. 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.
- D. Glass-Fiber Reinforced Gypsum (GFRG): High-density gypsum, reinforced with continuous random filament glass fiber mat and structural reinforcing.
  - 1. Glass Content: 5 to 6 percent by weight
  - 2. Density: 103 to 112 pcf
  - 3. Shell Thickness: 1/8 to 3/16-inch nominal
- E. 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.
- F. 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 at all back of house areas and concealed areas of public spaces.
  - 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.
- C. For Gypsum Board Fire Rated (Uninsulated)

1. Acudor; Model FB-5060.
  2. Milcor Style UFR.
  3. J.L. Industries Model FDWB
- D. For Gypsum Board Fire Rated (Insulated)
1. Karp; KRP-350FR
- E. Size: As indicated on the Drawings.

## 2.03 GLASS-FIBER REINFORCED GYPSUM ACCESS PANEL DOORS

- A. Glass-Fiber Reinforced Gypsum Doors and Frames:
1. Locations: Wall and ceiling surfaces in expose-to-view areas of public spaces.
  2. Hinges: Concealed continuous hinge.
  3. Latch: Cam latch operated by spanner head wrench with interior release.
- B. For Non-Rated Installation:
1. GC Products, Inc.; Stealth Access Panels
- C. Size: As indicated on the Drawings

## 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. Glass-Fiber Reinforced Gypsum Access Doors: Fabricated with GFRG with a shell thickness of 1/8-inch to 3/16-inch nominal
1. Tolerances:
    - a. Dimensional – all directions  $\pm 1/8"$
    - b. Thickness – skin  $\pm 1/16"/-0$
    - c. Thickness – total unit  $\pm 1/8"$
    - d. Warpage or bowing  $\pm 1/16"$  per ft.



- E. 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.
- D. Glass-Fiber Reinforced Gypsum Access Panels Installation:
  - 1. Install in accordance with applicable code and manufacturer's recommendations, plumb and true to line, shim where necessary.
  - 2. Coordinate work with related gypsum board work and framing.
  - 3. Install frame with #6 buglehead screws in countersunk holes in frame.
  - 4. Finish joints and surfaces of adjacent gypsum board work and panel and frame to a Level 5 finish as specified in Section 09250 – GYPSUM BOARD ASSEMBLIES.

#### 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 08342 - FIBERGLASS REINFORCED DOOR AND DOOR FRAME

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. Work Includes: Provide fiberglass reinforced plastic door and frame components including the following items:
  - 1. Fiberglass Reinforced Plastic (FRP) Doors.
  - 2. Fiberglass Door Frames.
- B. Related Work Described Elsewhere:
  - 1. Finish hardware is provide under Section 08710 - FINISH HARDWARE.

1.02 SUBMITTALS

- A. Submit in accordance with Section 01330 - SUBMITTALS.
  - 1. Manufacturer's Data: Submit manufacturer's technical product data substantiating that products comply with requirements.
  - 2. Schedule of doors and frames indicating the specific reference numbers as used on drawings, door type, frame type, size, handing and applicable hardware.
  - 3. Shop Drawings:
    - a. Elevations: Dimensioned elevation of each type door opening assembly in project; indicate sizes and locations of door and hardware.
    - b. Details: Installation details of each type installation condition in project.
  - 4. Samples:
    - a. Provide one 21 x 18 inch completely assembled (hinged) door and frame corner section, with faces and edges representing typical color and finish. One edge should be exposed for view of interior door and frame composition. Sample should include 6 inch louver opening, as required, as well as standard cutouts for hinges and strike plates.
    - b. Selection Samples: Submit manufacturer's standard and custom color chips.
    - c. Verification Samples: Submit samples to verify color match.
  - 5. Operation and Maintenance Manual
    - a. Include recommended methods and frequency for maintaining optimum condition of fiberglass doors and frames under anticipated traffic and use conditions.
  - 6. Manufacturer's Instructions: Submit printed installation instructions for door opening assemblies.

7. Warranty Documents: Submit manufacturer's standard warranty documents, executed by manufacturer's representative, countersigned by Contractor.

1.03 QUALITY ASSURANCE

- A. Performance Requirements: Door opening assemblies shall have a maximum flame spread 25 in accordance with ASTM E 84, self-extinguishing in accordance with ASTM D 635.
- B. Manufacturer shall have been in the business of manufacturing fiberglass doors and frames for a minimum of ten (10) years and be able to provide documented references of performance.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Packing, Shipping, Handling and Unloading: Package door opening assemblies in manufacturer's standard containers.
- B. Store door assemblies in manufacturer's standard containers, on end, to prevent damage to face corners and edges.

1.05 WARRANTY

- A. Manufactures Warranty: Manufacturer's 25-year warranty against failure due to corrosion from specified environment. Additionally, warranty all fiberglass doors and frames on materials and workmanship for a period of 10 years, including warp, separation or delamination, and expansion of the core.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Basis-of-Design Products: Drawings and specifications are based on Standard FRP Doors and Frames as manufactured by Chem-Pruf Door Company, LTD .

2.02 MATERIALS

- A. Fiberglass Mat: Minimum 1.5 ounces per square foot.
- B. Resins: Manufacturer's formulation for fabricating units to meet specified requirements.
- C. Anchors: Manufacturer's standard stainless steel expansion anchors.
- D. Fasteners: Stainless steel.

2.03 MANUFACTURED UNITS

- A. Non-rated Fiberglass Reinforced Plastic (FRP) Doors:
1. Thickness: 1-3/4 inches.
  2. Thermal Insulating Value: 'R' factor 11.

## 3. Construction:

- a. Core: Phenolic impregnated honeycomb core, or a 2 psf expanded polyurethane foam, which completely fills all voids between the door plates. Foam properties ASTM E-84 that comply with IBC Code.
- b. Door Plates: 1/8 inch thick, molded in one continuous piece, starting with a 25 mil gelcoat of the color specified, integrally molded with at least three layers of 1.5 ounce per square foot fiberglass mat and one layer of 18 ounce per square yard woven roving. Door plate weight shall not be less than 0.97 lbs per square foot at a ratio of 30/70 glass to resin.
- c. Stiles and Rails shall be constructed starting from the outside toward the inside, of a 25 mil gel coat of the color specified followed by a matrix of at least three layers of 1.5 ounce per square foot of fiberglass mat. The stile and rail shall be molded in one continuous piece to a U-shaped configuration and to the exact dimensions of the door. In this manner there will be no miter joints or disparate materials used to form the one-piece stile and rail.
- d. Louver openings shall be completely sealed so that the interior of the door is not exposed to the environment. Louvers are to be solid fiberglass "V" vanes and shall match the color, and finish of the door plates. At time of manufacture, 25 mil of resin-rich gelcoat must be integrally molded into louver and louver retainer.

## 4. Configuration and Sizes: Indicated on Drawings.

## 5. Finish: Door and frame shall be identical in color and finish. At time of manufacture, 25 mil of resin-rich gelcoat must be integrally molded into both the door and frame. Secondary painting to achieve color is not acceptable.

## 6. Color: To be selected by Architect from manufacturer's full range of colors.

B. Non-rated Fiberglass Frames:

1. Construction: Frames shall be fiberglass and manufactured using the resin transfer method in closed molds to assure uniformity in color and size. Beginning with a minimum 25 mil gel coat and a minimum of two layers continuous strand fiberglass mat saturated with resin, the frame will be of one-piece construction with molded stop. All frame profiles shall have a core material of 2 psf polyurethane foam.
2. Jamb/Header connection shall be coped by CNC for tight fit.
3. Internal Reinforcement shall be continuous within the structure to allow for mounting of specified hardware. Reinforcing material shall be completely non-organic with a minimum hinge screw holding value of 1000 lbs. Frame screw holding value to accommodate screw shall be minimum of 1,000 lbs per screw. Documented strength of frame screw holding value after third insert must be submitted. Dissimilar materials, such as steel, will be deemed unacceptable as reinforcement for hardware attachment.
4. Mortises for hardware shall be accurately machined by CNC to hold dimensions to +/- 0.010 inch in all three axis.

5. Hinge pockets shall be accurately machined by CNC to facilitate heavy duty hinges at all hinge locations, using plastic shims when standard weight hinges are used.
  6. Frame profile: To be Chem-Pruf Style 4 frame; 5-3/4 inches deep, 2 inches wide face; double rabbeted with 5/8 inch high stop.
  7. Sizes: Indicated on drawings.
  8. Finish: Frame shall be identical in color and finish to the door. A 25 mil resin rich gel coat will be integrally molded into the frame at time of manufacture. Secondary painting or gelcoating to achieve finish or color is not acceptable.
  9. Color: Gelcoated as Selected by the Architect.
- C. Frame Anchors: Types recommended by manufacturer for project conditions.
- D. Door Hardware: Specified Section 08710 - FINISH HARDWARE.

### PART 3 - EXECUTION

#### 3.01 EXAMINATION

- A. Verification of Conditions:
1. Openings are correctly prepared to receive doors and frames.
  2. Openings are correct size and depth in accordance with shop drawings.
- B. Installer's Examination:
1. Installer shall examine conditions under which construction activities of this section are to be performed and submit written report if conditions are unacceptable.
  2. Transmit two copies of installer's report to Architect within 24 hours of receipt.
  3. Beginning construction activities of this section before unacceptable conditions have been corrected is prohibited.
  4. Beginning construction activities of this section indicates installer's acceptance of conditions.

#### 3.02 INSTALLATION

- A. Install door opening assemblies in accordance with shop drawings, SDI 100, and manufacturer's printed installation instructions, using installation methods and materials specified in installation instructions.
- B. Field alteration of doors or frames to accommodate field conditions is strictly prohibited.
- C. Installation of door hardware is specified in Section 08710 - FINISH HARDWARE.
- D. Site Tolerances: Maintain plumb and level tolerances specified in manufacturer's printed installation instructions.

3.03 ADJUSTING

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

3.04 CLEANING

- A. Clean surfaces of door opening assemblies and sight-exposed door hardware in accordance with manufacturer's maintenance instructions.

3.05 PROTECTION OF INSTALLED PRODUCTS

- A. Protect door opening assemblies and door hardware from damage by subsequent construction activities until final inspection.

END OF SECTION

## SECTION 08710 – FINISH HARDWARE

### PART 1 - GENERAL

#### 1.01 SUMMARY

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

#### 1.02 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

- A. Section 06200 – FINISH CARPENTRY: Furnish templates for frame preparation.
- B. Section 08110 – STEEL DOORS AND FRAMES: Furnish templates for door preparation.
- C. Section 08115 – PREFINISHED STEEL DOOR FRAMES
- D. Section 08210 - WOOD DOORS: Furnish templates for door preparation
- E. Section 08520 – GLAZED ALUMINUM SYSTEMS

#### 1.03 REFERENCES: The publications listed below form a part of this Specification to the extent referenced. These publications are referred to in the text by the basic designation only.

- A. ADA - Americans with Disabilities Act.
- B. NFPA 80 - Fire Doors and Windows.
- C. NFPA 252 - Fire Tests of Door Assemblies.
- D. UL 10C - Fire Tests of Door Assemblies.
- E. NFPA 101 - Life Safety Code.
- F. 2006 IBC with Maui County Amendments

#### 1.04 SUBMITTALS

- A. Submit in accordance with Section 01330 -SUBMITTAL PROCEDURES.

- B. Schedule: Furnish six (6) copies of the schedule of hardware in compliance with specifications and Drawings. Schedule format shall be vertical type as listed in DHI document "Sequence and Format for the Hardware Schedule". List each opening and hardware to be applied. State materials finish, and manufacturer's number for each item. Required types are listed.
- C. Manufacturer's Data: Submit manufacturer's descriptive literature along with schedule for information only.
- D. Keying Schedule: Submit a keying schedule for approval, using keying nomenclature as listed in DHI document "Keying Terminology". Door designation listed in the Keying Schedule shall be same as those used on Drawings and Hardware Schedule.
- E. Templates: Furnish hardware templates of each fabricator of doors, frames and other work to be factory-prepared for the installation of hardware. Upon request, check Shop Drawings of such other work, to confirm that adequate provisions are made for proper location and installation of hardware.
- F. Tools and Maintenance Instructions: Furnish a complete set of special wrenches, tools, maintenance instructions applicable to each different or special hardware component.
- G. Certification: After completion and inspection by hardware supplier of all construction work, certify on an approved form, that all items of finish hardware have been adjusted and are working properly and that all hardware on fire rated (labeled) closures conforms to requirements of ULI.
- H. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance

#### 1.05 QUALITY ASSURANCE

- A. Perform work in accordance with ADA, ANSI A117.1, NFPA 80, NFPA 101, NFPA 252.
- B. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience. Obtain each type of hardware (latch and lock sets, hinges, closer, etc.) from a single manufacturer.
- C. Hardware Supplier Personnel: Employ an experienced Architectural Hardware Consultant (AHC), or Architect accepted equal, who is available at reasonable times during the course of the Work, to the Architect and Contractor for consultation about Project's hardware requirements, to verify specified hardware with door function and hardware finishes, and to establish keying system.
- D. Hardware Supplier: Supplier must have a local warehouse and office and have local inventory for all items supplied for this project.
- E. Hardware Installer: Company specializing in the installation of architectural hardware and approved by the Architect and architectural hardware consultant (AHC), or Architects approved equal.



#### 1.06 REGULATORY REQUIREMENTS

- A. Conform to applicable code for accessibility and requirements applicable to fire rated doors and frames.
- B. Products Requiring Electrical Connection: Listed and classified by Underwriter's Laboratories, Inc., as suitable for the purpose specified and indicated.

#### 1.07 DELIVERY

- A. Examine the drawings, specifications, and details in order to check all items so they will be suitable and of perfect fit and delivered where and when required.
- B. All hardware shall be delivered to the job site, packed separately with all trimmings, screws, etc., for the particular door, all properly labeled and numbered so that they can be checked when delivered.
- C. Upon delivery of the finishing hardware to the job site by the hardware supplier, the General Contractor shall have a responsible person check in the material at the place for storage. The hardware shall be protected from damage at all times, both prior to and after installation.

#### 1.08 COORDINATION

- A. Coordinate the work with other directly affected sections involving manufacture or fabrication of internal reinforcement for door hardware, and door machining for all hardware items.

### PART 2 - PRODUCTS

#### 2.01 SCHEDULED HARDWARE

- A. Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware is indicated in HARDWARE SCHEDULE at end of this Section. Products are identified by using proprietary catalog numbers and are used to establish quality and function of products desired.
- B. Manufacturers' Product Designations: Provide either product designated or comparable product of one of the other listed acceptable manufacturers.
- C. Hardware shall comply with requirements of the Americans with Disabilities Act Accessibility Guidelines (ADAAG), where required.

#### 2.02 MATERIALS AND FABRICATION

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

- for each type hardware item and with ANSI A156.18 for finish designations indicated. Do not furnish optional materials or forming methods for those indicated, except as otherwise specified.
- C. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware which has been prepared for self-tapping sheet metal screws, except as specifically indicated.
  - D. Furnish screws for installation, with each hardware item. Provide Phillips flat head screws except as otherwise indicated. Finish exposed screws to match hardware finish. If exposed in surfaces of other work, to match finish of such other work as closely as possible, including prepared-for-paint finish in surfaces to receive painted finish.
  - E. Provide concealed fasteners for hardware units which are exposed when door is closed, except to the extent no standard units of the type specified are available with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed in other work, except where it is not feasible to adequately reinforce the Work. In such cases, provide sleeves for each through bolt or use sex screws fasteners

#### 2.03 HINGES, BUTTS AND PIVOTS

- A. Templates: Except for hinges to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.
- B. Screws: Furnish Phillips flat head or machine screws for installation of units, except furnish Phillips flat head or wood screws for installation of units into wood. Finish screw heads to match surface of hinges or pivots.
- C. Hinges Pins: Except as otherwise indicated, provide hinge pins as follows:
  - 1. Nonferrous Hinges: Stainless steel pins.
  - 2. Exterior, Out-swing Doors: Non-removable pins (NRP).
  - 3. Interior Doors: Non-rising pins.
  - 4. Tips: Flat button and matching plug, finished to match leaves.
- D. Number of Hinges: Provide number of hinges indicated but not less than 3 hinges for door leaf for doors 90 inches or less in height and one additional hinge for each 30 inches of additional height.

#### 2.04 KEYING

- A. Keys: Provide four (4) keys per lock stamped with keyset number. All keys shall be stamped "DO NOT DUPLICATE". All locks shall be construction master-keyed. Provide ten (10) construction master keys, six (6) master keys per set.
- B. Permanent Keying Instructions:
  - 1. The project shall be Grand Master-keyed as directed by owner.
  - 2. Prior to acceptance of the keys, the Contractor shall remove the Construction Master and together with the Engineer, and representative from the owner,

and hardware installer, shall inspect each lock with the cut keys, building Grand Master Key, etc.

#### 2.05 WEATHERSTRIPPING AND DOOR SEALS

- A. Provide noncorrosive fasteners as recommended by manufacturer for application indicated.
- B. Weather-strip: Except where furnished as part of an entrance door package or as otherwise indicated, provide continuous weather-stripping at each edge of every exterior door leaf.
- C. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strip is easily replaceable and readily available from stocks maintained by manufacturer.
- D. Smoke Seals: Provide continuous seals at each edge of door leaf.

#### 2.06 TEMPLATES

- A. Templates as may be required to be furnished the Contractor within seven days after receipt of an order and approved hardware schedule.

#### 2.07 TOOLS AND INSTRUCTIONS

- A. All tools and maintenance or installation instruction packed with the closers and locksets shall be given to the State of Hawaii when the project is completed.

#### 2.08 FINISHES

- A. Finishes: Identified in schedule at end of Section.
  - 1. Designations used are those listed in ANSI/BHMA A156.18 -American National Standards for Materials and Finishes, including coordination with traditional U.S. finishes shown by certain manufacturers for their products.
  - 2. If no BHMA finish is established, match specified product.
- B. Provide matching finishes for hardware units at each door or opening to greatest extent possible, except as otherwise indicated. Reduce differences in color and textures as much as commercially possible where base metal or metal forming process is different for individual units of hardware exposed at same door or opening.
- C. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness and other qualities complying with manufacturer's standards, but in no case less than specified for applicable units of hardware by referenced standards.

### PART 3 - EXECUTION

#### 3.01 EXAMINATION

- A. Verify that doors and frames are ready to receive Work and dimensions are as indicated. Hardware installer must notify the architect of any conflicts prior to installing hardware.

#### 3.02 INSTALLATION

- A. Install each hardware item in compliance with manufacturer's instructions and recommendations.
- B. Mount hardware units at height indicated in the Door and Hardware Institute's Recommended Locations for Builders Hardware for Standard Steel Doors and Frames, except:
  - 1. As otherwise indicated or as required to comply with governing regulations.
  - 2. Mount deadbolt (if any) centerline not more than 5 inches above latchset handle centerline.
- C. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, coordinate removal, storage and reinstallation or application of surface protection with finishing work. Do not install surface mounted items until finishes have been completed on the substrate.
- D. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.
- E. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- F. Set metal thresholds for exterior doors in full bed of butyl rubber or polyisobutylene mastic sealant.
- G. Fit face of all mortise parts snug and flush.
- H. Operating parts shall move freely and smoothly without binding, sticking or excessive clearance.
- I. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- J. Protect hardware from damage or marring of finish during construction. Use strippable coatings, removable tapes or other approved means.
- K. Ensure that hardware displays no evidence of finish paint after building cleanup with exception of prime coated hardware installed for finish painting. The Contractor may achieve this by sequencing installation, removing after fittings and reinstalling after painting is completed, providing protection, cleaning original hardware finish, or other approved means.
- L. Latch and bolt: Install latch and bolt to automatically engage in keeper, whether activated by closer or manual push. In no case shall additional manual pressure

be required to engage latch or bolt in keeper.

### 3.03 HARDWARE MANUFACTURER'S REPRESENTATIVE/SUPPLIER INSPECTION

- A. Pre-Installation Meeting: Before start of work, under this contract, the Contractor, hardware installer, hardware manufacturer's representative or supplier and the Architect shall meet to review the hardware installation instructions and installation conditions.
- B. Before final inspection of the work under this contract and acceptance of the project by the Architect, the supplier of hardware and other items specified in this Section shall visit the site and carefully inspect all parts for conformance to this specification, adequacy for intended use, proper functioning, appearance, finish and successful operation, assuming joint responsibility with the General Contractor.

### 3.04 ADJUST AND CLEAN

- A. Hardware installer shall adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace items which cannot be adjusted to operate freely and smoothly as intended for application made.
- B. Hardware installer shall clean adjacent surface soiled by hardware installation.
- C. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, hardware installer shall return to the Work during the week prior to acceptance or occupancy and make final check and adjustment of all hardware items in such space or area:
  - 1. Clean operating items as necessary to restore proper function and finish of hardware and doors.
  - 2. Adjust door control devices to compensate for final operation of ventilating equipment.
  - 3. Lubricate bearings surface of moving parts and adjust latching and holding devices for proper function.
- D. Test keys for proper conformance with keying system

### 3.05 HARDWARE SCHEDULE

- A. Product types indicated in the HARDWARE GROUPS are those of the manufacturers listed and are used to establish the quality of the products intended.
- B. Typical requirements are described in the catalogs of:

#### MANUFACTURER LIST

CATEGORY	VENDOR NAME	MFG
BARN DOOR KIT	BY ARTISAN HARDWARE	
ART COMMUNICATING LOCK	BY BALDWIN HARDWARE CORP.	

BAL DEADBOLT	BY BALDWIN HARDWARE CORP.	
BAL DOOR PULLS CONTEMP.	BY BALDWIN HARDWARE CORP.	
BAL EDGE PULL	BY BALDWIN HARDWARE CORP.	
BAL EMERGENCY RELEASE	BY BALDWIN HARDWARE CORP.	
BAL PASSAGE SET	BY BALDWIN HARDWARE CORP.	
BAL PRIVACY SET	BY BALDWIN HARDWARE CORP.	
BAL CONCEALED CLOSER	BY DORMA USA, INC.	
DOR PATIO SECURITY LATCH	BY HARRY ENGERT CO., INC.	HAR
HINGE	BY McKINNEY PRODUCTS COMPANY	
MCK AUTO. DOOR BOTTOM	BY PEMKO	
PEM DOOR SEAL	BY PEMKO	
PEM PRIVACY DOOR LATCH	BY PEMKO	
PEM HINGE PIN STOP	BY PERFECT PRODUCTS/DOOR SAVER	
PRF DOOR STOP	BY ROCKWOOD MANUFACTURING CO.	
ROC DOOR VIEWER	BY ROCKWOOD MANUFACTURING CO.	
ROC ELECTRONIC LOCKSET	BY KABA/SAFLOK	SAF
FACTORY TRAINING	BY KABA/SAFLOK	SAF
KEY CARDS	BY KABA/SAFLOK	SAF
QUANTUM ENCODER	BY KABA/SAFLOK	SAF
SERVER	BY KABA/SAFLOK	SAF
WINDOW SOFTWARE	BY KABA/SAFLOK	SAF
DOOR CLOSER	BY SARGENT MANUFACTURING CO.	SAR
LOCKSET	BY SARGENT MANUFACTURING CO.	SAR
MORTISE CYLINDER	BY SARGENT MANUFACTURING CO.	SAR
OH CONCEALED STP/HDL	BY SARGENT MANUFACTURING CO.	SAR
PRIVACY SET	BY SARGENT MANUFACTURING CO.	SAR
STOREROOM LOCK	BY SARGENT MANUFACTURING CO.	SAR
BARN DOOR TRACK KIT	BY SPECIALTY DOORS, INC.	SPL

ALL HARDWARE MANUFACTURERS TO PROVIDE COMMERCIAL GRADE EXTERIOR OR  
EXTERIOR GRADE HARDWARE GROUPS PER DESCRIPTION

#### MANUFACTURER LIST

CATEGORY	VENDOR NAME	MFG
HINGE	BY McKINNEY PRODUCTS COMPANY	MCK
DOOR SEAL	BY PEMKO	PEM
SPLIT ASTRAGAL	BY PEMKO	PEM
THRESHOLD	BY PEMKO	PEM
FLOOR STOP	BY ROCKWOOD MANUFACTURING CO.	ROC
KICKPLATE	BY ROCKWOOD MANUFACTURING CO.	ROC
PULL PLATE	BY ROCKWOOD MANUFACTURING CO.	ROC
PUSH PLATE	BY ROCKWOOD MANUFACTURING CO.	ROC
WALL STOP (CONCAVE)	BY ROCKWOOD MANUFACTURING CO.	ROC
DOOR CLOSER	BY SARGENT MANUFACTURING COMPANY	SAR
LOCKSET	BY SARGENT MANUFACTURING COMPANY	SAR
MORTISE CYLINDER	BY SARGENT MANUFACTURING COMPANY	SAR
MORTISE DEADLOCK	BY SARGENT MANUFACTURING COMPANY	SAR
PRIVACY SET	BY SARGENT MANUFACTURING COMPANY	SAR
PANIC EXIT DEVICE	BY SARGENT MANUFACTURING COMPANY	SAR

ALL EXTERIOR GROUPS: 630 SATIN STAINLESS STEEL  
ALL INTERIOR GROUPS: US26D SATIN CHROME PLATED

HW GROUP – 001  
DOUBLE EXTERIOR DOORS (PANIC)

6.0	EA	HINGE	-	PEM
2.0	EA	PANIC EXIT DEVICE	-	ROC
1.0	EA	MORTISE DEADLOCK	-	SAR
2.0	EA	KICKPLATE	-	ROC
2.0	EA	DOOR CLOSER	-	SAR
2.0	EA	FLOOR STOP	-	ROC
1.0	EA	FLOOR/HEAD BOLT SET	-	SAR
1.0	EA	THRESHOLD	72"	PEM
1.0	EA	DOOR SEAL	-	PEM

HW GROUP - 002  
SINGLE EXTERIOR DOORS (PANIC)

3.0	EA	HINGE	-	PEM
1.0	EA	PANIC EXIT DEVICE	-	ROC
1.0	EA	MORTISE DEADLOCK	-	SAR
1.0	EA	KICKPLATE	-	ROC
1.0	EA	DOOR CLOSER	-	SAR
1.0	EA	FLOOR STOP	-	ROC
1.0	EA	THRESHOLD	36"	PEM
1.0	EA	DOOR SEAL	-	PEM

HW GROUP – 003  
EXTERIOR BATHROOM DOOR

3.0	EA	HINGE	-	MCK
1.0	EA	DEADLOCK	-	SAR
1.0	EA	DOOR CLOSER	-	SAR
2.0	EA	DOOR SEAL	-	PEM
1.0	EA	DOOR PUSH	-	PEM
1.0	EA	DOOR PULL	-	
1.0	EA	WALL STOP	-	ROC
1.0	EA	THRESHOLD	36"	PEM

HW GROUP – 004  
EXTERIOR DOUBLE DOOR-KITCHEN

6.0	EA	HINGE	-	PEM
2.0	EA	LOCKSET	-	ROC
1.0	EA	MORTISE DEADLOCK	-	SAR
2.0	EA	KICKPLATE	-	ROC
2.0	EA	DOOR CLOSER	-	SAR
2.0	EA	FLOOR STOP	-	ROC
1.0	EA	FLOOR/HEAD BOLT SET	-	SAR
1.0	EA	THRESHOLD	72"	PEM
1.0	EA	DOOR SEAL	-	PEM

HW GROUP – 005  
INTERIOR BATHROOM DOOR

3.0	EA	HINGE	-	MCK
1.0	EA	DEADLOCK	-	SAR
1.0	EA	DOOR CLOSER	-	SAR
1.0	EA	DOOR PUSH	-	PEM
1.0	EA	DOOR PULL	-	SAR
1.0	EA	WALL STOP	-	ROC
1.0	EA	MARBLE THRESHOLD	36"	-

HW GROUP – 006  
INTERIOR OFFICE DOOR

3.0	EA	HINGE	-	MCK
1.0	EA	LOCKSET	-	SAR
1.0	EA	WALL STOP	-	ROC

HW GROUP – 007  
INTERIOR STORAGE DOOR

3.0	EA	HINGE	-	MCK
1.0	EA	LOCKSET	-	SAR
1.0	EA	WALL STOP	-	ROC

HW GROUP – 008  
INTERIOR DOUBLE ACCESS DOOR (PANIC)

6.0	EA	HINGE	-	PEM
2.0	EA	PANIC EXIT DEVICE	-	ROC
1.0	EA	LOCKSET	-	SAR
2.0	EA	DOOR CLOSER	-	SAR
2.0	EA	WALL STOP	-	ROC
1.0	EA	FLOOR/HEAD BOLT SET	-	SAR
1.0	EA	ASTRAGAL	-	PEM

HW GROUP – 009  
EXTERIOR STORAGE DOOR

3.0	EA	HINGE	-	PEM
1.0	EA	MORTISE DEADLOCK	-	SAR
1.0	EA	KICKPLATE	-	ROC
1.0	EA	DOOR CLOSER	-	SAR
1.0	EA	WALL STOP	-	ROC
1.0	EA	THRESHOLD	36"	PEM
1.0	EA	DOOR SEAL	-	PEM



HW GROUP – 010  
EXTERIOR WATER HEATER DOOR

3.0	EA	HINGE	-	PEM
1.0	EA	MORTISE DEADLOCK	-	SAR
1.0	EA	THRESHOLD	36"	PEM
1.0	EA	DOOR SEAL	-	PEM

HW GROUP – 011  
INTERIOR KITCHEN DOOR

3.0	EA	HINGE	-	PEM
1.0	EA	MORTISE DEADLOCK	-	SAR
1.0	EA	KICKPLATE	-	ROC
1.0	EA	DOOR CLOSER	-	SAR
1.0	EA	WALL STOP	-	ROC
1.0	EA	MARBLE THRESHOLD	36"	-

END OF SCHEDULE

END OF SECTION

## 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.
  - 1. Insulating Glass Units
  - 2. Monolithic Glass Units
- B. Related Work Described Elsewhere:
  - 1. Section 07910 – FAÇADE SEALANTS
  - 2. Section 08115 – PRE-FINISHED STEEL DOOR FRAMES
  - 3. Section 08210 – WOOD DOORS
  - 4. Section 08460 – AUTOMATIC ENTRANCE DOORS
  - 5. Section 08990 – GLAZED ALUMINUM SYSTEMS

#### 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. GANA's Glazing Manual.
  - 5. 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 square feet in exposed surface area of one side, provide glazing products that comply with Category II materials, for lites 9 square feet 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 or flexure limit of glass whichever is less with full recovery of glazing materials.
- D. Sealants for glazing shall conform to AAMA 800, "Voluntary Specifications and Test Methods for Sealants", AAMA 850, "Fenestration Sealant Guide Manual" and the requirements specified in Section 07910 – FAÇADE SEALANTS.
- 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 DELEGATED ENGINEERING REQUIREMENTS

- A. Project Glazing Analysis: Prepared by manufacturer for primary glass or fabricator for fabricated glass units, analyze each glass type and glazing condition for following:
  - 1. Thermal Analysis:
    - a. Evaluate effects of partial and full shading of glass under expected service temperature ranges.
    - b. Evaluate that specified probability of breakage, glass statistical factor, will not be reduced.
  - 2. Wind Load Analysis: Evaluate effects of wind loading and determine design factor, statistical probability of breakage, and center deflection for largest size of each thickness and type of primary glass or fabricated glass units.
  - 3. Heat Strengthened Glass Face Pressure: Evaluate that pressure falls within specified limits.

#### 1.04 PERFORMANCE REQUIREMENTS

- A. Other Requirements: Coordinate and comply with applicable performance requirements included in specification Section 08990 - 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° off vertical: Not more than 8 per 1,000 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 inch, whichever is less, supported on all four (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 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 lites 1/4-inch thick and a nominal 1/2-inch wide air space
  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/ square feet x h x ° F
    - b. Solar Heat Gain Coefficient: NFRC 200.
    - c. Solar Optical Properties: NFRC 300

#### 1.05 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 08990 – GLAZED ALUMINUM SYSTEMS:
  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:
  1. Submit three (3) each 12-inch square samples of each type and thickness of glass for acceptance prior to ordering.
  2. Submit 12-inches long of each type product and profile, including molded corners for gaskets.
- 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:
  - 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 - FACADE SEALANTS
- L. Source Quality Control – Heat Soaking Test Reports: Logs from fabricator specified in PART 2 “Source Quality Control” Article.

#### 1.06 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.

#### 1.07 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.

#### 1.08 ENVIRONMENTAL REQUIREMENTS

- A. Weather Condition Limitation: Proceed with work only when existing and forecasted weather conditions will permit installation according to manufacturers' instructions, warranty requirements, and following requirements:
  - 1. Do not glaze when glazing channels and rabbets are wet

2. Do not glaze when ambient or surface temperatures are outside limits allowed by respective product manufacturers, or below 40° F. At respective product manufacturer's discretion, glazing may proceed below this temperature according to following:
  - a. Manufacturer establishes written provisions required to ensure proper installation.
  - b. Contractor records conditions under which installation was performed.
3. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

#### 1.09 WARRANTY

##### B. 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, faulty work and failures, signed by an authorized representative using manufacturer's standard form.
  - a. Coated Glass Products: 10 years.
  - b. Laminated Glass Products: 5 years.
  - c. Insulated Glass Unit Products: 10 years.
2. Defects, Faulty Work, and Failures: Includes, but not limited to, following:
  - a. General:
    - 1) Defective manufacture, fabrication, and installation.
    - 2) Failure of sealants or gaskets to remain watertight and airtight.
    - 3) Spontaneous glass breakage.
    - 4) Glass breakage due to installation or thermal movement
  - b. Evaluation of Coated Vision Glass: As viewed from indicated distance, against a bright, uniform background; vision area shall extend to within 3 inches of perimeter of lite.
    - 1) Pinholes:
      - (i) Distance of 6 feet or more, pinholes greater than 1/32-inch diameter in central area and 1/16-inch diameter in outer area not acceptable.
      - (ii) The central area is a square or rectangle concentric with the daylight opening and having width and height respectively equal to 80 percent of the daylight opening width and height.
      - (iii) The outer area extends from the border of the central area to the edges of the daylight opening.
      - (iv) Within any 12-inch diameter circle, there shall be no more than one pinhole with diameter in the range 1/32 inch to 1/16 inch.

Within any 12-inch diameter circle, there shall be no more than four pinholes.

2) Reflectance, Transmission and Color:

- (i) Distance of 10 feet from the glass, viewing perpendicular to the glass plane, using natural light (or acceptable light box in the case of factory inspections) for locating flaws.
- (ii) Streaks or splotches resulting from non-uniformity of the coating which are visible from the building interior or exterior are not permitted.

3) Scratches: Distance of 10 feet or more, scratches exceeding 1/2 inch not acceptable if located in vision area.

c. Definitions for Deterioration:

- 1) Coatings on Glass: Defects developed from normal use that is attributed to manufacturing process, such as peeling, cracking, crazing, delaminating, uneven color fade, and other indications of deterioration in coating, and not to causes other than glass breakage and practices for maintaining and cleaning coated glass contrary to manufacturer's written instructions.
- 2) Sealed Insulating Glass Units: Failure of hermetic seal under normal use that is attributed to manufacturing process, such as obstruction of vision by interpane dusting or misting, internal condensation, moisture, or film on interior surfaces of glass, and not to causes other than glass breakage and practices for maintaining and cleaning units contrary to manufacturer's written instructions.
- 3) Laminated Glass Units: Defects developed from normal use that is attributed to manufacturing process, such as edge separation, edge fogging, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced product standard, and not to causes other than glass breakage and practices for maintaining and cleaning laminated glass contrary to manufacturer's written instructions.

## PART 2 - PRODUCTS

### 2.01 MANUFACTURER'S

- A. All glass products shall be of the quality as manufactured by Old Castle Building Envelope, PPG Industries, Inc., Pilkington LOF, Guardian Industries, Viracon, Inc., or approved equal.

### 2.02 LAMINATED GLASS UNITS

- A. Laminated Glass: ASTM C 1172, and complying with other requirements specified and with the following;

1. Interlayer: Polyvinyl butyral 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.
- B. Laminating Process: Fabricate laminated glass to produce glass free of foreign substances and air or glass pockets.

### 2.03 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 published test data for units with 1/4-inch-thick panes of glass and 1/2-inch thick air space.
  6. U-values indicated are expressed in the number of Btu's per hour per sq. ft. per ° F difference.
- B. Insulating Glass Certification Program: Provide insulating glass units permanently marked either on spacers or at least one component pane of units with appropriate certification label of inspecting and testing organization indicated below:
  1. Insulating Glass Certification Council (IGCC).
- C. Characteristics:
  1. Thickness of Each Pane: 1/4-inch.
  2. Air Space Thickness: 1/2-inch.
  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.
- D. Vacuum-Deposited Insulating Glass Units: 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:
  1. Insulated Glass Units: Consisting of two lites of fully tempered glass separated by metal spacer system for an overall thickness of 1-inch.
    - a. Outer Lite: Float glass, Kind FT (Fully Tempered), Condition C, Type 1, Class 1 (Clear), Quality q3, 1/4-inch thick.
      - i. Low-E Coating: PPG Solarban 70 XL on the number two surface.
    - b. Air Space: 1/2-inch.
    - c. Interior Pane: Float glass, Kind FT (Fully Tempered), Condition A, Type 1, Class 1 (Clear), Quality q3, 1/4-inch thick Thickness: 1/4-inch.
    - d. Performance Requirements:
      - i. Visible Light Transmittance: 64 percent.
      - ii. Summer Daytime U value: 0.26 Winter Nighttime U value: 0.28
      - iii. Shading Coefficient: 0.32
      - iv. Solar Heat Gain Coefficient: 0.27

#### 2.04 MONOLITHIC GLASS UNITS

- A. Float Glass, Clear, Tempered, (Safety Glass): Kind FT (fully tempered), Condition A, Type 1, Class 1, Quality q3, 1/4-inch thick unless indicated or required otherwise.

#### 2.05 GLASS QUALITY CONTROL

- A. Fabrication Process: By horizontal (roller) process with roller-wave distortion parallel to bottom edge of glass as installed according to following criteria, unless otherwise indicated, specified, or required:
  1. Bow and warp: 1/3 of published tolerances of ASTM C1048.
  2. Warp: As indicated in ASTM C 1048, Table 2.
  3. Localized Warp: Not more than 1/32-inch in 12-inches.
  4. Glass that has any deviation from flat (bow) of 0.15% of the shortest glass dimension.
  5. Roll-Wave Distortion: Peak to valley deviation not more than 0.003-inch for 1/4-inch thick glass at center of glass and 0.008-inch at edges. Deviation from flatness at any peak not more than 0.005-inch.
  6. Where bow tolerance and wave tolerance differ, the stricter requirements shall govern.

7. 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-inches of corners; depth shall not exceed 0.0394 inch and length, or diameter shall not exceed 1/4-inch.

## 2.06 GLAZING MATERIALS

### A. General:

1. All gaskets and weather stripping 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, weather stripping 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 12 psf.
8. Refer to Section 07910 – FAÇADE SEALANTS for approved sealants, structural 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.
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](http://www.pecora.com).
  - b. Saint-Gobain Performance Plastics: [www.plastics.saint-gobain.com](http://www.plastics.saint-gobain.com).
  - c. Tremco, Inc.: [www.tremcosealants.com](http://www.tremcosealants.com)

C. Gasket Glazing:

1. "Sponge" glazing gaskets shall be cellular neoprene or cellular EPDM complying with ASTM C 509, Option 1, Type II or silicone complying with ASTM C 1115, Type C, Class F. Sponge gaskets shall have a hardness of 40  $\pm$ 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 complying with ASTM C 864, Option 1 or dense extruded silicone complying with ASTM C 1115, Type C, Class F. Wedge gaskets shall have a hardness of 75  $\pm$ 5 durometer Shore A for hollow profiles and 60  $\pm$ 5 for solid profiles.
3. Both gaskets shall be compatible for incidental point contact with structural or weather seal silicones.

D. Setting Blocks:

1. Shall be dense extruded silicone, ASTM C 1115, Type C with a hardness of 85  $\pm$ 5 durometer Shore A.
2. Shall have a minimum length of 4-inches 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.

F. Edge Blocks

1. Locate side blocks where required within the upper half of each jamb for each light.
2. Blocks shall be 65  $\pm$ 5 durometer Shore A dense silicone, ASTM C 1115, Type C, sized and profiled for intended use.

3. Install block with 1/8-inch 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.

## 2.07 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.

## 2.08 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. Tempered Glass Heat Soaking Testing: (CDC Standard)
  1. Purpose: Heat soak [all] [a representative sampling] glass with surface or edge stress of 7,500 psi (527.30 k/sq cm) according to following for not less than 2 cycles.
  2. Method:
    - a. Monitor surface temperature with thermocouples.
    - b. Heat up furnace for amount of time required by thickness:
      - i. 1/4 in (6 mm): 30 minutes.
      - ii. 3/8 in (9 mm): 70 minutes.
      - iii. 1/2 in (12 mm): 120 minutes.
      - iv. 3/4 in (19 mm): 270 minutes.
    - c. Hold glass in furnace with center of lite at not less than 525 deg F (275 deg C) for not less than one hour.
    - d. Cool down time of one-half of heat up time.
  3. Reports: Maintain log indicating dates, times, and results; include print-outs from computer monitoring equipment.

## 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. Installation Quality Standards: Install glass and glazing watertight, airtight, and complying with project glazing analysis. In addition to standards specified elsewhere, perform work according to following, unless otherwise specified or more stringent requirements are indicated:
  - 1. GANA-GM Glazing Manual.
  - 2. GANA-FGMA Sealant Manual
- B. 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.
- C. 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.
- D. 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.
- E. Provide edge blocking to comply with requirements of referenced glazing standard, except where otherwise required by glass unit manufacturer.
- F. Set units of glass in each series with uniformity of draw, bow and similar characteristics.
- G. 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.
- H. Force sealants into glazing channels to eliminate voids and to ensure complete "wetting" or bond of sealant to glass and channel surfaces.
- I. 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.

- J. 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.
- K. 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.
- L. 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 strike-off flush.
- M. 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.
- N. 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.

### 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 08830 - MIRRORS

### PART 1 - GENERAL

#### 1.01 SUMMARY

- A. Section includes the following types of silvered flat glass mirrors:
  - 1. Film-backed glass mirrors qualifying as safety glazing.

#### 1.02 SUBMITTALS

- A. Product Data: For each type of product indicated.
  - 1. Mirrors. Include description of materials and process used to produce each type of silvered flat glass mirror specified that indicates sources of glass, glass coating components, edge sealer, and quality-control provisions.
- B. Shop Drawings: Include mirror elevations, edge details, mirror hardware, and attachments to other work.
- C. Samples: For each type of the following products:
  - 1. Mirrors: 12-inches square, including edge treatment on two adjoining edges.
  - 2. Mirror Clips: Full size.
- D. Qualification Data: For qualified Installer.
- E. Product Certificates: For each type of mirror and mirror mastic, from manufacturer.
- F. Preconstruction Test Reports: From mirror manufacturer indicating that mirror mastic was tested for compatibility and adhesion with mirror backing paint and substrates on which mirrors are installed.
- G. Maintenance Data: For mirrors to include in maintenance manuals.
- H. Warranty: Sample of special warranty.

#### 1.03 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.
- B. Source Limitations for Mirrors: Obtain mirrors from single source from single manufacturer.
- C. Source Limitations for Mirror Accessories: Obtain mirror glazing accessories from single source.
- D. Glazing Publications: Comply with the following published recommendations:
  - 1. GANA's "Glazing Manual" unless more stringent requirements are indicated. Refer to this publication for definitions of glass and glazing terms not otherwise defined in this Section or in referenced standards.

2. GANA Mirror Division's "Mirrors, Handle with Extreme Care: Tips for the Professional on the Care and Handling of Mirrors."
- E. Safety Glazing Products: For film-backed mirrors, provide products complying with testing requirements in 16 CFR 1201 for Category II materials.
- F. Preconstruction Mirror Mastic Compatibility Test: Submit mirror mastic products to mirror manufacturer for testing to determine compatibility of mastic with mirror backing paint and substrates on which mirrors are installed.

#### 1.04 DELIVERY, STORAGE, AND HANDLING

- A. Protect mirrors according to mirror manufacturer's written instructions and as needed to prevent damage to mirrors from moisture, condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with mirror manufacturer's written instructions for shipping, storing, and handling mirrors as needed to prevent deterioration of silvering, damage to edges, and abrasion of glass surfaces and applied coatings. Store indoors.

#### 1.05 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install mirrors until ambient temperature and humidity conditions are maintained at levels indicated for final occupancy.

#### 1.06 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which mirror manufacturer agrees to replace mirrors that deteriorate within specified warranty period. Deterioration of mirrors is defined as defects developed from normal use that are not attributed to mirror breakage or to maintaining and cleaning mirrors contrary to manufacturer's written instructions. Defects include discoloration, black spots, and clouding of the silver film.
  1. Warranty Period: Two (2) years from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.01 FLAT GLASS MIRRORS

- A. Glass Mirrors, General: ASTM C 1503.
- B. Clear Glass: Mirror Select Quality. One surface of the glass shall have silver coating and copper-free protective film backing. Two coats of mirror backing paint shall be applied over the backing and edges of the mirror.
  1. Nominal Thickness: 1/4-inch.
  2. Size: As indicated on the Drawings

#### 2.02 MISCELLANEOUS MATERIALS

- A. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85,  $\pm 5$ .



- B. Edge Sealer: Coating compatible with glass coating and approved by mirror manufacturer for use in protecting against silver deterioration at mirrored glass edges.
- C. Mirror Mastic: An adhesive setting compound, asbestos-free, produced specifically for setting mirrors and certified by both mirror manufacturer and mastic manufacturer as compatible with glass coating and substrates on which mirrors will be installed.
- D. Film Backing for Safety Mirrors: Film backing and pressure-sensitive adhesive; both compatible with mirror backing paint as certified by mirror manufacturer.

#### 2.03 MIRROR HARDWARE

- A. Mirror Top Clips: C.R. Laurence two-piece anochrome mirror clips Model No. KV278.
- B. Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.
- C. Anchors and Inserts: Provide devices as required for mirror hardware installation. Provide toothed or lead-shield expansion-bolt devices for drilled-in-place anchors. Provide galvanized anchors and inserts for applications on inside face of exterior walls and where indicated.

#### 2.04 FABRICATION

- A. Mirror Sizes: To suit Project conditions cut mirrors to final sizes and shapes.
- B. Cutouts: Fabricate cutouts for notches and holes in mirrors without marring visible surfaces. Locate and size cutouts so they fit closely around penetrations in mirrors.
- C. Mirror Edge Treatment:
  - 1. Flat polished
  - 2. Seal edges of mirrors with edge sealer after edge treatment to prevent chemical or atmospheric penetration of glass coating.
  - 3. Require mirror manufacturer to perform edge treatment and sealing in factory immediately after cutting to final sizes.
- D. Film-Backed Safety Mirrors: Apply film backing with adhesive coating over mirror backing paint as recommended in writing by film-backing manufacturer to produce a surface free of bubbles, blisters, and other imperfections.

### PART 3 - EXECUTION

#### 3.01 EXAMINATION

- A. Examine substrates, over which mirrors are to be mounted, with Installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance of the Work.
- B. Verify compatibility with and suitability of substrates, including compatibility of mirror mastic with existing finishes or primers.

- C. Proceed with installation only after unsatisfactory conditions have been corrected and surfaces are dry.

### 3.02 PREPARATION

- A. Comply with mastic manufacturer's written installation instructions for preparation of substrates, including coating substrates with mastic manufacturer's special bond coating where applicable.

### 3.03 INSTALLATION

- A. General: Install mirrors to comply with mirror manufacturer's written instructions and with referenced GANA publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.
- B. Provide a minimum air space of 1/8 inch between back of mirrors and mounting surface for air circulation between back of mirrors and face of mounting surface.
- C. Mastic Mounted Mirrors: Install mirrors with mastic and mirror hardware. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirrors.
  - 1. Mirror Clips: Place a felt or plastic pad between mirror and each clip to prevent spalling of mirror edges. Locate clips where indicated.
  - 2. Install mastic as follows:
    - a. Apply barrier coat to mirror backing where approved in writing by manufacturers of mirrors and backing material.
    - b. Apply mastic to comply with mastic manufacturer's written instructions for coverage and to allow air circulation between back of mirrors and face of mounting surface.
    - c. After mastic is applied, align mirrors and press into place while maintaining a minimum air space of 1/8 inch between back of mirrors and mounting surface.

### 3.04 CLEANING AND PROTECTION

- A. Protect mirrors from breakage and contaminating substances resulting from construction operations.
- B. Do not permit edges of mirrors to be exposed to standing water.
- C. Maintain environmental conditions that will prevent mirrors from being exposed to moisture from condensation or other sources for continuous periods of time.
- D. Wash exposed surface of mirrors not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash mirrors as recommended in writing by mirror manufacturer.

END OF SECTION

## SECTION 08990 - GLAZED ALUMINUM SYSTEMS

### PART 1 - GENERAL

#### 1.01 SUMMARY

- A. This section includes the provision and installation of the Glazed Aluminum Systems, including Aluminum Architectural Windows, Exterior Glass and Glazing, and Façade Sealants as well as a coordinated installation of this work with the Fiber Cement Siding.
  - 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 - FAÇADE 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.
  - 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.
  - 8. All materials and labor to erect a visual mock-up on site.
- D. Related work not included in this section:
  - 1. Section 07910 – FAÇADE SEALANTS
  - 2. 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. AAMA – Architectural Aluminum Manufacturers Association
  - 1. 101/I.S. 2, Voluntary Specifications for Windows and Glass Doors.
  - 2. AAMA 501.1, Standard Test Method for Water Penetration of Windows, Curtain Walls and Doors Using Dynamic Pressure
  - 3. WSG.1, Window Selection Guide
  - 4. AAMA 2603, Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels
  - 5. AAMA 2604, Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels
  - 6. AAMA 2605, Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels
  - 7. AAMA 800, Test Methods for Sealants
  - 8. AAMA 1503, Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.
  - 9. RPC, Rain Penetration Control.
  - 10. CW-13, Structural Sealant Glazing Systems
  - 11. AAMA 620, Voluntary Specifications for High Performance Organic Coatings on Coil Coated Architectural Aluminum Substrates
  - 12. AAMA 621, Voluntary Specifications for High Performance Organic Coatings on Coil Coated Architectural Hot Dipped Galvanized (HDG) and Zinc-Aluminum Coated Steel Substrates
  - 13. 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
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 C 1401, Guide for Structural Sealant Glazing
  11. ASTM D 968, Test Method for Abrasion Resistance of Organic Coatings by Falling Abrasive
  12. ASTM D 1654, Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments
  13. ASTM D 2244, Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
  14. ASTM D 2247, Practice for Testing Water Resistance of Coatings in 100% Relative Humidity
  15. ASTM D 3363, Test Method for Film Hardness by Pencil Test
  16. ASTM D 4214, Test Method for Evaluating Degree of Chalking of Exterior Paint Films
  17. 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
  18. ASTM E 330, Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference
  19. ASTM E 331, Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference

- 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. No pressure reduction allowed; design pressure shall be as specified herein.
- 21. ASTM E 547, Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Cyclic Static Air Pressure Differential. No pressure reduction allowed; design pressure shall be as specified herein.
- H. SSPC-Society for Protecting Coatings.
  - 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. GANA – 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. AMCA - Air Movement and Control Association International Inc.
  - 1. AMCA Standard 500 Test Method for Louvers, Dampers, and Shutters.
  - 2. AMCA Publication 261 Directory of Licensed Products, current edition.
- N. IBC 2006 with City and County of Honolulu amendments.

### 1.03 QUALITY ASSURANCE

- A. Engage a single firm to assume undivided responsibility for fabrication, installation and total coordination of all components of the Work as described above and herein. This firm must demonstrate not less than ten (10) years consecutive successful experience in fabrication and installation of work similar to the work of this project. Individual experience does not qualify.
- B. The subcontracting of any work included hereunder is specifically prohibited, except for that which may be accepted by the Architect, Owner or their representatives in writing ten (10) days prior to award of the contract.
- C. The Glazing Contractor is responsible for coordination, compatibility and design integrity to secure 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.

- D. 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.
- E. 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.
- F. Manufacturer's representative shall periodically inspect material and installation to insure 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.
- G. 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.
- H. 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.

#### 1.04 DRAWINGS AND SPECIFICATIONS

- A. The character of these documents is 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 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. Provide glass manufacturers wind and thermal stress analysis, and center deflection calculations showing that specified maximum probabilities of breakage are not exceeded.
    - c. Written statement from glass manufacturer that each glass product is suitable for proposed application. Submit letter that states manufacturer has reviewed the Glazed Aluminum System shop drawings and has approved the glazing details shown therein.
  - 3. Sealants & Backer Rod
    - a. Comply with submittal requirements of Section 07910 –FAÇADE SEALANTS.
    - b. For each type of Sealant provide three (3) cured samples and four (4) copies of technical data and color selection charts.
    - c. Sealant Manufacturer's review of sealant conditions and usage along with certification that all products are recommended for such use and fully



- meet the specifications and will not cause staining or change in appearance of adjacent substrate materials.
- d. Compatibility and Adhesion Test Reports: For each type of sealant manufacturer's report on compatibility, staining and adhesion tests.
  - e. Certification of acceptance of installation procedures signed by the glass manufacturer and silicone sealant manufacturer.
  - f. 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. 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.
- 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. 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.
  - 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 Structural Engineer 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.

#### 1.06 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.
- 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 2006 and ASCE 7.
    - a. Wind load Criteria:
      - 1) Design Wind Speed: 105 mph in three second gusts.
      - 2) Exposure: B
      - 3) Importance Factor: 1.0

- 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.
  - d. A 1/3 increase in allowable working stress for wind or seismic loads is not acceptable.
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.
  - 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. 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.
  - 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. 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 elements, loosening, weakening or fracturing of attachments or components of system.
- G. 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. No chemical anchors for overhead deadload connections shall be allowed on this project.
- H. 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. Interstory Drift
    - e. Elastic shortening of the building, as may be anticipated.
    - f. Differential foundation settlement, when relative.

- g. 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.
- I. Lateral Displacement Resistance Criteria:
  - 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. 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 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. The wall may experience localized material failures, sealant may tear, 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.
- J. 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.
- K. Air Infiltration
  - 1. Air-Infiltration Rate for Fixed Windows: Not more than 0.06 cfm/ft<sup>2</sup> 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.
- L. 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.
  - 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.

## 1.07 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 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: 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.



- I. 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. Glass Warranty: Refer to Section 08800 – GLAZING
  - D. Submit a written warranty signed by glass manufacturer that guarantees spandrel glass as specified in Section 08800 – GLAZING.
    - 1. Warranty Period: 5 years after date of Substantial Completion.
  - E. Sealant Warranty: Refer to Section 07910 – FAÇADE SEALANTS, for a 20-year warranty.
  - F. 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.
  - G. 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.

#### 1.08 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.

#### 1.09 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.
- 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 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.
- 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.

### 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. EFCO
  - 2. Oldcastle Building Envelope
  - 3. Wausau
  - 4. or approved equal.

## 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.
  - 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.

## 2.03 ALUMINUM SLIDING WINDOWS

- A. Horizontal Sliding Window: Non-thermal, dual glazed units, Horizontal Rolling Window System of HC60 grade or better, in sizes and configurations as indicated and scheduled on the Drawings.
  - 1. Frames: Principal window members will be a minimum 0.080-inch in thickness, trims shall be 0.062-inch in thickness.
  - 2. Sash: Sash members shall be minimum 0.062-inch thick. Sash's glazing pocket sized to accept a factory glazed 1-inch infill specified in Section 08800 – GLAZING with a minimum 5/8-inch glass bite.
  - 3. Hardware:
    - a. Roller Assembly: Two stainless steel tandem wheel housings conforming to AAMA 906-96: Each housing contains two adjustable 1-5/8" stainless steel wheels.
    - b. Lock: Dual point adjustable stainless-steel mortise lock with interior latch lever.
    - c. Pulls: Powder coated, white, interior pull handles, the handles shall allow for a hand to grab and control the window. Pulls must be ADA compliant.
    - d. Restrain window opening at 4" maximum, provide opening force per Building Code for Fire rescue.
  - 4. Weather Stripping: Window ventilators shall receive continuous seamless elastomeric or embossed non-vinyl skin over closed-cell foam. Weather stripping shall be applied to the integral dovetail weather-strip grooves in the interior and exterior contact surfaces of the head and jambs of the frame ventilator sections. Weather-stripping that is surface applied or requires additional retainer or requires screws for application shall not be acceptable.
  - 5. Fabrication:

- a. Frame: Head and sill field fastened to jambs with stainless steel screws (two per corner). Sill to jamb corners field sealed.
- b. Water control: Sill to be two-piece tank design, all sill anchor fasteners to be concealed in the tank with the proper application of sealant on the fastener heads. Weep slots and drain slots allow water to drain by gravity and resist wind-driven water.
- c. Panels: Vertical panel stiles coped and fastened to horizontal panel rails with a telescopic design joint secured with two stainless steel screws per panel corner.
- d. Glazing: Manufacturer's standard extruded EPDM wrap-around gasket complying with the requirements specified in Section 08800 – GLAZING.

#### 2.04 ALUMINUM TERRACE DOORS AND SIDELITES

- A. Aluminum Terrace Doors: Terrace door assembly shall meet the performance requirements and shall have a grade designation for Heavy Commercial ATD-CW-55. Provide TerraStile Series T450i Outswing Terrace Doors as manufactured by EFCO Corporation.
- B. All aluminum frames shall be fabricated from extrusions having a nominal wall thickness of 0.125 inch. All glazing bead extrusions shall have a nominal wall thickness of 0.070 inch.
- C. Door Leaf: 2-1/4-inch deep with 10-inch bottom rails. Door leaf components shall be miter cut and mechanically fastened with stainless steel fasteners. Each corner will have extruded aluminum corner keys. Corners shall be sealed with joint sealant to ensure water tightness. Frames glazing pocket sized to accept a 1-inch infill and a 1/2-inch glass bite.
- D. Sidelites: Aluminum framing shall be thermally broken, 4-1/2-inch depth, offset captured glazed; glass set to the exterior, jambs and vertical mullions continuous; head and sill attached by screw spline joinery, equivalent to EFCO Corporation., Series 450X Fixed Window.
- E. Accessories:
  - 1. Threshold: Extruded aluminum threshold of dimensions and profile required to comply with performance requirements indicated and the Department of Justice 2010 ADA Standards for Accessible Design Section 303.
    - a. Finish: to match door frame.
  - 2. Weather stripping:
    - a. General: Weatherstripping material captured in extruded aluminum door panel. Surface applied self-adhesive weather stripping not acceptable.
      - 1) Designed to provide an effective pressure-equalization seal at the interior face of the door panel and completely concealed when outswinging aluminum-framed glass door is closed.
      - 2) Standard: AAMA/NWWDA 101/I.S.2.
        - a) Elastomeric cellular preformed gaskets EPDM or Neoprene: ASTM C 509.
        - b) Dense elastomeric gaskets: ASTM C 864.

c) Molded PVC gasket: ASTM D 2287

3. Door Hardware

- a. Hinge: 2 pair, ANSI/BHMA 156.1, Grade 1 fully mortised, five- knuckle, stainless steel butt hinges per leaf. Stainless steel pins with FRP bushings 4-1/2 inch x 4-1/2 inch. Finish, US26D.
- b. Lockset: Manufacturers standard locking mechanism shall be multipoint rolling cam type on the active leaf as installed by the door manufacturer.
- c. Levers: As selected by Architect from manufacturer's full range of designs.
- d. Secondary ADA compliant U bolt lock per Marriott Brand standard

2.05 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. 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).
  - 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. 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.
- H. Submit for approval a quality control program, including procedures and processes, to assure compliance with the specified requirements.
- I. 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.

- J. 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.
  - 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: Sage Brown, Duranar UC45082.
- K. Wood Cladding Finish: Penetrating oil finish, Penofin Exterior Hardwood Formula.

## 2.06 GLASS AND GLAZING

- A. Comply with the requirements of Section 08800 - GLAZING
- B. Vision glass re-glazing at Window Wall shall be either from the exterior or the interior. At the interior, however, must be without removal of adjacent finished conditions.

## 2.07 GASKETS/WEATHERSTRIPPING

- A. Comply with the requirements of Section 08800 - GLAZING

## 2.08 FASTENERS

- A. 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.
- 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
  - 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
- 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: Elco Industries, Inc.; 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 Elco Industries, Inc. or Kwik-Flex as manufactured by Hilti, Inc. No substitutions accepted. Self-drilling fasteners used in wet areas shall include Elco'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.

## 2.09 SEALANT MATERIALS

- A. Comply with the requirements of Section 07910 - FAÇADE 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.
- 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.

## 2.10 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. 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. 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.
- F. 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.
- G. 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.

## 2.11 FABRICATION



- A. All parts of the Glazed Aluminum Systems shall be of the materials, design, sizes and thicknesses shown or called for on the drawings and/or herein specified. Methods of fabrication and assembly however, unless otherwise specifically stated, shall be at the discretion of the manufacturer subject to acceptance by the Architect.
- B. Make all cutouts for penetrations at the factory, wherever possible.
- C. Changes of plane, parallel or transverse to longitudinal axis shall be accomplished as detailed on the drawings in the factory wherever practical and with a minimum of field fabrication.
- D. All miter and 90° joints are to be made in a factory environment.
- E. Protection against galvanic action shall be provided wherever dissimilar metals are in contact by painting the dissimilar metal surfaces with a heavy coat of zinc chromate primer (Specification FS TT-P-645, SSPC-SP6 and SSPC- SP12.01) or by application of an appropriate sealant or tape or other approved galvanic isolator.
- F. All welding shall be in accord with pertinent recommendations of the American Welding Society and shall be done with electrodes and/or by methods recommended by the suppliers of the metals being welded. Type, size and spacings of welds shall be as shown on approved shop drawings and structural calculations. Paint all field welds with zinc rich primer.
- G. Welds behind finished surfaces shall be done as to minimize distortion and/or discoloration on the finished side. Weld splatter and welding oxides on finished surfaces shall be removed by descaling and/or grinding. Telegraphing of welds through a finished surface will not be accepted.

## 2.12 SHOP ASSEMBLY

- A. To the fullest extent practicable, fabrication and assembly shall be executed under factory conditions, and in compliance with the standards and procedures of the appropriate manufacturers. Components or parts that are not required to be shop assembled shall be shop fitted and marked before disassembly to ensure proper assembly later at the building site.
- B. Any site assemblies shall be approved by the Architect, Owner and their representatives.
- C. Assemble components into complete weathertight units with flush, rigid, hairline and watertight joints. Match components to ensure continuity of line and design. All fastening, jointing and splicing of members shall be concealed, unless noted otherwise.
- D. Fasteners shall not penetrate gutters or drainage systems.
- E. Welds of gutters and end dams shall not constitute a water seal. All welds in areas intended to retain and channel water shall be completely sealed with approved sealants.
- F. Provide weep holes and internal passages to drain to exterior all moisture entering joints and glazing spaces, and condensation occurring within frame construction.



## 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 subcontractor's 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. Building frame: adjust work to conform with the following tolerances (maximum variations) in the building frame and other work adjacent to the wall:
  - 1. Vertical Location. Plumb variations such as faces of exterior columns and walls shall be  $\pm 1$  inch in 100 feet.  $1/4$  inch in 10 feet, 1-inch max. for total height of structure.
  - 2. Variations from levels shown on drawings, top and bottom surfaces of floor slabs and spandrel beams shall be  $\pm 1$  inch.

3. Variations from location shown on drawings such as outer faces of walls, framing members and floor slabs shall be  $\pm 1$  inch.
  4. Variation from location shown on drawings for adjacent surfaces of spandrel materials or jamb materials is a maximum of 1/4 inch.
  5. Variation from location shown on drawings for edge of floor slab shall be  $\pm 1/2$  inch.
- D. 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 inch.
  2. Maximum deviation from approved shop drawings in plan or elevation, including deviation from plumb, level, or dimensioned angle: 1/8 inch per 12 foot run in any direction, or 1/2 inch in any total length.
  3. Maximum Variation from Plumb: 1/32 inch every 3 feet non-cumulative or 1/4 inch per 100 feet, whichever is less.
  4. Longitudinal or Diagonal Warp:  $\pm 1/8$  inch from 10 feet straight edge.
  5. Sealant Space Between aluminum frames and Adjacent Construction: Minimum of 1/4 inch.
- E. Provide shims, slotted holes or other means necessary for leveling, plumbing and other required adjustments.
- F. 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.
- G. 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.
- H. Protect glass, cement plaster 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.
- I. 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.
- J. 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.

- K. 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.
- L. 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.
- M. 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.
- N. 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.
- O. 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.
- P. 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 – FAÇADE 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 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.

3.05 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 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. Acoustical assembly's for gypsum board walls and ceilings.
  - 3. Shaftwall partitioning.
- B. Related Work Described Elsewhere:
  - 1. Wood Framing is provided under Section 06100 – ROUGH CARPENTRY.
  - 2. Thermal and acoustical insulation are provided under Section 07210 – BUILDING INSULATION.
  - 3. Access panels are provided under Section 08305 – ACCESS DOORS.

#### 1.02 QUALITY ASSURANCE

- A. Fire Resistive Design: The construction shall comply with the applicable provisions of 2006 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. STC-Rated Assemblies: For STC rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- D. 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 "Gypsum Wallboard", 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 inches wide, QuietRock 525 as manufactured by Quiet Solution, Inc.
- 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.
- E. Abuse Resistant Board (ARB): ASTM C 1629, Abuse resistant gypsum board with fiberglass mat facing, 5/8-inch thick with tapered edges, 48 inches wide, Type X (Special Fire Retardant).
- F. Tile Backer Unit: ASTM C 1178 "Glass Mat Water-Resistant, Gypsum Backing Board", 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.
- G. Soffit Board: ASTM C 931 or ASTM C 1396, "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. Shaftliner: ASTM C 442 "Gypsum Backing Board and Coreboard", 1-inch thick gypsum coreboard, "V" T&G square panels, 24 inches wide, used as base layer for vent shaft partitioning, where noted.
  - I. Wallboard Fasteners: ASTM C 1002 "Steel Drill Screws for the Application of Gypsum or Metal Plaster Bases", standard bugle head self-drilling, self-tapping corrosive-resistant drywall screws, Screws used in fire-resistive rated construction shall be of type approved for use by governing building code.
  - J. Reinforced Tape and Cement: 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.
  - K. Shaftwall Framing:
    - 1. C-H Studs: Studs shall be minimum 25-gauge, 2-1/2 inch unless indicated otherwise on the drawings. Studs shall be rolled formed electro-zinc plated steel. Provide holes and notches for conduit or electrical wiring.
    - 2. Runner Tracks: Standard J-profile track with manufacturer's standard long-leg length, but at least 2 inches long and matching studs in gauge thickness and depth.
  - L. Furring Channels (non-acoustical assembly's): ASTM C 645, hat-shaped, 7/8-inch deep, hot-dipped galvanized, 25-gauge or as required by specified partition or ceiling assembly.
  - M. 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.
  - N. Resilient Channel-Isolation Clip System (acoustical assembly's):
    - 1. Sound isolation clips specified shall be designed and manufactured by Kinetics Noise Control, Dublin, Ohio. Product shall be Model Iso-Max Sound Isolation Clips or approved equal.
    - 2. Vertical Load capacity. Clips shall have sufficient capacity to support wall or ceiling weights as constructed. In a vertical load test comparable to a ceiling installation, the clip shall have a minimum design load capacity of 36 lbs. using 25-gauge furring channel. The minimum design load capacity when using 22-gauge furring channel shall be 48 lbs. Design Load capacity shall be based on a safety factor where the load to failure, defined as pullout of the channel from the clip, is a minimum 2.5 times the allowable maximum Design Load. Anchors for attachment of the clips to the substructure shall be selected to support wall and/or ceiling weights at each clip.



3. The isolation clips shall consist of a rubber element into which a standard galvanized steel furring channel, 7/8-inch x minimum 25-gauge, is captured. The channel legs snap fit into the rubber element without any metal-to-metal or other rigid contact with building elements.
  4. The isolation clip is attached to the wall/ceiling framing or other structural substrate through galvanized steel brackets on each side of the rubber isolation element. The brackets shall be of sufficient strength to carry the wall or ceiling weight without bending or failure.
- O. 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.
- P. Joint Treatment Materials: ASTM C 475; type recommended by manufacturer for the application indicated, except as otherwise noted. Perforated tape, and joint and topping compound, or "all-purpose" compound.
- Q. Laminating Adhesive: Special adhesive or joint compound specifically recommended for laminating gypsum boards.

## 2.02 TEXTURED FINISHES

- A. Primer: Texture manufacturer's latex primer paint or a high quality interior latex primer with a minimum solids content of 40 percent by volume, appropriate for the substrate to which it is applied.
- B. Unaggregated Finish: Water-based, job-mixed, unaggregated, drying-type texture finish for spray application.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. USG Corporation; SHEETROCK Wall and Ceiling Spray Texture (Unaggregated).
  2. Texture: As approved by mock up and Marriott Brand Standard.

## 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



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. Shaftwall Framing:
  - 1. Vent Shaft Furring: Install floor, ceiling, and sidewall angle runners accurately according to partition layout, and securely to structural supports with suitable fasteners, in accordance with wallboard manufacturer's recommendations. Install ceiling runners by fastening through the web. Install angle runners horizontally as bracing at quarter points and spaced no greater than 5-feet on center.
  - 2. Seal tracks for sound rated partitions with continuous beads of acoustical sealant along each face prior to installation of gypsum board.
- D. 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 ¼-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.

E. 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 1997 UBC.
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.

F. 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 kerf-ed 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.

G. Installation resilient channel

1. Install work in accordance with the manufacturer's approved product installation procedures.
2. Spacing and location of resilient channel shall be determined by the manufacturer based on wall or ceiling type. Installation drawing details shall be provided by the manufacturer to assure optimum sound control and structural integrity of the sound-isolated drywall ceiling system.

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, wall surfaces to receive an eggshell finish and wall surfaces to receive all grades of wallcovering.
  4. Level 5: For wall surfaces to receive semi-gloss enamel. All other exposed surfaces
  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.

### 3.04 APPLYING TEXTURE FINISHES

- A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.
- B. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture matching approved mockup and free of starved spots or other evidence of thin application or of application patterns.
- C. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture-finish manufacturer's written recommendations.
- D. Texture Finish Schedule: Spray texture to be applied to walls in all guest units.

1. Level of gypsum board finish prior to application of textured finish: Level 4.
2. Walls: Spray apply an orange peel finish using specified texturing compound. Comply with manufacturer's recommendations for job-mixed texture compound. Texture to match approved texture of unit mock-up.

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. Gypsum concrete underlayment is specified under Section 03541 – GYPSUM CEMENT BASED CONCRETE
  - 2. Sealants are specified under Section 07920 - SEALANTS.
  - 3. Tile backer board is provided under Section 09250 – GYPSUM BOARD ASSEMBLIES.
  - 4. 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. Samples: Submit four (4) each, samples of various tiles and accessories required to the Contracting Officer 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.
- E. 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.
- F. Sealant Compatibility Test Report: From sealant manufacturer, complying with requirements in Section 07920 – SEALANTS and indicating that sealants will not stain or damage tile.
- G. Warranty: Warranty for a minimum of 2 years against defects resulting from the use of defective or inferior materials, equipment or workmanship.
- H. Maintenance Data: For ceramic and stone 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 and stone tiles 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. Source Limitations for Other Materials: Obtain each type of grout, tile accessories, sealant, and other material from a single manufacturer for each product.

### 1.04 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.

### 1.05 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.

### 1.06 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.

## PART 2 - PRODUCTS

### 2.01 MATERIALS

- A. Ceramic Wall and Floor Tiles ("CT-" designation on the Drawings): 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. Slip Resistance: Floor tiles without abrasive content: Static coefficient of friction not less than 0.60 when tested according to ASTM C 1028. Wet and dry values reported separately.

2. Ceramic Floor, Wall Tile and Trims: Dust-pressed, white non-vitreous body with cushion or semi-cushion edges in sizes and finishes as scheduled.
3. Porcelain Tile: Porcelain wall tile and trim shall be glazed and floor tile unglazed, in size and finish as scheduled.
4. 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.
5. Quarry Tile: Extruded clay or shale; unglazed, square edged, non-abrasive textured wear surface, Dal-Tile Corp, Quarry Textures, in finishes as scheduled.
  - a. Field Tile: 6-inches square by 1/2-inch thick
  - b. Cove Base: 5-inches by 6-inches
  - c. Cove Corners: 1-inch by 5-inches

## 2.02 SETTING MATERIALS

- A. Mortar Bed: Portland Cement Mortar, ANSI 108.02 and as specified below:
  1. Portland Cement: ASTM C 150, Type I or II.
  2. Aggregate: ASTM C 144.
  3. Cleavage Membrane: Polyethelene sheeting, ASTM D 4397, 4.0 mils thick.
  4. 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
- 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 of gauging water.
- C. Large Heavy Tile (LHT), Latex-Portland Cement Mortar: Provide large heavy tile mortar for floor tiles have at least on side dimension greater than 15-inches. Comply with requirements in ANSI A118.4. Provide product that is approved by manufacturer for application thickness of 3/8 inch minimum.
- D. Epoxy Mortar: ANSI A118.3, 100 percent solids. For use with Quarry Tile
- E. Water: Fresh, clean and drinkable.

## 2.03 GROUTING MATERIALS

- A. Manufacturer and Colors as indicated by "GR-" designation on the Drawings.
  1. Polymer-Modified Tile Grout: ANSI A118.7 composed of Portland cement, graded aggregates, polymers and color-fast pigments.
    - a. Sanded Grout for joints from 1/8-inch to 1/2-inch.
    - b. Un-Sanded Grout for joints less than 1/8-inch.



2. Epoxy Grout at Quarry Tile: ANSI A118.3. 100-percent solids, two component system, Sanded.

#### 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 they are applied to.
  1. Single-component, mildew-resistant, silicone sealant (JS-06) 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.

#### 2.05 MISCELLANEOUS MATERIALS

- A. Stone Threshold: As scheduled.
- B. Edge Trim: Edge trim shall be aluminum in sizes as indicated or required by thicknesses of materials including setting materials. Trim shall be equal to Schluter Systems Inc. components.
- C. Waterproofing Membrane: As specified in Section 09340 – TILE WATERPROOFING.
- D. Prefabricated Shower Pans: Prefabricated type, presloped, one-piece shower pan with integrated curb with structural ribbing and linear drain; Redi Trench Shower Pan as manufactured by Tile Redi USA, LLC. Fabricate of dimensions and layouts indicated; provide custom layouts where required. Provide barrier-free shower pans where required by ADA-ABA and as indicated on the Drawings
  1. Setting Adhesive: Provide prefabricated shower pan manufacturers multiple part, chemical resistant epoxy setting adhesive, complying with ANSI A118.3; Redi Pox.
  2. Provide all manufacturers aluminium sheet wall flashing; Redi Flash.
  3. Drain Grate: Polished Chrome Designer Grate

### 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 Contracting Officer. 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. 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.
- D. Clean dirty or stained stone tile surfaces by removing soil, stains, and foreign materials before setting. Clean stone tile by thoroughly scrubbing with fiber brushes and then drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh materials or abrasives.
- 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. Prefabricate Shower Curb Installation: Follow curb manufacturers written instructions.
  1. Measure and cut solid curb to the required length with fine tooth saw and dry fit.

2. Apply thinset mortar to the floor substrate and the bottom and both ends of the solid curb. Embed into the thinset on the floor substrate. Remove any excess thinset mortar and allow to cure
  3. Continuously seal joints where the curb ends meet wall and jamb construction with silicone sealant (JS-06).
- 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. TCA Installation Guidelines: TCA “Handbook for Ceramic Tile Installation”; comply with TCA 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 follows:
  1. Space movement joints a maximum of 12-feet on center with a minimum joint width of 1/4-inch for interior installations.
  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 07920 – SEALANTS.
  4. 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.

- 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: 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. Sealer: Apply 1-2 coats to tile and grout in accordance to the manufacture'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, TCA installation methods related to types of subfloor construction, and grout types:
  - 1. Latex Portland Cement Mortar (Interior): ANSI A108.5 as indicated.
    - a. On-Ground Concrete: TCNA Installation Method F113 for 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 a LHT mortar.
    - b. Above-Ground Concrete: TCNA Installation Method F113A for 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 a LHT mortar.
    - c. Above-Ground Concrete: TCNA Installation Method F131 for quarry tile installation with ANSI A118.3 Epoxy cement mortar bond coat over waterproofing membrane.
    - d. 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 a LHT mortar.

- e. Wood Joist/Plywood Substrate, Poured Gypsum Underlayment, Bonded Membrane: TCNA Installation Method F180 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 a LHT mortar.
- f. Elevator Cab Floors with Exterior Glue Plywood Substrate: TCNA Installation Method F160 (Modified) for tile installation with ANSI A118.11 Latex-Portland cement LHT mortar.

2. Grout: Polymer Modified Tile Grout.

B. Floor Installation

- 1. Apply thin-set mortar over concrete or cured waterproofing membrane on top of concrete substrate or gypsum concrete underlayment 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, 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. Stone Thresholds: Install stone thresholds at locations indicated; set in same type of setting bed as abutting field tile unless otherwise indicated. 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: 1/8-inch joint width.
  - 2. Quarry Tile: 3/8-inch joint width

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, TCA installation methods related to subsurface wall conditions, and grout types:
  - 1. Latex-Portland Cement Mortar: ANSI A108.5.
    - a. Tile Backer Board: TCA Installation Method W245.

- b. Tub and Shower Walls: TCA Installation Method B419
- 2. Grout: 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 bath tub 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 percent except in shower walls where contact area shall not be less than 95 percent 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.

### 3.07 SHOWER PAN INSTALLATION

- A. Install in accordance with prefabricated shower pan manufacturer's instructions and recommendations and the following:
  - 1. Verify that shower pan is aligned properly and fits tight against framing on all sides of the shower.
  - 2. Verify the drainpipe stubbed up from the slab is adjusted to a height sufficient to fit properly into the shower pan drain connection.
  - 3. Apply a 1/2-inch to 3/4-inch mortar bed on the entire area of the shower floor to the edge of the drain hole. Brush PVC or ABS adhesive on the outside of the cut drain pipe and quickly insert into drain connection.
  - 4. Set the shower pan carefully into the mortar bed and the drain housing into the drain hole in the concrete slab. Be sure the drainpipe extends far enough below the subfloor.
  - 5. Firmly press the shower pan into place, making sure there is a good seal between the curb and the subfloor.
  - 6. Verify shower is level in all directions.
  - 7. Install sheet metal wall flashing with upturn leg against the metal wall framing and downturn leg over and down the pan splash walls. Install the shower backer board in accordance with the standards established by the Tile Council of North America, Inc.
  - 8. Seal and waterproof joint between backer board and the sheet metal wall flashing over shower pan splash walls.
  - 9. Coordinate and adjust shower pan drain height to accommodate tile and setting bed thickness.

#### B. Shower Floor Installation

1. Apply pre-fabricated shower pan manufacturer's epoxy setting adhesive over the pre-fabricated shower pan using the appropriate type and size trowel recommended for the size tile by the tile manufacturer. Place only that amount of adhesive that can be covered with tile before initial set.
  2. 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.
  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. Rake out joints to depth required to receive grout as units are set.
- C. 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 MEMBRANE INSTALLATION

- A. Install waterproofing membrane in accordance with Section 09340 – TILE WATERPROOFING.

### 3.09 GROUTING JOINTS

- A. General:
1. Grout Stone, Cermic and Porcelain tile to comply with ANSI A108.10 and ANSI A108.6 for epoxy grout at quarry tile installation.
  2. Remove temporary shims before grouting.
  3. 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. Cure Polymer Modified Tile grout by maintaining in a damp condition for seven days except as otherwise recommended by latex-additive manufacturer.
  3. Allow epoxy grout to cure per manufacturer's instructions.

### 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 Applications: Tile at showers walls and upper level bathroom floors.
  - 2. The waterproofing shall not allow for the passage of water thru 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 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 (VOC).
- 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 TCA 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. Mockups: Apply mockups to set quality standards for materials and execution.
  - 1. Architect will select one representative shower for waterproofing and shower pan system to develop a standard of workmanship.
  - 2. Remove and reapply mockup until they are approved by Architect.
  - 3. Mockup shall be water tested as specified herein prior to approval
  - 4. Installation of other shower waterproofing shall not commence prior to the approval of the mockup. If done, said installations will be done at the contractor's risk and may be subject to removal or reapplication at no cost to the Owner.
  - 5. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- K. Preinstallation Conference: Conduct conference at Project site.
  - 1. Before installing waterproofing, meet with representatives of authorities having jurisdiction, manufacturer's technical representative, Owner, 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; base, intermediate, and topcoats; 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 an alloy of non-plasticized chlorinated polyethylene (CPE) with non-woven fiber laminated to both sides, 0.030-inch nominal thickness.
- C. Products: Subject to compliance with requirements, provide one of the following: Noble Company, Nobleseal TS (Basis of Design).
  - 1. Pre-manufactured items for Interior Waterproofing: Whenever possible, utilize manufacturer's pre-manufactured items such as corners, curbs and other similar items.
- D. Miscellaneous Materials
  - 1. Bonding Mortar: Latex-Portland cement mortar, ANSI A118.4, with manufacturer's standard latex additive (water emulsion) serving as a replacement for part or all of gauging water.
- E. Seam Sealants: Manufacturer's thermoplastic, high-solid, synthetic co-polymer rubber sealant; NobleSealant 150.

### 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 content in plywood substrate using pin-type moisture meter. Plywood substrate should have a moisture content of 12% or less.
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.
  1. For gypsum concrete underlayment prime the entire surface to receive crack isolation membrane and tile with specified primer. Apply primer in strict accordance to the manufacturer's written instructions.

### 3.03 INTERIOR TILE WATERPROOFING INSTALLATION

- A. Waterproofing Application, General
  1. Apply waterproofing systems per TCA 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. Unroll sheet into bonding mortar before mortar skins over and embed membrane using a rubber hand roller or flat side of trowel.
  4. Prior to curing lift sheet and inspect for full contact.
  5. Seaming: Where seams are required seam wall membrane together with 2-inch overlaps with the upper edge towards the direction of the drainage. Apply a 3/16-inch continuous bead of seam sealant, without skips or gaps, 3/4-inch from the edge of the sheet being overlapped. Overlap sheets and flattened seam with roller or flat side of trowel.
  6. Turn sheet membrane installed on floors up vertical surfaces minimum 2-inches higher than finished floor and bond to substrate,
  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. 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 Architect or Owner 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.

### 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 09652 – RESILIENT FLOORING

### PART 1 - GENERAL

#### 1.01 SUMMARY

A. This Section includes the following:

1. Sheet vinyl flooring
2. Resilient Wall Base

B. Related Sections include the following:

1. Section 03300 – CAST-IN-PLACE CONCRETE for leveling and finishing of concrete floor slabs and topping in preparation for resilient flooring.
2. Section 03541 – GYPSUM CEMENT BASED CONCRETE for leveling and finishing of gypsum based concrete topping in preparation for resilient flooring.

#### 1.02 SUBMITTALS

- A. Product Data: Submit manufacturers data, installation instructions, and maintenance manuals for woven textile flooring.
- B. Samples: Submit verification samples showing the required finishes, colors, designs, and textures for flooring, as well as samples of adhesives and applicable accessories such as welding rods.
- C. Manufacturer Instructions: For specified products, submit latest editions of product supplier's installation and cleaning and maintenance instructions.
- D. Product Test Reports: Submit test certificates from an independent test laboratory showing compliance with specified performance characteristics and physical properties.
- E. Compatibility and Adhesion Test Reports: Submit test reports confirming adhesive's effectiveness and compatibility with the flooring products specified and the substrates to which flooring is being applied.
- F. Warranty Documentation: For specified products and accessories, submit product supplier's warranty documents.

#### 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: Installer shall have a minimum of five years of proven experience in performing work of this section and in installing sheet vinyl floor covering – including heat welding and coving, if applicable -- similar to that required for this project and shall provide a minimum of three references for comparable systems and installations successfully performed by the installer within the last 18 months.
  1. Installer shall be certified in resilient flooring installation.

- 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.

#### 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 65 and 80° 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° F plus or (-) 5° 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° F or more than 95° 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 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 quantity of woven textile flooring not less than 2 percent of total installed, whichever is less, of each type, color, pattern of flooring 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 wall base installed.
3. Deliver extra materials to Owner.

#### 1.07 WARRANTY

- A. Provide manufacturer's limited warranty against defects in manufacturing and workmanship of resilient flooring for a period of One year from the Date of Substantial Completion.
- B. Provide manufacturer's limit warranty against wear for a period of 2 years from the Date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.01 ASBESTOS PROHIBITION

- A. 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.

#### 2.02 MANUFACTURERS AND PRODUCTS

- A. Homogeneous Vinyl Sheet Flooring: ASTM 1913
  1. Resilient flooring composed of homogeneous single polyurethane reinforced wear layer, Melodia as manufactured by Johnsonite.
    - a. Non-directional pattern
    - b. Thickness: 0.080-inch (2.0mm)
    - c. Roll/Sheet Width: 6-foot- 6-inches.
    - d. Critical Radiant Flux Classification: ASTM E 648; Class 1; Not less than 0.45 W/sq. cm.
    - e. Static Load Limit: ASTM F 970, 250 psi.
  2. Color and Pattern: As Scheduled
- B. Resilient Wall Base (RB-): 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 or approved equal.
    - a. Color and Size as indicated on the Drawings. Provide in manufacturer's standard coiled lengths
  2. Provide coved toe base and pre-molded outside and inside corners.

#### 2.03 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, Portland cement based or blended hydraulic cement based formulation provided or approved by floor covering manufacturer for applications indicated.
- B. Adhesives: Brush-on , roll-on, or trowel on water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.
- C. Chemical Weld Adhesive: Flooring manufacturer's recommended vinyl seam adhesive..
- D. Sealers: Types recommended by flooring 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 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 to include Gypsum Cement 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. Concrete Moisture Testing: Where installation directly over Portland cement based concrete, perform anhydrous calcium chloride test per ASTM F 1869, as follows:
    - a. Perform tests so that each test area does not exceed 200 sq. ft. and perform not less than two (2) tests in each installation area with test areas evenly spaced in installation area.
    - b. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lbs. of water per 1,000 sq. ft. in 24 hours.
    - c. Perform alkalinity and adhesion tests recommended in writing by flooring and adhesive manufacturer.

- 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.
- 3. Subfloor finishes comply with requirements specified in Section 03300 - CAST-IN-PLACE CONCRETE for slabs receiving resilient flooring.
- 4. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.
- C. Gypsum Concrete Underlayment: Verify that gypsum based concrete underlayment is primed or seal as recommended by the flooring and gypsum concrete underlayment manufacturer for the application as specified herein.
- D. 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. 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. 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

- A. General: Comply with tile manufacturer's written installation instructions.
- B. 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.
- 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.
- E. 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.

- F. 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, non-staining marking device.
- G. 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.
- H. Place resilient transition moldings tightly butted to flooring, and secure with adhesive recommended by the transition molding manufacturer. Install transition molding at edges of flooring that would otherwise be exposed and the transition to another type of flooring.
- I. After sheet in adhesive, roll the floor with a 100 lb. tree section floor roller. Roll the adhered areas at least twice, once in each direction.

#### 3.04 RESILIENT WALL BASE INSTALLATION

- A. Apply wall base to walls, columns, pilasters, 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. Pre-molded Corners: Install pre-molded corners before installing straight pieces.

#### 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 Project Acceptance.

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 Project Acceptance in each area of Project. Clean products according to manufacturer's written recommendations.

END OF SECTION

## SECTION 09681 - CARPETING

### PART 1 - GENERAL

#### 1.01 SUMMARY

A. Work Includes:

1. Carpeting for Stretch-in Installation.
2. Carpeting and Pad for Double Glue-Down Installation

#### 1.02 QUALITY ASSURANCE

A. Standards: Comply with applicable standards of the following organizations:

1. Carpet and Rug Institute (CRI)
2. Carpet Cushion Council (CCC)

B. Installer Qualifications: Carpet Installation must be preformed by Installers with a minimum of five (5) years experience in the installation of commercial carpeting.

C. 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 layout of all areas to the Architect for approval. The drawings shall clearly indicate and accurately locate all side seams. Wherever possible, the lay of carpets in adjoining areas shall be in the same direction. Completed work shall conform to approved drawings.
2. After receiving the carpeting but before cutting, submit sets of the above drawings with all proposed cross seams and piece markings added to the drawings. No cutting shall be done before the Architect approves this layout.

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

D. Samples: For each carpet, color and texture, submit the following samples for Architects approval.

1. Carpet: 12-inch square.
2. Carpet Cushion: 6-inch square.

#### 1.04 PROJECT CONDITIONS

A. All measurements and job conditions will be the responsibility of the floor covering installation contractor.

- B. Carpet installation shall be done after painting and finishing work is completed. Ceilings and overhead work shall be completed, tested and approved before carpet 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. Properly cure and dry concrete to eliminate vapor emissions that may affect the long-term performance of the installation. Install flooring after building air conditioning, dehumidifiers, etc. have operated to reduce moisture or provide approved sealer.
- E. Do not install carpet over concrete slabs until slabs have cured, are sufficiently dry to bond with adhesive, and have pH range recommended by carpet and adhesive manufacturer.

#### 1.05 DELIVERY, STORAGE, AND HANDLING

- A. General: Conform to "CRI Carpet Installation Standard 2011".
- B. Carpeting and pad shall be delivered to site in manufacturer's original unopened packaging with each roll having register number tags attached or registered identification stenciled on mill wrappings 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 manufacturer shall submit a certificate guaranteeing carpet and pad against manufacturing defect for a period of not less than two years.
- B. Upon completion, the carpet contractor shall submit a certificate guaranteeing 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: From the same production run of each original material and in an amount of whichever is greater of 25 of the total of each different material or number of full-width rolls necessary to cover 200 square feet of area.

2. Remnants: Turn over usable remnant material of 100 square feet or greater if any.

## PART 2 - PRODUCTS

### 2.01 MATERIALS

- A. Carpet: As scheduled
  1. Performance Characteristics:
    - a. Critical Radiant Flux Classification: Class 1; Not less than 0.45 W/sq. cm.
- B. Carpet Cushion: As scheduled.
  1. Performance Characteristics:
    - a. Critical Radiant Flux Classification: Class 1; Not less than 0.45 W/sq. cm.
- C. Tackless Carpet Stripping: Water-resistant, pressure treated plywood, in strips as required to match cushion thickness and that comply with CRI 104, Section 16.2.
- D. Hot Melt Seaming Tape: Hot melt tape Orcon Super 3 or CT-1, AIM 750, Roberts 50-315 or 50-330 or approved equal as recommended by carpet manufacturer for taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams. Seam adhesive shall be equal to AIM G-103, Roberts 0502 or approved equal.
- E. Adhesives: Adhesives: 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.
  1. Cushion Adhesive: W.W. Henry 630 Beach Pro pressure sensitive flooring adhesive.
  2. Carpet Adhesive: W.W. Henry 351 FastPro Fast Grab Pro Grade Carpet Adhesive.
  3. Seam Adhesive: Latex seam sealer or thermoplastic adhesives.
- 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 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 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, regardless of age and grade level, 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. Results of test to be submitted to Owner and Architect prior to floor covering installation
  - 3. Perform alkalinity and adhesion tests recommended in writing by manufacturer.
  - 4. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.

### 3.02 PREPARATION

- A. Surface to receive carpet must be free of dirt, moisture and irregularities in order to present a clean, smooth surface for installation.

### 3.03 INSTALLATION, GENERAL

- A. Every piece of carpet delivered to the job shall have been marked to indicate its proper location relative to other pieces in the installation. This information shall be written on the back of each piece in indelible ink. Also, a copy of the invoice, which shall have the manufacturer's name, pattern number(s) and color(s) shall be given to the Inspector upon delivery of the materials to the site.
- B. Carpet shall be unrolled and allowed to relax in the installation area for a minimum of 24 hours.
- C. All materials shall be installed by a licensed carpet installer.
- D. Floor areas shall be broom cleaned immediately before installation.
- E. Carpet in an enclosed area shall be matched as closely as possible in color and shade. To achieve this, all the flooring laid in such an area shall be from the

same dye lot whenever possible, with pieces laid adjacent to one another in the same order as fabricated. Where applicable allow for pattern repeat.

F. Carpet shall be prepared for seaming as follows:

1. Carpet edges at all seams shall be trimmed to match the carpet nap with tools and techniques best suited for the carpet style. Pile loops which are frayed in cutting shall be trimmed at the top of the primary backing. However, cutting of pile loops shall be kept to a minimum, and any seam which becomes objectionable because excessive trimming is required shall be rejected.
2. A continuous bead of latex seam sealer or thermoplastic adhesive shall be applied along the base of the pile loops adjacent to all cut edges and allowed to dry thoroughly. Material must be applied in a manner that encapsulates both primary and secondary backings.
3. Proper Seam Characteristics: With any seaming method, a properly constructed seam:
  - a. has cleanly trimmed edges properly secured with seam sealer;
  - b. has tightly abutted edges without gaps or overlaps;
  - c. maintains reasonable pattern match where applicable; and
  - d. will not be totally invisible.

G. Seams and cross seams shall be made using hot melt tape. Materials and installation shall be as follows:

1. Materials: 4 inches wide hot melt tape, minimum 2-1/2 inches fiberglass and/or rayon transverse reinforcing loops or strands and 9 longitudinal beaded strips of resin adhesive (Vectron 7510, Roberts 50-300 Series, Taylor #621, Orcon CT-11, Silver Triumph or approved equal.)
2. Installation:
  - a. Seaming shall be done by experienced carpet layers capable of producing work in keeping with the acceptable standards in the industry.
  - b. Carpet shall be so positioned before seaming that abutting edges form a tight seam when pressed down.
  - c. Tape shall be laid centered on the seam.
  - d. The heating iron shall have thermostatic heat controls and shall be adjusted to a temperature which will not affect the materials in the carpet selected for this installation.
  - e. The hot iron shall be drawn over the tape no faster than is necessary to ensure the complete melting of the resin adhesive (maximum 4 feet per minute). The seam shall be closed immediately behind the iron and pressed flat as needed to ensure uniform bonding and a smooth seam.

### 3.04 STRETCH-IN INSTALLATION

- A. Install carpet in accordance to manufacturer's recommendations and comply with "CRI Carpet Installation Standard 2011", Section 16 "Stretch-in Installations".

- B. Lay cushion smooth and even over the entire area to be carpeted with seams at 90-degree angle with carpet seams. If not possible, parallel seams shall be offset a minimum 6-inches from the carpet seams. Place pad face up as recommended by the pad manufacturer. Cushion seams must be butted without compression, leaving no gaps. Secure in place with Roberts or equal carpet cement or 3/8-inch chisel point staples as follows:
1. Concrete Substrate: A solid application of adhesive shall be applied at all edges of pad. Provide a primer if/as necessary to ensure positive bonding of adhesive to the substrate. Where pieces of pad join, a 12-inch width of adhesive shall be applied at the seam and minimum 2-inch wide carpet padding tape shall be applied over seam area.
- C. Tackless strips shall be installed adjacent to all vertical surfaces. Locate to ensure concealment of carpet edge between stripping and base of wall. Rooms 30-feet or greater in either dimension shall have commercial 3-row or pairs of 2-row tackless strips. Binder edging shall be installed wherever carpet abuts other exposed flooring material and at other locations if indicated. Carpet strips and the binder edging shall be nailed to floor. Binder edging shall be installed in full lengths with joints permitted only where the length of installation exceeds the manufacturer's stock length and/or at changes in direction. Edging shall be in true alignment with the mitered joints at direction changes.
1. Carpet shall be laid so that seams perpendicular to a wall do not occur at door openings in that wall unless otherwise approved by the Architect.
  2. Carpets in rooms or corridors less than 12 feet wide shall have no more than one seam lengthwise to the room or corridor and a minimum number of seams across the width of the room or corridor.
  3. Where applicable, allow for pattern repeat
- D. Carpet shall be hooked to pins of tackless strip and stretched uniformly a minimum of 1 to 1-1/2 percent in length and width. Carpet shall be smooth, ripple-free, and taut. Lengths over 20-feet shall be power stretched. Where called for, binder edging shall be clamped down over exposed edges of the carpet.

### 3.05 DOUBLE-GLUE-DOWN INSTALLATION

- A. Install carpet in accordance to manufacturer's instructions and comply with "CRI Carpet Installation Standard 2011" Section 14 "Double-Glue-Down Installations".
- B. Cushion shall be cut in the longest lengths possible. Spread cushion adhesive to the substrate using the adhesive manufacturer's recommended trowel. Allow adhesive to set open until dry to the touch or as recommended by manufacturer for releasable type installation. Lay-in cushion smooth and even over the entire area to be carpeted with seams at 90-degree angle with carpet seams. If not possible, parallel seams shall be offset a minimum 6-inches from the carpet seams. Place pad face up as recommended by the pad manufacturer. Cushion seams must be butted without compression, leaving no gaps.
- C. Carpet in an enclosed area shall be matched as closely as possible in color and shade. To achieve this, all the flooring laid in such an area shall be from the same dye lot whenever possible, with pieces laid adjacent to one another in the same order as fabricated. Where applicable allow for pattern repeat.

- D. Apply carpet adhesive to properly prepared cushion using manufacturer's recommended notch trowel. Lay carpet immediately into wet adhesive, peeling back a section periodically to make sure adhesive is penetrating into carpet backing. Carpet shall be laid in full lengths wherever possible. It shall be cut to fit snugly against all vertical surfaces and shall be installed in those cabinets, which do not have raised bottoms, as well as under movable shelving and casework. The number of seams and cross seams shall be held to a minimum. Carpet shall be aligned so that lines of carpet match as woven, length and width. Filler strips for any location shall be in one piece.
1. Carpet shall be laid so that seams perpendicular to a wall do not occur at door openings in that wall unless otherwise approved by the Architect.
  2. Carpets in rooms or corridors less than 12 feet wide shall have no more than one seam lengthwise to the room or corridor and a minimum number of seams across the width of the room or corridor.
- E. Where applicable, allow for pattern repeat. Once carpet is laid rolling must be performed with a roller of a weight recommended by carpet manufacturer. Roll carpet in both directions, but do not over roll.

### 3.06 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 with a proper type of spot remover, and all loose threads shall be snipped from the carpet with a sharp pair of scissors. The entire installation shall be left clean and, in a condition, acceptable to the Architect.

### 3.07 PROTECTION

Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer, to ensure carpet is not damaged or deteriorated at time of Substantial Completion.

### 3.08 EXCESS CARPET

All useable pieces of carpet not necessary to complete the work are to be left on the jobsite and placed in an orderly manner in such areas as designated by the Owner.

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.

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.

#### 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.

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.
- 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 Benjamin Moore, ICI Devoe, ICI Dulux, Pittsburg, Pratt & Lambert, Rust-Oleum, Sherwin-Williams or approved equal.

- 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-03**): 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.

## 2.02 MANUFACTURERS

- A. Basis-of-Design Products: Products reference in the Contract Document are product of Benjamin Moore. Subject to compliance with the requirements comparable products from the following manufacturers may be incorporated into the Work:
  - 1. Glidden
  - 2. Pittsburg
  - 3. Pratt & Lambert

4. Sherwin-Williams
5. Sikkens
6. 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, CMU, Cement Plaster and Fiber Cement siding:

Prime Coat:	Benjamin Moore Moore's Acrylic Masonry Sealer 066
2nd and 3rd coats	Moorcraft Super Spec 100% Acrylic Exterior Satin 184 or MoorGlo 100% Acrylic House and Trim Paint N096; Semi-Gloss at Fiber Cement Trims

#### 2. Painted Wood and Soffit Board Finish:

Prime Coat:	Benjamin Moore Fresh Start All Purpose 100% Acrylic Primer 023
2nd and 3rd coats	MoorGlo 100% Acrylic House and Trim Paint N096; Semi-Gloss

#### 3. Galvanized & Non-Ferrous Metal:

Three coats:	IMC DTM Acrylic Semi-Gloss (M29)
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#### 4. Primed and Unprimed Ferrous Metal

Primer Coat:	**Zinc Clad IV B69A8/B69V @ 3.0 mils DFT
Intermediate (1)Coat:	Macropoxy 646 Fast Cure Epoxy B58-00/B58V600 @ 3.0 mils DFT.
Finish (1) Coat:	HI-Solids Polyurethane B65-300/B60V30 @ 3.0 mils DFT.

Note: \*\* Only recommended for steel, not required for shop-primed or galvanized steel.

### E. Interior Painting:

#### 1. Gypsum Board:

Wall:

Prime coat: Benjamin Moore Regal Premium Interior Latex Primer N216

2nd and 3rd coats: Benjamin Moore Regal Premium Interior 100% Acrylic Eggshell N319  
or  
Benjamin Moore Regal Premium Interior 100% Acrylic Semi-Gloss N333 (at Bathrooms)  
or  
Benjamin Moore Regal Premium Interior 100% Acrylic Flat N215 (at Corridors)

Ceiling:

Prime coat: Benjamin Moore Regal Premium Interior Latex Primer N216

2nd and 3rd coats: Benjamin Moore Regal Premium Interior 100% Acrylic Flat N215  
or  
Benjamin Moore Regal Premium Interior 100% Acrylic Semi-Gloss N333 (at Bathrooms)

2. Transparent Wood Finish: (Finish to Match Control Sample)

Filler (open grain wood): Benjamin Moore Benwood Alkyd/Oil Wood Grain Filler 238

2 coats: Benjamin Moore Benwood Polyurethane Finish Low Lustre C435

3. Painted Wood Finish:

Prime coat: Benjamin Moore Regal Premium Interior Latex Primer N216

2nd and 3rd coats: Benjamin Moore Regal Premium Interior 100% Acrylic Semi-Gloss N333

4. Galvanized Metal:

Three coats: IMC DTM Acrylic Semi-Gloss (M29)

5. Ferrous Metal:

2 coats: Benjamin Moore IronClad Latex Low Lustre Metal & Wood Enamel 363.

6. Primed and Unprimed Ferrous Metal at Pool Building (Exposed):

Primer Coat: \*\*Zinc Clad IV B69A8/B69V @ 3.0 mils DFT  
Intermediate (1) Coat: Macropoxy 646 Fast Cure Epoxy  
B58-00/B58V600 @ 3.0 mils DFT.  
Finish (1) Coat: HI-Solids Polyurethane B65-300/B60V30 @ 3.0  
mils DFT.

Note: \*\* Only recommended for unprimed steel, not required for shop-primed or galvanized steel.

7. 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.

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 work day.
- 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



## DIVISION 10 – SPECIALTIES

### SECTION 10165 –TOILET PARTITIONS

#### PART 1 - GENERAL

##### 1.01 SUMMARY

A. Work Includes:

1. Stainless Steel, floor and ceiling anchored toilet enclosures and wall mounted urinal screens
2. Solid Phenolic floor anchored toilet enclosures and wall mounted urinal screens.

B. Related Work Described Elsewhere:

1. Section 06100 – ROUGH CARPENTRY: Blocking.

##### 1.02 SUBMITTALS

- A. Product Data: For each type of product indicated, include construction details, details of anchors, hardware, and fastenings, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For fabrication and installation of toilet compartments and screen assemblies, include plans, elevations, sections, details, and attachments to other work. Show locations of cutouts for compartment-mounted toilet accessories.
- C. Samples: Submit 4 samples of each type of material, color, and finish required for units, prepared on 6-inch square samples of same thickness and material indicated for Work.

##### 1.03 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication and indicate measurements on Shop Drawings.
1. Where field measurements cannot be made without delaying the Work, establish dimension and proceed with fabricating toilet compartments without field measurements. Coordinate supports, adjacent construction, and fixture locations to ensure that actual dimensions correspond to established dimensions.

#### PART 2 - PRODUCTS

##### 2.01 SOLID PHENOLIC TOILET PARTITIONS

- A. Manufacturers: Products indicated in Drawings and the section is products of Bradley Corporation; Mills Partitions; Series 400 Sentinel overhead braced. Subject to compliance with requirements, provide products by one the following:

1. American Sanitary Partition Corporation.
  2. Bobrick Washroom Equipment
  3. Bradley Corporation; Mills Partitions.
  4. General Partitions Manufacturing Corporation.
- B. Solid Phenolic: NFPA Class B, ASTM E-84 Fire Resistance Standards; flame spread 30, smoke developed 110.
1. Color: As scheduled.
- C. Door, Panel, and Pilaster Construction: Solid phenolic material constructed of solidly fused plastic laminate with matte finish melamine surfaces, colored face sheets, and black phenolic-resin core that are integrally bonded. Edges shall be black. Brown edges shall not be acceptable. Color and pattern as selected by Architect from manufacturer's standard colors.
1. Doors and Pilaster: Finished to 3/4-inch thick.
  2. Panels: Finished to 1/2-inch thick.
- D. Pilaster Shoes and Sleeves (Caps): Stainless sheet, ASTM A 666, Type 302 or 304, not less than 22 gauge specified thickness and 4-inches high, finished to match hardware.
- E. Leveling Device shall be 3/16" (5-mm) hot rolled steel bar; chromate-treated and zinc plated; through-bolted to base and top of solid phenolic stile.
- F. Brackets (Fittings): Stirrup Type. Ear or U-brackets, stainless steel.
- G. Anchorage and Fasteners: Manufacturer's standard exposed fasteners of stainless steel finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless steel, hot-dip galvanized steel, or other rust-resistant, protective-coated steel.

## 2.02 FABRICATION

- A. Overhead Braced Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at pilasters for structural connection to floor. Provide shoes at pilasters to conceal anchorage.
- B. Floor-and-Ceiling-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment at tops and bottoms of pilasters. Provide shoes and sleeves (caps) at pilasters to conceal anchorage.
- C. Doors: Unless otherwise indicated, provide 24-inch wide in-swinging doors for standard toilet compartment and 36-inch wide out-swinging doors with a minimum 32-inch wide clear opening for compartments indicated to be accessible to people with disabilities.
1. Hinges: Manufacturer's standard self-closing type that can be adjusted to hold doors open at any angle up to 90 degrees.
  2. Latch and Keeper: Manufacturer's standard recessed latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with accessibility requirements of

authorities having jurisdiction at compartments indicated to be accessible to people with disabilities.

3. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper on each compartment door, sized to prevent in-swinging door from hitting compartment-mounted accessories.
4. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-swinging doors.
5. Door Pull: Manufacturer's standard unit at out-swinging doors that complies with accessibility requirement of authorities having jurisdiction. Provide units on both sides of doors at compartments indicated to be accessible to people with disabilities.

D. Urinal Screens: Wall mounted.

### PART 3 - EXECUTION

#### 3.01 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices. Provide clearances of not more than 1/2-inch between pilasters and panels and not more than 1-inch between panels and walls.
- B. Stirrup Brackets: Secure panels to walls and to pilasters with not less than 2 brackets attached near top and bottom of panel. Locate wall brackets so holes for wall anchors occur in masonry or tile joints. Align brackets at pilasters with brackets at walls.
- C. Overhead-Braced Units: Secure pilasters to floor and level, plumb, and tighten. Set pilasters with anchors penetrating not less than 1-3/4 inches into structural floor unless otherwise indicated in manufacturer's written instructions. Secure continuous head rail to each pilaster with no fewer than two fasteners. Hang doors to align tops of doors with tops of panels and adjust so tops of doors are parallel with overhead brace when doors are in closed position.

#### 3.02 ADJUSTING

- A. Hardware Adjustment: Adjust and lubricate hardware according to manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION

## SECTION 10200 - METAL LOUVERS

### PART 1 - GENERAL

#### 1.01 SUMMARY

- A. Section includes:
  - 1. Storm Resistant Fixed Wall 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. Airborne sound transmission loss: Provide acoustical louvers complying with airborne sound transmission loss ratings indicated, as demonstrated by testing manufacturer's stock units according to ASTM E 90.
- C. Structural Performance: Structural supports shall be designed and furnished by louver manufacturer to withstand loads created by the following criteria:
  - 1. Wind Speed: 105 mph, Exposure B
  - 2. Seismic Zone: As determined by 2006 IBC

### PART 2 - PRODUCTS

#### 2.01 MATERIALS

- A. 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.

- B. Aluminum Sheet: ASTM B 3209, Alloy 1100, 3003 or 5005.
- C. 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.
- D. 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.
- E. 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 STORM RESISTANT FIXED WALL LOUVERS

- A. Storm Resistant Horizontal Louver (5-inch Deep): Heads, jambs and mullions to be one piece 0.075-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 0.060-inch thick aluminum extrusions with front lip gutter and secondary gutters designed to catch and direct water to jamb and mullion downspouts. Equal to Construction Specialties. Model RSH-5700 or approved equal.
  - 1. Air Performance: Louver shall pass a maximum free area velocity of 600 fpm with less than 0.12-inch wg pressure drop.

- a. Test criteria shall be based on a 48-inch square sample with a minimum free area of 7.32 square feet or 45.8 percent.
2. Wind-Driven Rain Performance: Not less than 95 percent effectiveness when subjected to a rainfall of 3 inches/hr. and a wind speed of 29 mph.
  - a. Test criteria shall be based on a 39.37-inch square sample.
3. Louver shall carry the AMCA Certified Ratings Seal for both water penetration and air performance.

#### 2.04 BIRD SCREENS

- 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: 0.50-inch, 5/8-inch expanded aluminum mesh.
- B. Secure screens to louver frames with stainless steel machine screws, spaced at each corner and at 12-inch on center between.
- C. Louver Screen Frames: Fabricate screen frames with mitered corners to louver sizes indicated and to comply with the following requirements:
  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.

#### 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 605.2, "High Performance Organic Coatings on Architectural Aluminum Extrusions and Panels," with total dry film thickness of not less than 1.4 mils. Color as selected by the 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.
- 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

## SECTION 10440 - SIGNAGE

### PART 1 - GENERAL

#### 1.01 SUMMARY

- A. Provide all signage as specified herein, including the following:
  - 1. Cutout dimensional characters.
- B. Sign Locations: Every room shall receive one identifying sign, additional signs include entry and building sign.
- C. Work Includes the following:
  - 1. Project channel letter building sign
  - 2. Main entry Identification signs.
  - 3. Vehicular directional & regulatory signs (excluding standard MUTCD signs.
  - 4. Pedestrian directional & regulatory signs.
  - 5. Interior room identification and code required signs.
  - 6. ADA signs.

#### 1.02 SUBMITTALS

- A. Submit in accordance with DHHL General Conditions.
- B. Manufacturer's Data: Include manufacturer's construction details relative to materials, dimensions of individual components, profiles, and finishes for each type of sign required.
- C. Shop Drawings: Provide shop drawings for fabrication and erection of signs. Include plans, elevations, and large-scale sections of typical members and other components. Show anchors, grounds, reinforcement, accessories, layout, and installation details.
  - 1. Provide message list for each sign required, including large-scale details of wording and layout of lettering.
  - 2. For signs supported by or anchored to permanent construction, provide setting drawings, templates, and directions for installation of anchor bolts and other anchors to be installed as a unit of work in other sections.
  - 3. Furnish full-size spacing templates for individually mounted dimensional letters and numbers.



D. Samples: Provide the following samples of each sign component for initial selection of color, pattern and surface texture as required and for verification of compliance with requirements indicated:

1. Samples for verification of color pattern, and texture selected, and compliance with requirements indicated:
  - a. Dimensional Characters: Full-size Samples of each type of dimensional character (letter, number, and graphic element).
  - b. Aluminum: For each form, finish, and color, on 6-inch long sections of extrusions and squares of sheet at least 4 by 4 inches.
  - c. Warranty: Special warranty specified in this Section.

E. Sign Submittals:

- 1. One Sign Standard room identification: TYPE 1**
- 2. One Sign Bathroom Identification for each sex: TYPE 2**
- 3. One Sign Standard Back of House room: TYPE 3**
- 4. One Sign ADA landscape sign for direction: TYPE 4**
- 5. Building Names Sign: 3" raised pin mounted channel letters: Type 5**

#### 1.03 QUALITY ASSURANCE

- A. Single-Source Responsibility: For each separate type of sign required, obtain signs from one source from a single manufacturer.

#### 1.04 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.

#### 1.05 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
    - a. Deterioration of metal and polymer finishes beyond normal weathering.
  2. Warranty Period: Five years from date of project acceptance.

## PART 2 - PRODUCTS

### 2.01 MATERIALS

- A. Aluminum Sheet and Plate: ASTM B 209 (ASTM B 209M), alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.
- B. Anchors and Inserts: Use nonferrous metal or hot-dipped galvanized anchors and inserts for installations as required for corrosion resistance. Use toothed steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

### 2.02 DIMENSIONAL CHARACTERS

#### A. Cutout Characters

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following
  - a. A.R.K. Ramos Architectural Signage Systems
  - b. ASE, Inc.
  - c. Brandy
  - d. Mathews Bronze
  - e. Supersine Company
  - f. Approved equal
- 2. Character Material: Sheet or plate aluminum
- 3. Character Height: 5-1/2"
- 4. Thickness: 1/2"
- 5. Finishes:
  - a. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard, in color matching owner provided sample.
- 6. Mounting: Projecting studs
- 7. Typeface: Contractor shall match owner provided font sample.

### 2.03 ACCESSORIES

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signage, noncorrosive and compatible with each material joined, and complying with the following:
  - 1. Use concealed fasteners and anchors unless indicated to be exposed.
  - 2. Exposed Metal-Fastener Components, General:
    - a. Fabricated from stainless-steel.
  - 3. Sign Mounting Fasteners:
    - a. Projecting Studs: Threaded studs with sleeve spacer, welded or brazed to back of sign material, screwed into back of sign assembly, or screwed into tapped lugs cast integrally into back of cast sign material, unless otherwise indicated.
    - b. Through Fasteners: Exposed metal fasteners matching sign finish, with type of head indicated, installed in predrilled holes.

#### 2.04 MISCELLANEOUS METAL MESSAGE SIGNS

- A. Shape, color, dimensions, symbols, wording, and lettering shall be as shown on drawings.
- B. Signs shall be made of white aluminum sheets, the minimum thickness shall be 0.063-inch. Aluminum sheet shall conform to ASTM B 209, alloy and temper 6061-T6 flat sheet.
- C. Message shall be silk screened on the face of the white finished aluminum. Match message color to sample provided by owner.
- D. Fasteners shall be one-way tamper-proof stainless steel.

#### 2.05 FINISHES

- A. Colors and Surface Textures: For exposed sign material that requires selection of materials with integral or applied colors, surface textures or other characteristics related to appearance, provide color matches indicated, or if not indicated, as selected by the Project Manager from the manufacturer's standards.
- B. Metal Finishes: Comply with NAAMM "Metal Finishes Manual" for finish designations and applications recommendations.

### PART 3 - EXECUTION

#### 3.01 INSTALLATION

- A. General:

1. Installation of all signage shall be in strict accordance with manufacturer's printed instruction and approved shop drawings. Installation shall be accomplished by experienced mechanics and in a workmanlike manner.
2. Locate sign units and accessories where indicated, using mounting methods of the type described and in compliance with the manufacturer's instructions.
3. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
4. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
5. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

B. Dimensional Lettering Signage

1. Projecting Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.
  - a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place spacers on studs, place sign in position, and push until spacers are pinched between sign and substrate, embedding the stud ends in holes. Temporarily support sign in position until adhesive fully sets.

- C. Post Mounted Signs: Attach panel signs to posts using one-way, tamper-proof fasteners. Shields shall be provided as required to suit the mounting conditions. Double-stick tape of adhesives shall not be used.

3.02 CLEANING AND PROTECTION

- A. Remove and replace damaged or deformed characters and signs that do not comply with specified requirements. Replace characters with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures. All removal or replacement to be at no cost to the owner.
- B. Remove temporary protective coverings and strippable films as signs are installed.
- C. At completion of the installation, clean soiled sign surfaces in accordance with the manufacturer's instructions. Protect units from damage until acceptance by the Project Manager. Remove all tools, equipment, debris, and surplus materials.

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 and if not in schedule provide one in each of the following rooms; Kitchen, Classroom and Multi-Purpose Room.
  - 1. Fire extinguishers.
  - 2. 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. UL-Listed Products: Fire extinguishers shall be UL listed with UL listing mark for type, rating, and classification of extinguishers.
- D. 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.

## PART 2 - PRODUCTS

### 2.01 FIRE EXTINGUISHER

- A. Multi-purpose, dry chemical type, UL rated, 4A-80B:C, 10-pound nominal capacity, in red polyester coated steel container; Potter-Roemer Model 3010 or approved equal, for Class A, B, and C fires.
  - 1. For all areas except where carbon dioxide type is indicated for use.
- B. Carbon Dioxide type, UL rated, 10B:C, 10 pound nominal capacity, in red polyester coated aluminum container; Potter-Roemer Model 3410 or approved equal, for Class B and C fires.
  - 1. For use in electric rooms, elevator machine rooms, tele-communication rooms and facility support rooms.
- C. Provide with standard wall bracket where indicated for surface mounting.
- D. Other Acceptable Manufacturers: Provide fire extinguishers as manufactured by Larsen's Manufacturing Co., JL Industries, Inc.

### 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 enameled steel box, with trim, frame, 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 Larsen's Manufacturing Co., Potter-Roemer, JL Industries, Inc. or approved equal.
- D. Cabinet Types: Suitable for mounting conditions indicated, of the following type:
  - 1. Non- Rated Extinguisher Cabinets: Semi-recessed Potter-Roemer Model – AL-1734-DV
    - a. 22 gauge steel box with aluminum frame and door .
    - b. Glazed Door: Duo- Vertical with tempered safety glazing.
    - c. Box Finish: White baked polyester powder coat..
    - d. Aluminum finish to be anodized, color to be selected by Architect.
  - 2. Fire- Rated Extinguisher Cabinets: Semi-recessed Potter-Roemer Model – AL-FRC-1734-DV
    - a. Construct fire-rated cabinets with double walls fabricated from 22 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.
    - b. Glazed Door: Duo- Vertical with tempered safety glazing.
    - c. Box Finish: White baked polyester powder coat..

- d. Aluminum finish to be anodized, color to be selected by Architect.

### 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).
- 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 ADAAG Section 4.4.
- D. Wipe all surfaces clean and free of soil, fingerprints, etc. after installation.

#### 3.03 SCHEDULE

- A. Non- Rated Extinguisher Cabinets: At all locations except where fire-rated or bracket mounted cabinets are indicated for use.
- B. Fire- Rated Extinguisher Cabinets: Where cabinets are to be installed in a fire-rated partition.
- C. Bracket Mounted: At electric rooms, elevator machine rooms, tele-communication rooms and facility support rooms.

END OF SECTION

## SECTION 11450 - RESIDENTIAL APPLIANCES

### PART 1 - GENERAL

#### 1.01 SUMMARY

- A. Section Includes: Provide installation of all DHHL purchased appliances indicated on floor plans.
- B. Related Work Described Elsewhere: Coordinate all residential appliances with cabinets provided under Section 06200 - FINISH CARPENTRY as applicable.

#### 1.02 SUBMITTALS

- A. Submit under the provisions of Section 01330 - SUBMITTAL PROCEDURES.
- B. Manufacturer's Data: Request from DHHL, owner purchased – contractor installed appliance schedule and review all manufacturer's product brochures, specifications and installation instructions for each type of residential appliance, including electrical, water and gas utility connections.

#### 1.03 QUALITY ASSURANCE

- A. UL Standards: Provide residential equipment with UL labels.
- B. Uniformity: Provide products of same manufacturer for each type of equipment required.

#### 1.04 DELIVERY AND STORAGE

- A. Coordinate with DHHL the purchase and deliver products to project site in manufacturer's undamaged protective containers.
- B. Inspect appliances with appliance supplier, note any appliance damaged during delivery and placement, and inform Architect of damaged units. Supplier shall repair or replace damaged appliance to the satisfaction of the Architect.

#### 1.05 SPECIFIED PRODUCT WARRANTIES

- A. Furnish manufacturer's standard written warranty for each item of equipment to Owner for their records.

### PART 2 - PRODUCTS

#### 2.01 APPLIANCES

##### A. Kitchen:

1. Refrigerator/Freezer(s) – DHHL Purchased-Contractor Installed



2. Range/Oven(s) – DHHL Purchased-Contractor Installed
3. Counter top Microwave Oven – DHHL Purchased-Contractor Installed
4. Range Hood(s)- DHHL Purchased-Contractor Installed: General Electric 36" Wall-Mount Pyramid Chimney Hood JVV5361FJDS
5. Ice Maker - DHHL Purchased-Contractor Installed: Hoshizaki DKM-500BAJ, Ice Maker, Air-cooled, Serenity Series, Ice Machine and Dispenser with Floor Stand.
6. Disposal – InSink-Erator, Badger, 3/4 Horsepower

### PART 3 - EXECUTION

#### 3.01 INSTALLATION

- A. General: Comply with manufacturer's instructions and recommendations.
- B. Built-in Equipment: Securely anchor units to supporting cabinetry or countertops with concealed fasteners. Verify that clearances are adequate for proper functioning and rough openings are completely concealed.
- C. Freestanding Equipment: Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate for proper operation of equipment.

#### 3.02 CLEANING

- A. Clean all appliances, inside and out, and leave units in clean condition, ready for operation.

END SECTION

## DIVISION 13 – SPECIAL CONSTRUCTION

### SECTION 13120 - PRE-ENGINEERED/PREMANUFACTURED STRUCTURES

#### PART 1 - GENERAL

##### 1.1 GENERAL REQUIREMENTS

As specified in Section 01001.

##### 1.2 PROJECT SCOPE OF WORK

All the materials, design coordination, labor, equipment, etc. required for the work specified in this section and referenced sections shall be included in the basic bid for this project. These specifications and the drawings present functional, dimensional and class of quality of finish requirements for the structures and does not limit the scope of work for manufacturer and/or contractor to construct a fully operational community center. The manufacturer of the pre-engineered/pre-manufactured structure shall be responsible for the completed design documentation, engineering, fabrication, delivery and installation of the structures to the project site for a turn key community center. The contractor shall be responsible for the completed and operational portables/modules to achieve this intent.

##### 1.3 WORK INCLUDED: The work to be performed under this section shall include but is not limited to the following as indicated on the drawings and specified herein.

- A. Design submittal confirmation and coordination for Modular Fabricators proprietary system
- B. Site improvements to include the parking lot, driveways, utility upgrades, mains. Etc.
- C. Furnishing of all labor, materials, equipment and tools for the complete fabrication, installation and operation of the pre-engineered and pre-manufactured structures, including but not limited to stairs, ramps, handrails, interior finishes and improvements, etc.
- D. Site preparation and field construction of foundation for structures.
- E. Final hook-up to all site utilities, including but not limited to, electricity, water, and sewer.
- F. All delivery and shipping charges from the manufacturer to the project site, including permits, police escorts, etc.

##### 1.4 BUILDING CODES:

- A. Governing Code: The pre-engineered/pre-manufactured structure shall be designed and constructed to meet, but not be limited to, the minimum requirements of the following governing codes. Where conflicting requirements between governing codes occur, the more

stringent requirement shall apply, unless otherwise permitted by the approving agencies.

1. Building Code: International Building Code (IBC), 2006
2. Fire Code: 2012 National Fire Code, NFPA 1, Uniform Fire Code
3. Plumbing Code: International Plumbing Code (IPC), 2006
4. Electrical Code: National Electrical Code (NEC), 2008
5. County Ordinance: Maui County Code, latest Amendments.
6. Energy Code: International Energy Conservation Code (IECC), 2015.
7. Accessibility Code: 2010 ADA Standards for Accessible Design

- C. Foundation Design: Foundation design shall be based on an assumed nominal soil bearing pressure of 2,000 psf on non-expansive soil.
- D. Occupancy: Group A-3 - Training and Skilled Development Not Within A School
- E. Type of Construction: Type VB

#### 1.5 MANUFACTURER

- A. Modular building shall be provided by a manufacturer who has a minimum five (5) years of manufacturing experience in custom modular pre-engineered structures and is presently regularly engaged in the fabrication and erection of pre-fabricated modular mobile structures of the type and quality as indicated and/or specified herein. The design is based on modular building system by Blazer Industries, Inc., Whitley Manufacturing Co., Inc., but it is anticipated that all pre-approved equals shall be accepted as part of the proposal to bid.

#### 1.6 SHOP DRAWINGS AND SUBMITTALS (POST-CONTRACT AWARD)

(Submit in conformance with Section 01300 – Submittals and/or as specified below.)

- A. Pre-Final Coordinated Shop Drawing: Provide comprehensive and coordinated construction/fabrication shop drawing to confirm Architectural, Structural, Mechanical and Electrical requirement for the project to include drawings, finish and fixture catalog cut sheets for evaluation and comment.
- B. Final Approved Design: Submit 6 complete sets of construction/fabrication and installation drawings to the DHHL for preliminary review. Upon completion of the preliminary review, make necessary corrections and re-submit 10 complete sets of digital bond copy drawings, including one (1) set of original reproducible printed on mylar, of the pre-engineered structure. Drawings shall be stamped and signed by a licensed engineer/architect registered in the State of Hawaii. **Note: One (1) set of**

**bond drawings shall have “wet” (original) signatures (blue ink) by the licensed engineer/architect registered in the State of Hawaii.** (This is a requirement of the Maui County Building Division.) The mylar original shall also have an original “wet” signature.

- C. Submit 6 sets of specifications to the Architect for preliminary review. Upon completion of the preliminary review, make necessary corrections and re-submit 10 complete sets of bound specifications. Specifications shall include all technical information of all the materials to be utilized on this project and standards or means of installation.
- D. Submit 8 sets of structural calculations to the Architect for preliminary review. Upon completion of the preliminary review, make necessary corrections and re-submit 10 complete sets of structural calculations, stamped and signed by a licensed engineer registered in the State of Hawaii.
- E. Submit 6 copies of certification by a building official in the state of manufacturer or a certified building inspector approved by the State of Hawaii and/or the County of Maui, that the pre-engineered structure has been constructed according to all applicable codes and regulations.
- F. See Submit 6 copies of material product data and samples of the following materials:
  - 1. Architectural: See Divisions 2-11- Various Section Titles
  - 2. Structural: See Divisions 2-6 - Various Section Titles
  - 3. Mechanical: See Division 15 - MECHANICAL
  - 4. Electrical: See Division 16 – ELECTRICAL.
- G. Submit 6 copies of shop drawings for all items not adequately detailed or diagrammed in the construction documents.

1.7 **PRE-ENGINEERED STRUCTURE:** All drawings and engineering calculations shall be stamped and signed by a registered architect and/or professional structural engineer with a current registration to practice in the State of Hawaii.

- A. Design Structural Loads: All design structural loads shall be as established in the 2006 IBC except as noted below. Applicable live loads reductions shall apply:

- 1. Live Loads:

Roof Live Loads	20 PSF
Floor Live Loads	50 PSF
Partition Live Loads	15 PSF

- 2. Seismic Criteria: Seismic loads shall be computed in accordance with the 2006 IBC, utilizing the following coefficients:  
Mapped Spectral Response  
 $S_s = 0.792$

$S1 = 0.209$

$Sds = 0.623$

$Sd1 = 0.275$

Seismic Importance factor 1.0

3. Wind Loads: Wind loads shall be calculated in accordance with the 2006 IBC. Special attention shall be taken to design and detail for wind uplift loads. Calculations and wind strapping details shall be provided for review. Wind loads shall be based on the following criteria:

3 second gust wind speed 105 mph

Directionality Factor  $K_d$  0.8

Importance Factor 1.0

Exposure C

Topographic Factor  $K_{zt}$  1.7

- 1.8 BUILDING PERMIT: The Owner (DHHL) and its design team shall be responsible for the approval of the pre-engineered structure with the County of Maui Building Department for applicable permit(s) for construction. Pre-engineered structure permit will be included as part of the overall Building Permit Application which will be submitted by the DHHL's design consultant for initial processing. The Contractor shall insert the pre-engineered structure's plans, specifications and calculations, into the Building Permit Application sets for approvals. All fees required for the permit(s) shall be paid for by the Contractor.
- 1.9 GUARANTEE/WARRANTY: The Contractor/Manufacturer shall jointly guarantee the materials and workmanship for the pre-engineered structure for a period of five (5) years from the date of final acceptance. Specific material and other warranties beyond this general warranty shall also be provided as specified. Standard manufacturer's material warranties for products used in the construction shall be submitted together with the Contractor/Manufacturer joint guarantee.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Asbestos Prohibition: No asbestos containing materials or equipment shall be used under this section. The contractor shall ensure that all materials and equipment incorporated in the project are asbestos-free.
- B. All materials utilized in this project shall be equal to or better than the materials specified. The products of other manufacturers are acceptable provided they meet or exceed the material and construction requirements specified herein and are pre-qualified and accepted by written amendment. It is not the intent of these specifications to preclude the manufacturer from utilizing products that are equivalent the products specified but more available to the manufacturer.

- C. The following items provide general information of the materials desired for this project. It is not implied to be the only materials for this project. The Contractor/Manufacturer shall be responsible to provide all materials, item, etc. necessary for a complete, finished, operable, pre-engineered structure.
- D. Unless specified otherwise, all fasteners, hardware, etc. shall be of non-corrosive or corrosion resistant materials.

### PART 3 - EXECUTION

#### 3.1 FABRICATION (FACTORY)

- A. Manufacturer shall employ skilled and experienced personnel, fully supervised and trained in the manufacture of modular structures and the application and installation of materials and equipment specified for use in this project.
- B. All materials shall be installed in conformance with building codes, product manufacturer's written requirements and recommendations, and industry standards. Where conflicting requirements and recommendations occur, the more stringent shall apply unless permitted otherwise in writing by the DHHL.
- C. All building structures shall be constructed in modules, structurally independent of each other, and fabricated off-site and transported to the project site.
- D. All modules shall be of nominal sizes noted on the drawings or as required to be transportable over County and State highways and streets. Sizes of modules shall not vary from the drawings more than 6 inches in all dimensions unless approved in writing by the DHHL prior to the bid opening.
- E. To the greatest extent possible, all modules shall be fully finished and equipped at the factory to minimize field work. Field work should be limited to connecting the modules together including utilities and finishing of the joined areas.
- F. Modules shall be designed and fabricated to be readily disassembled with moderate effort and transported to another site via over water transportation to another island. Modules shall be designed for assembly, disassembly, and transport at least two (2) additional times.

#### 3.2 DELIVERY/SHIPPING

- A. Contractor shall be responsible for all shipping and transportation arrangements, charges and permits required to have the modules delivered to the job site from the point of manufacture.

- B. Contractor shall coordinate the delivery of the modules for installation upon delivery to the site. On-site storage is limited, and modules should not be delivered until ready for installation. Off-site storage, if required, shall be arranged and paid by the Contractor.
- C. All modules shall be protected with temporary shipping supports and protective covering prior to the transport from the factory.

### 3.3 INSTALLATION/ASSEMBLY (JOB SITE)

- A. All site utility work and foundation work shall be completed prior to taking delivery of the building module.
- B. Upon delivery of the modules, set in place as indicated on the drawings. Connect to all site utilities and anchor to the new foundation.
- C. Modules shall be set-in place level and plumb.
- D. Remove all temporary shipping supports and protective covering from modules and dispose accordingly.
- E. All anchoring devices and connectors for attaching modules to each other, shall be of non-corrosive materials, installed and removable with standard common tools.
- F. All connections, where modules meet, shall be trimmed, finished and made weather and water tight.
- G. Provide removable open slat skirting at full perimeter of building with lockable access doors or panels.
- H. Stairs, ramps and railings shall be either site constructed or as feasible set-in place level and plumb.
- I. Initial startup, testing, commissioning and confirmation of operation of all mechanical and electrical appliances, fixtures and equipment, with comprehensive report listing each element and its operational status.

### 3.4 EQUIPMENT MANUALS AND INSTALLATION/ASSEMBLY INSTRUCTIONS

- A. Furnish in a hard cover binder with table of contents and dividers, 4 copies of all equipment operation, final equipment operational report and repair manuals.
- B. Furnish in a hard cover binder with table of contents and dividers, 4 copies of plans, shop drawings, specifications, etc. of the construction installation and assembly details and instructions. Information and details shall clearly illustrate, in clear drawings and layman language, the procedures and requirements for assembly and disassembly of the modules. Information shall include all temporary measures required to protect or support the structures during disassembly, assembly and transport.
- C. Warranty(s)

3.5 CLEAN-UP

- A. Remove as required, and dispose of, all debris from the project site. The Contractor shall maintain the project site in a clean and neat state.
- B. Upon completion of the installation of the modules, and prior to the transferring of the structures to the DHHL, the Contractor shall make all necessary touch-ups and clean all surfaces, fixtures, furnishings and equipment to the satisfaction of the DHHL.

END OF SECTION



DIVISION 15 - MECHANICAL

SECTION 15400 – PLUMBING

PART 1 - GENERAL

1.01 SUMMARY

Provide an air conditioning and ventilation system, complete and operating and as indicated on the drawings. Provide shall mean "furnish and install" when used herein.

1.02 SUBMITTALS

- A. Submit in accordance with Section 01300 – SUBMITTALS.
- B. Equipment Submittal: Before beginning work, submit for review certified literature showing ratings and dimensions of equipment, of a list indicating manufacturer and model of fixtures and trim, and a list indicating all materials and items that are of a different manufacturer or model than those specified.
- C. Shop Drawings: After review of equipment, contract documents and field conditions, submit for review dimensioned installation shop drawings to scale. Show details where space requirements present problems, proposed departures from the Contract Documents due to field conditions, and requirements for the concrete work, access panels, inserts in slabs and openings in structure. No reproductions (of any kind) of the contract documents shall be acceptable as shop drawings. The Owner shall have the right to require additional dimensions and/or details as he deems necessary to assure proper installation and service clearances of the equipment that have been substituted (pre-approved or approved by substitution request) with equipment described in the contract documents.
- D. As-Built Drawings: Record all changes from the contract and shop drawings. Indicate location of concealed piping and isolating valves and items requiring maintenance or inspection. Dimension underground piping from a visible point on the structure. Indicate invert and slope of drainage piping at sufficient locations so that the invert can be calculated for any point in the system. Submit as-built drawings for review prior to final inspection.

1.03 CERTIFICATES

The Owner shall have the right to require a written certificate, dated and signed by a responsible employee of the Contractor, evidencing the performance of any portion of the work, or any testing; as a condition precedent to the acceptance of any work or the result of any test. Whenever a regulatory agency performs inspections or tests of any portion of the work, a certificate shall be furnished by the Contractor that the inspection or test was satisfactorily passed. Submit five (5) copies of the certificates stating that the solder and fluxes used are lead free.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

Furnish new equipment, fixtures, materials and accessories bearing the manufacturer's identification. Coordinate deliveries to avoid interferences or construction delays. Protect products during delivery, storage, installation, and the remainder of the construction period after installation.

1.05 GENERAL REQUIREMENTS

- A. Provide a complete plumbing system including water and waste, vent and gas. "Provide" shall mean "furnish and install" when used herein. Connect to utility systems as shown on drawings.
- B. Electrical: Provide all temperature, pressure, flow and indicating controls for this work. Mount control devices and provide control wiring and conduit.
- C. Provide all temperature, pressure, flow and indicating controls for this work. Mount control devices and provide control wiring and conduit. All switches shall be ADA heights (44" max above finished floor). Equipment selection and locations shall be coordinated with Electrical Contractor for compatibility with the fire alarm system prior to equipment submittal.
- D. Connect to plumbing system all fixtures and equipment, including any furnished by the Owner under another section of these specifications.

1.06 COORDINATION WITH OTHER SECTIONS

- A. Mounting of starters and providing of fused or non-fused disconnect switches, circuit protection and power wiring and conduit are specified under ELECTRICAL Section.
- B. Excavating, trenching and backfilling shall follow standard industry practices and the Uniform Plumbing Code, latest edition.

1.07 QUALITY ASSURANCE

- A. Comply with all the requirements of the State of Hawaii, County of Maui and applicable utility companies, and all recommendations of manufacturers.
- B. Obtain and pay for all fees, permits, licenses, assessments, connection charges and inspections required for this work.
- C. Substitution of another manufacturer's product for equipment specified hereinafter and for items with "acceptable pre-approved equal" after the brand name requires written permission by the Project Architect prior to bidding. No substitutions shall be considered after the bid opening. Acceptable pre-approved equal products of the following manufacturers are acceptable in lieu of those specified hereinafter by the manufacturer and model number. Architectural FF&E specification sections also include specialty plumbing fixtures and equipment to be provided.

1. Valves: Nibco, Stockham or Walworth.
  2. Fixtures: American Standard, Kohler, Elkay, Just.
  3. Drainage System Specialties: Josam, Smith, Wade or Zurn.
  4. Pipe Supports: Elcen, Fee and Mason, Grinnell or Unistrut.
  5. Fixture Trim: Grohe, Chicago, American Standard, Kohler, Elkay.
  6. Fire Extinguishers: Elkhart, Potter-Roemer, Standard, Wilkirk.
- D. Comply with the recommendations and requirement of the latest edition Codes and Standards listed hereinafter in addition to the detailed requirements of this specification. In the event of conflicting requirements, this specification shall prevail.
1. American Society for Testing and Materials Publications (ASTM):
    - A 74 Cast Iron Soil Pipe and Fittings
    - A 53 Pipe, Steel, Black and Hot-Dipped Zinc Coated Welded and Seamless
    - B 88 Seamless Copper Water Tube
    - B 306 Copper Drainage Tube (DWV)
    - C 564 Rubber Gaskets for Cast Iron Soil (R 82) Pipe and Fittings
  2. American National Standards Institute Publications (ANSI):
    - B16.18 Cast Copper Alloy Solder-Joint Pressure Fittings
    - B16.22 Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings
    - B16.23 Cast Copper Alloy Solder Joint Drainage Fittings - DMV
    - B16.26 Cast Copper Alloy Fittings for Flared Copper Tubes
    - B16.29 Wrought Copper and Wrought Copper Alloy Solder-Joint Drainage Fittings
    - C1 National Electrical Code
  3. Cast-Iron Soil Pipe Institute Publication (CISPI):
    - Standard Hubless Cast-Iron Sanitary System
    - No. 301 with Cast-Iron No Hub Pipe and Fittings

Pamphlet Installation Suggestions for "No Hub" Pipe 100 Fittings

4. ADAAG Americans with Disabilities Act Accessibility Guidelines

1.08 GUARANTEE

All work in this section to be guaranteed for a period of one year from date of acceptance of the work as a whole by the Project Architect. Should any equipment, fixture or material fail within this period, the Contractor shall be responsible for all damage to any part of the premises caused by the failure and shall repair or replace the defects at no cost to the Owner.

1.09 ACCESSIBILITY REQUIREMENTS

Furnishing and installation of all items in this section shall comply with Americans with Disabilities Act Accessibility Guidelines (ADAAG), 36 CFR Part 1191.

PART 2 - PRODUCTS

Note: All products shall comply with the EPA Lead Free Act

2.01 EQUIPMENT

Requirements of the manufacturer's equipment that is a component of a system provided under this work is included with the system's specification hereinafter. Capacities and characteristics of the equipment are indicated on the drawings. See electrical drawings for voltage and phase requirements of all equipment furnished under this work.

2.02 FIXTURES

- A. Mop Sink: Kohler Whitby K-6710 enameled cast iron corner type with coated wire rim guard. Use with K-8907 faucet with wall support, vacuum breaker, stops and threaded hose end.
- B. Sink: Elkay DLR 331910 18 gage stainless steel, double compartment, 33"x19-1/2"x10-1/8" deep overall dimensions. Provide duo-strainer. Use with K-7776-K-CP 8" reach multi-swivel kitchen sink faucet, lever handles.
- C. ADA Sink: Elkay LRAD 331955 18 gage stainless steel, double compartment, 33"x19-1/2"x5-1/2" deep overall dimensions. ADA Accessible with rear-offset drain locations. Provide duo-strainer with offset P-trap. Use with K-7776-K-CP 8" reach multi-swivel kitchen sink faucet, lever handles. Provide Truebro ADA knee protection for P-trap and angle stops.
- C. Accessible Lavatory: Kohler Greenwich K-2030, vitreous china, ADA approved wall mounted with floor mounted concealed wall hanger, perforated strainer, offset P-trap, 3-hole 8" center faucet drilling. Provide Truebro ADA knee protection for P-trap and angle stops. Use with K-7303-K-CP gooseneck faucet with lever handles, 1.5 gpm faucet with 8" centers.

- D. Accessible Water Closet: Kohler K-3519 Highline, 1.0 gal/flush flush tank, elongated rim, fully glazed trapway, 17-1/8" rim height, Pressure-assist flushing system. Provide solid plastic white commercial weight elongated open front check hinged seat, trip handle on the wide side of the toilet stall.
- E. Water Closet: Kohler K-3531 Wellworth, 1.0 gal/flush flush tank, elongated rim, fully glazed trapway, 15-1/2" rim height, Pressure-assist flushing system. Provide solid plastic white commercial weight elongated open front check hinged seat.
- F. Urinal: Kohler Dexter K-5016 0.5 gpf, wall mounted, ADA height concealed floor mounted wall carrier, top spud, elongated rim, ADA approved design. Use with Sloan Royal 180-0.5 ADA flush valve mounted at ADA height.
- G. Interior Hosebibb: Chicago 952 polished chrome plated with integral vacuum breaker and 1771 chrome plated loose key shutoff valve and wall flange.
- H. Exterior Hosebibb: Chicago 998 rough chrome plated exterior use with integral vacuum breaker and 3/4" hose thread outlet. Provide removable tee handle, lock shield cap, square head cock for servicing.

## 2.03 PIPE AND FITTINGS

- A. Only "domestic" piping shall be allowed on this project (made in USA, no foreign products).
- B. Waste, Vent and Storm Drain Piping Below Grade, Storm Drain Piping Below Grade: Schedule 40 DWV PVC with solvent weld joints, ASTM D 4396, ASTM F 891, NSF Standard No. 14, IAPMO UPC certified. Fittings shall be ASTM D 1784, 2665 and 3311 approved.
- C. Waste, Vent and Storm Drain Piping Above Grade: Same as above grade system.
- D. Water Pipes and Condensate Drain: Type "L" hard drawn copper tube, ASTM B 88 with non-lead soldered (95-5) joint wrought copper pressure fittings for aboveground. All solder shall be non-lead; flux shall be non-corrosive complying with Copper Development Association Standard 1.0. Water piping below grade shall be Type "L" soft drawn copper with brazed joints.
- E. Gas Piping Below Grade Outside the Building: High density polyethylene with heat fusion joints. Piping SDR number, wall thickness, and installation methods shall be in accordance with the Gas Company and with the Uniform Plumbing Code.
- F. Gas Piping Above Grade: Schedule 40 ASTM A-53 hot-dipped galvanized steel pipe with screwed joints.

2.04 VALVES (ALL BRONZE, LEAD FREE)

- A. Ball Valve 3 inches and Smaller (Shut-Off Valve): Nibco T-580-70 or T-585-70.
- B. Check Valve 2 inches and Smaller: Nibco T-413, horizontal swing, renewable seat and disc.
- C. Check Valve 2-1/2 inches and Larger: Nibco T-918, horizontal swing, renewable seat and disc.

2.06 ACCESS PANELS

Milcor access doors; style AP for plaster surfaces, style A for acoustical tile surfaces, style M for masonry and other surfaces. 12" x 12" minimum size in walls and partitions, 24" x 24" for ceiling access.

2.07 PLUMBING SYSTEM SPECIALTIES

(All drains and floor cleanouts with flashing flange and strainers maximum 1/4" openings, tops shall be matching nickel/bronze, heavy duty type.)

- A. Cleanouts:
  - 1. Floor Cleanout: Josam 58210 series. Provide clamp device when installed in floor with waterproofing membrane. Provide nickel bronze heavy duty cleanout covers.
  - 2. Heavy Duty Floor Cleanout: Josam 58680 cast iron frame with anchor flanges and heavy duty gasketed cover.
  - 3. Wall Cleanout: Josam 58510 series with Josam 58640-15 access frame and cover.
  - 4. Cleanout to Grade: Josam 56000-15 installed in concrete pad, pad and cover to be flush with grade.
  - 5. Cleanout: Josam 58480 series, coated cast iron, spigot connection, bronze threaded plug.
- B. P-traps Installed Below Floor: Deep-seal type P-trap.
- C. Floor Drains: Josam 30000-S coated cast iron with flashing flange, weepholes and adjustable satin Nikaloy square heel-proof strainer. Trap primer.
- D. Heavy Duty Floor Drains: Josam 32160 with heavy duty secured tractor grate, acid resistant epoxy coating. Trap primer.
- E. Water Heater: Residential upright type, glass lined tank with anode rod, non-simultaneous dual elements, factory installed heat traps, IECC 2006 compliant, 55 gallon capacity, 4500 watts, 21 gallons per hour recovery.

## 2.08 INSULATION

- A. Apply in accordance with manufacturer's recommendations by skilled mechanics. Flame spread rating shall not exceed 25 and a smoke development rating not to exceed 50.
- B. Saddles: Provide 180 degree galvanized sheetmetal protective saddles at each hanger or support on insulated piping and shall be no less than 16 gauge and no less than 12 inches long. Minimum 9 pcf insulation at supported saddles.
- C. Provide 3/4" thick Imcolock insulation with vapor barrier on waste piping receiving cold water or condensate collection including drinking fountain. Provide spray-on urethane insulation with vapor barrier on underside of floor sinks installed above grade to prevent condensation.
- D. Insulate hot water piping located indoors with 1" thick fiberglass insulation with all service jacket. Insulate cold water piping within 8' of the water heater or hot water storage tank. Insulate all solar hot water supply and return piping.

## 2.09 FIRE EXTINGUISHERS

Potter Roemer 3000 series or pre-approved equal, 10 pound dry chemical type, U/L 4A:60B:C with semi-recessed all aluminum cabinet with polycarbonate bubble continuous hinge. Use surface mounted stainless steel cabinet when located outdoors.

## PART 3 - EXECUTION

### 3.01 PREPARATION

Trenching and backfilling shall be in accordance with the Uniform Plumbing Code. Visit the work site and become fully aware of all existing conditions. Investigate the Contract Documents and make proper provisions to avoid interferences or construction delays. Determine the exact route of each pipe. Make off-sets and changes in direction required to maintain proper head room and pitch or to accommodate the structure and the work of other trades. Furnish other trades with information to properly locate and size openings in the structure required for this work. Furnish anchor bolts, sleeves, inserts and support required for this work.

### 3.02 INSTALLATION AND REQUIREMENTS

Perform work using personnel skilled in the trade involved. Provide competent supervision. Furnish new equipment, fixtures, materials and accessories bearing the manufacturer's identification and conforming to recognized commercial standards. Provide guard around all exposed moving machinery parts and around high-temperature equipment and materials. When exposed to weather, provide a weather protected enclosure around electrical equipment, controls and other items that are not satisfactorily protected. Provide all extra materials and labor for a complete operable system at no extra cost to the Owner. Installation shall be in accordance with manufacturer's recommendations. Provide access panels for all items requiring servicing, inspection, maintenance and adjustment.



### 3.03 UTILITY CONNECTIONS

Existing utility locations were determined from information available at the time of design. Verify the exact location and elevation of all existing utilities. Notify the Project Architect immediately in writing of all discrepancies. Be fully responsible for any and all damage resulting from failure to exactly locate and preserve existing ground utilities.

### 3.04 EQUIPMENT INSTALLATION

Install equipment in the space allotted with sufficient clearance and support for proper operation and maintenance. Where equipment differs in arrangement or connections from those shown, provide all required changes in piping, supports, floor drain locations and appurtenances and cost of work of any other trades affected. Provide equipment accessories necessary for proper operation and support. Final connections shall include shutoff valves, regulators, traps, unions, strainers, and direct/indirect waste connections. Plumbing contractor shall obtain all information necessary for a complete and operable system. Provide structural steel framing for equipment as required. Water heater installation shall be in accordance with the Plumbing Code.

### 3.05 FIXTURE INSTALLATION

Set fixtures in approved workmanlike manner. Point up all edges against walls and partitions with white grout. Provide adequate supports for wall-mounted fixtures. Provide supplies for all water lines to fixtures; Brasscraft or equivalent, compression joint type with chrome plated brass escutcheon and cover tube, loose-key angle stop valve and drawn copper tube riser. Provide chrome plated brass p-trap, waste fittings and escutcheon as required for fixture. Exposed metal including pipe shall be polished chrome plated. Provide concealed arm wall/floor supports for lavatories and urinals.

### 3.06 PIPING INSTALLATION

Conform to the requirements of the Uniform Plumbing Code and all manufacturer's recommendations. Inspect all pipes inside and outside. Remove interior obstructions and ream out pipe ends. Tool markings on polished fittings are not acceptable. Cut pipe accurately so that it can be worked into place without springing or forcing. Install pipes parallel to the wall of the structure and plumb. Make changes in direction with fittings. Bushings are not permitted. Pull-tees are not permitted. Install valves with stems above horizontal. Provide proper support and adequate provisions for expansion, contraction, slope and anchorage. Provide dielectric unions or separations at all dissimilar metals. Wrap pipe or tubing with 1/4-inch thick felt, secured with tape, where they contact other materials. Have piping treated, inspected and approved before it is furred in, buried or otherwise hidden. Provide standard weight galvanized steel pipe sleeves for all pipes passing through structure, sufficiently large to provide 1/4-inch clearance around pipe. Caulk watertight around pipes passing through sleeves. Wrap pipe with polyethylene tape where it passes through sleeve and when it contacts concrete or masonry. Grout with fire proof material around all pipe penetrations through slabs and walls full length of penetrations. Provide



chrome plated brass escutcheons, set tight on the pipe and to the wall where pipes are exposed in finished areas. Provide clamping collar or membrane flange where pipe or drains penetrate waterproof membrane. Perform all welding using qualified welders in accordance with American National Standards Institutes Code B31.1 and American Welding Society Standard B3.0. Soil for bedding and backfill shall be tested for soil resistivity. If soil resistivity is less than 20,000 ohms-cm, provide cathodic protection of underground steel (including gas) and copper lines.

### 3.07 PIPING SYSTEM SUPPORTS

- A. Pipe Supports: Factory-fabricated by Elcen, Fee and Mason, Grinnel or Unistrut; no chains or perforated straps permitted. Provide concrete inserts, beam clamps, channel framing, hanger rods and accessories required for proper support. Ramset or explosive type anchors may not be used without written permission by the Owner. Trenching/backfilling in accordance with the Plumbing Code. Support underground piping on firm soil along its entire length. Where rocks are encountered, have trench excavated to a minimum overdepth of four inches and backfilled with granular moist earth, thoroughly tamped. Materials used for backfilling over piping shall be granular earth, free from debris and stones. The Owner may reject any materials which he considers unsuitable for fill. Clay and adobe type soil is not allowed. Provide a minimum of two feet of cover for all pipes. Where sewer and water lines are laid in the same trench, place water line on solid shelf with bottom of water line twelve inches above top of sewer. Where sewer and water lines cross, encase sewer in four inch thick concrete envelope. Support steel and copper pipe at maximum spacing of 6 feet for pipes 1-1/2 inches and smaller, 10 feet for pipes 2 inches through 4 inches and 15 feet for pipes larger than 4 inches. Support vertical piping with hanger at base of riser and with pipe clamp at each floor. Provide expansion loops in water piping where pipe crosses structural expansion joints. Loop shall consist of four 90 degree elbows with 10 pipe diameters in between. Beam clamps or perforated straps for support are not allowed. All mechanical items penetrating ceiling grids shall be in center of ceiling grid with escutcheon plates. Provide seismic restraints for earthquake zones and cross bracing. Termite barriers shall be used on all piping risers through the floor slab.
- B. Pipe Hangers: Steel clevis hanger with adjustable hanger rod; 3/8" for pipe 2" and smaller, 1/2" for pipe 2-1/2" through 3-1/2" and 5/8" for pipe 4" and larger. Groups of lines may be supported from steel channel pipe clamp.

### 3.08 DRAINAGE, WASTE AND VENT PIPING SYSTEMS

Slope drain lines at 1/4 inch per foot unless otherwise indicated. On roof drains and where other drains occur above the ground floor, provide clamping device with drain. Provide a prefabricated flashing sheet (non-lead) extending eight inches out around drain body and secure with clamping device. On vents through roof, extend vent flashing eight inches out all around base of vent, extending collar up vent and turn in at top. Install hubless cast-iron pipe in accordance with CISPI pamphlet 100-1972. Provide cast-iron and neoprene gasketed no-hub coupling below grade. MG stainless steel clamps and cast-iron no-hub couplings shall be installed in accordance with manufacturer's written

instructions. Cleanout to grade shall be encased in concrete, flush with finished grade.

### 3.09 WATER PIPING SYSTEM

- A. Secure each water line where it penetrates partitions to serve fixtures, hose bibbs and similar items. Wrap all lines passing through concrete with polyethylene tape. Install unions or flanges at all valves, equipment and system specialties. Set hose bibbs 18 inches above finished grade, unless otherwise indicated. Install dielectric unions at connections of copper and ferrous pipes. Provide access panels as required. No flux shall enter inside of piping.
- B. Provide water hammer arrester on all cold water lines serving fixtures using flush valves sized in accordance with the PDI Standard WH201 for the total number of fixture units connected to the branch line. Install arrester between last two fixtures served or as shown. Provide access panel for concealed arresters. Provide 12-inch long air chambers line sized at all plumbing fixtures.
- C. Provide square head cock on all hose bibbs.

### 3.10 INSULATION SYSTEM

- A. Thermal insulation shall be furnished and installed as specified. Should alternate construction methods other than called for in this specification be required, the Contractor shall so submit during pre-qualification and substitution portions of bidding.
- B. Where observation of work or workmanship indicated in this specification is not complied with, the entire section or all of the installed insulation shall be removed and reinstalled as specified.
- C. All components of the insulation for piping, including facings, mastics and adhesives, shall have a fire rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed. Ratings shall be as determined by Underwriter's Laboratories, Inc. or other approved testing laboratory.
- D. Hot Water Pipe Insulation: John Manville flame-safe, one-piece construction one-inch thick, preformed fiberglass pipe insulation with  $K=0.22$  at 75 degrees F mean temperature. Jacket shall have 2-inch overlap at both longitudinal and circumferential joints. Insulation to have all purpose vapor barrier. Fittings to be UNIF-FIT, pre-molded PVC insulated fitting covers or made with miter joint using fiberglass. Insulation within fitting cover to be fiberglass.
- E. Insulation shall be applied on clean dry surfaces free from any foreign matter and only after tests and approvals required by the specifications have been completed.
- F. Insulate all piping in a neat, workmanlike fashion in accordance with recommended thickness. All joints and seams shall be butted tightly together. Jackets shall be secured tightly and smoothly over insulation.

- G. All pipe insulation shall be continuous through wall and ceiling openings and sleeves.
- H. All surface finishes to be extended to protect all surfaces, ends, and raw edges of insulation.

### 3.11 ELECTRICAL

Provide control wiring and conduit. Conform to the requirements of ANSI C1, National Electric Code, and to the requirements of ELECTRICAL section of these specifications. Obtain equipment manufacturer's control wiring diagram for the equipment furnished. Prepare a control and interlock wiring diagram for the complete system. Indicate terminal points to factory wired equipment. Submit control diagrams for review.

### 3.12 FIELD QUALITY CONTROL

- A. Test plumbing systems in accordance with the Uniform Plumbing Code. Perform tests in the presence of, and to the satisfaction of inspectors having jurisdiction over the work. Ask for final inspection by the Owner after tests, adjustments and balancing has been performed.
- B. Test drainage systems in accordance with Section 318 of the Plumbing Code.
- C. Hydrostatically test the domestic water piping system at 100 psi for 2 hours. Inspect the entire system while under pressure and correct all deficiencies.
- D. Test equipment to demonstrate its operation and compliance with the specification.

### 3.13 BALANCE, ADJUSTING AND CLEAN

Clean up work areas and fixtures. Adjust system for proper operation ready for use. Automatic control devices shall be adjusted for proper operation. Touch up with matching paint all damaged factory finishes.

### 3.14 PAINTING AND IDENTIFYING

- A. The following items furnished under this section are to be painted and identified under SECTION 09901 - PAINTING. Do not paint over name plates or other identifying labels.
- B. Paint exposed black iron work including pipe, fittings, iron body valves, pipe hangers, etc., with two coats of zinc rich paint.
- C. Stencil all exposed piping with painted black letters indicating the service and with an arrow indicating the direction of flow. Stencil where pipes enter and leave each area and at not over 30 ft. intervals within an area. Paint color band at stencils; yellow for fuel and green for water systems. Width of color band, size of legend letters, and position of legend shall conform to the requirements of ANSI A13.1, Scheme for the Identification of Piping Systems.

### 3.15 TESTING AND INSPECTION

- A. Contractor shall furnish all equipment for tests and any required retests and pay for all cost of repairing any damage resulting from such tests. Contractor shall adjust systems until they are approved. Tests shall be performed in the presence of, and to the satisfaction of, an inspector of the official agency involved.
- B. Sanitary and water piping shall be tested in accordance with the Plumbing Code. Sanitary drains shall be tested with a minimum of 10 feet of water for 15 minutes. Water piping shall be tested. Valves shall be rated for at least 200 psi working pressure.
- C. Defective Work: If inspection of tests indicate defects, such defective work or material shall be replaced and inspection and tests repeated. Repairs to piping shall be made with new material. No caulking of screwed joints or holes will be accepted. Installation shall be repaired by skilled mechanics of the trade involved at no extra expense to the Owner.
- D. Protection to Fixtures, Materials and Equipment: Pipe openings shall be closed with caps or plugs during installation. Fixtures and equipment shall be tightly covered and protected against dirt, water and chemical or mechanical injury. Upon completion of all work, the fixtures, materials and equipment shall be thoroughly cleaned, repainted, adjusted and operated.
- E. Chlorination: Domestic water lines shall be sterilized with chlorine before acceptance of work. Sterilize water system for 24 hours with 100 ppm chlorine introduced into the lines in an approved manner. Dosage of chlorine shall not be less than 50 ppm. After a contact period of not less than eight (8) hours, the system shall be flushed with clean water until the residual chlorine content is not greater than 0.2 ppm. All valves in the lines being sterilized shall be opened and closed several times during the contact period. A certificate shall be furnished to the Project Architect evidencing proper performance of sterilizations.

### 3.16 CLEANING AND ADJUSTING

At the completion of the work, all parts of the installation shall be thoroughly cleaned. Equipment, pipe valves, and fittings shall be cleaned of grease and metal cuttings, and sludge that may have accumulated by operation of the system for testing. Any stoppage or discoloration or other damage to parts of the building, its finish, or furnishing, due to the Contractors failure to properly clean the piping system shall be repaired by the Contractor without cost to the Owner. Touch up with matching paint all damaged factory finishes.

3.17 INSTRUCTIONS

Instruct the Owner's representative in the proper operation and maintenance of the systems. Review the maintenance manuals with the Project Architect. Post sequence of operation instructions adjacent to equipment, mounted in frame with clear plexiglass cover plate. Submit a list of manufacturer's warranties for the equipment furnished.

END OF SECTION

## SECTION 15800 – AIR CONDITIONING AND VENTILATION

### PART 1 - GENERAL

#### 1.01 SUMMARY

- A. Provide all labor and materials necessary for a complete and operating air conditioning and ventilation system. "Provide" shall mean "furnish and install" when used herein. Project drawings show general requirements as to size, arrangement of ducts and piping, and location of equipment. All products shall be made in the United States of America. Manufacturer of equipment shall have Hawaii stocked spare parts, representation and support of a service organization which has services manufacturer's units of comparable type, size and capacity as specified herein. Manufacturer must have other units of comparable type, size and capacity installed and operating satisfactorily in the State of Hawaii for a minimum of two years prior to bid opening.
- B. Electrical: Provide all indicating controls for this work. Mount control devices and provide control wiring and conduit. Furnish motor starters for equipment under this section.

#### 1.02 SUBMITTALS

- A. Submit in accordance with SECTION 01300 – SUBMITTALS.
- B. Shop Drawings and Product Data:
  - 1. Submit shop drawings and product data in one complete package. Piecemeal submittals are not acceptable.
  - 2. Reproductions of Contract Drawings for the use of shop drawings are not acceptable.
  - 3. Shop Drawings: After review of equipment, contract documents and field conditions, submit for review dimensioned installation shop drawings to scale. Show details where space requirements present problems, proposed departures from the Contract Documents due to field conditions, and requirements for the concrete work, access panels, inserts in slabs and openings in structure. Drawings shall also indicate adequate clearances for operation, maintenance, and replacement of operating equipment. The shop drawing review is confined to arrangement of equipment only and will not relieve the Contractor from responsibility for proper fit, performance, or construction. Any deviation from Contract documents including dimensional, performance or material changes shall be clearly noted on shop drawings.

4. Equipment Submittal: Before beginning work, submit for review certified literature showing ratings and dimensions of equipment, and of a list indicating all materials and items that are of a different manufacturer or model than those specified.
- C. Site Maintained Drawings:
1. Maintain an accurate record of all changes made in installation from layout and materials shown on Contract Drawings and/or approved shop drawings.
  2. Indicate location of items requiring maintenance or inspection.
  3. Submit reproducible copies (contract Mylars) of these drawings to Project Architect prior to final inspection.
- D. As-Built Drawings: Record changes from the contract drawings of all ductwork and equipment. Indicate location of dampers and items requiring maintenance or inspection. Submit as-built drawings for review prior to final inspection.
- E. Operation and Maintenance Manuals: Submit four (4) hard bound copies of the operating and maintenance manuals on all equipment and the system as a whole bound. The manual shall identify project name and number, Contractor, Consultant, date and all equipment provided. It shall include the equipment manufacturer's name, model and serial number, tag number, capacity, quantity of units, their location and area (room) served and shall include the manufacturer's operation and maintenance manuals including control and wiring diagrams and source of service and replacement parts. Provide tabs separating each piece of equipment. When standard manufacturer's brochures are used, adequately indicate (highlight, arrow, etc.) the project related information and delete (X or cross-out) the non-applicable information. Include all applicable submittal items and information. Submit complete manuals for review prior to final inspection.
1. Distribution of Submittal:
    - 1 copy: User
    - 2 copies: User's Facility Maintenance Agency
  2. Operating Instructions in manual shall include
    - a. General description of the system and sequence of operations for all equipment.
    - b. Step by step procedure to follow in putting each piece of equipment in operation and trouble shooting.

- c. Provide schematic control diagrams for each separate system. Each diagram shall show locations of start-stop switches and correct operating settings for each control instrument shall be marked on this diagram.
  - d. Provide diagram for the electrical control system showing the wiring of all related electrical control items and interlocks.
  - e. Include all air balance and test reports.
  - f. Provide a copy of the control diagram for each component of the system. Diagrams shall be part of the mechanical equipment submittal.
- F. Comply with the recommendations and requirement of the Codes and Standards listed hereinafter in addition to the detailed requirements of this specification.
- 1. American National Standards Institute Publications (ANSI):
    - A13.1 Scheme for Identification of Piping Standards
    - B9.1 Safety Code for Mechanical Refrigeration
    - B31.1 Power Piping
    - B31.5 Refrigeration Piping
    - C 1 National Electrical Code
  - 2. National Fire Protection Association (NFPA) Standards:
    - 90A Air Conditioning and Ventilation System
    - 54 National Fuel Gas Code
  - 3. Air Conditioning and Refrigeration Institute (ARI) Standards:
    - 410 Forced-Circulation Air Cooling and Heating Coils
    - 430 Central Station Air Handling Units
    - 520 Positive Displacement Refrigerant Compressors, Compressor Units and Condensing Units
  - 4. Air Moving and Conditioning Association (AMCA) Standards:
    - 210 Test Code for Moving Devices
    - 300 Test Code for Sound Rating Air Moving
  - 5. American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE):



Handbook, Applications - latest edition

Equipment - latest edition

15 Safety Code for Mechanical Refrigeration

34 Number Designation and Safety Classification of Refrigerants

6. Sheet Metal and Air Conditioning Contractors National Association (SMACNA):

Manual for the Balancing and Adjusting of Air Distribution Systems

Low Velocity Duct Construction Standards, latest edition

Duct Liner Application Standards

7. American Society of Mechanical Engineers (ASME):

Boiler and Pressure Vessel Code

Section VIII D1, Pressure Vessels, Division I

8. American Society for Testing and Materials (ASTM):

C534 Preformed Flexible Elastomeric Cellular Thermal Insulation in  
Sheet and Tubular Form

9. Anti-Friction Bearing Manufacturers Association (AFBMA):

Load Ratings and Fatigue Life for Ball Bearings

Load Ratings and Fatigue Life for Roller Bearings

1.03 COORDINATION WITH OTHER SECTIONS

A. Electrical: Mounting of starters and providing of fused or non-fused disconnect switches, circuit protection and power wiring conduit are under ELECTRICAL Section.

B. Painting: Painting of equipment and materials under Section 09901 - PAINTING.

1.04 PRODUCT HANDLING

A. Protection: Use all means necessary to protect materials and equipment before, during, and after installation and to protect installed work and materials of all other trades. Under no circumstances shall any mechanical equipment be stored outside, unprotected.

B. Replacements: In event of damage, immediately make all repairs and replacements necessary at not cost to the Owner.

## 1.05 CERTIFICATES

The Project Architect shall have the right to require a written certificate, dated and signed by a responsible employee of the Contractor, evidencing the performance of any portion of the work, or any testing; as a condition precedent to the acceptance of any work or the result of any test. Whenever a regulatory agency performs inspections or tests of any portion of the work, a certificate shall be furnished by the Contractor that the inspection or test was satisfactorily passed.

## PART 2 - PRODUCTS

### 2.01 EQUIPMENT

Capacities and characteristics of equipment are indicated on the drawings. See electrical drawing for all voltage and phase requirements of all equipment furnished under this work. Provide disconnect switch for all mechanical equipment. Exposed to weather starters shall be 4X stainless steel type. All steel surfaces shall be hot-dipped galvanized. All steel exposed to weather shall be hot-dipped galvanized and shall have an additional two coats of rust-proof paint.

### 2.02 FANS

Exhaust fans shall be direct drive inline centrifugal type with adjustable fan speed control for fan balancing, DC motor and insulated cabinet. Greenheck SQ or equivalent.

### 2.03 ROOF EXHAUST TERMINATION

All aluminum construction with stainless steel birdscreen, seismic/hurricane resistant construction. Greenheck FGR or equivalent.

### 2.04 AIR DISTRIBUTION DEVICES

Supply diffuser shall be all aluminum construction with opposed blade volume dampers, louvered face, deflection pattern adjustment, removable core. Titus TDCA-AA or approved equal. Return and exhaust registers shall be fixed blade, 3/4" spacing, Titus 350F or approved equal.

### 2.05 PIPE, FITTINGS AND VALVES

None required.

### 2.06 PIPE SLEEVES

Piping sleeves through walls, floors, sidewalks and pads shall be Sch. 40 PVC pipe. Piping through sleeves of fire rated walls or plenum chambers shall be caulked tight with fiberglass material and firestopped to match the rating of the wall. Sleeves installed through drilled holes through concrete shall be grouted and finished on both sides. Exterior sleeves shall be caulked watertight.

## 2.07 ACCESS PANELS

Provide access panels for all mechanical equipment requiring adjustment, servicing and routing maintenance. Access panels shall be 12 inch x 12 inch minimum size in walls and partitions, 24 inch x 36 inch minimum size for ceilings. Provide fire rated access panels to match rating of wall/ceiling where required.

Provide duct access panels of the same material as the ducts per NFPA 96 for cleaning of the interior of the ducts. Provide access to the duct access panels through the Firemaster duct wrap.

## 2.08 DUCTWORK AND ASSOCIATED SHEETMETAL WORK

- A. All low pressure air conditioning and exhaust ducts shall be galvanized steel with gages and construction in accordance with SMACNA Standards "HVAC Duct Construction Standards".
- B. Flexible Duct Connections: Neoprene coated glass fabric prefabricated connections, UL approved. Flexible duct connectors shall be provided at each inlet and discharge of air handling units, fan coil units and exhaust fans.
- C. Damper: Opposed blade type, galvanized steel with exterior lever and locking quadrant.
- D. Flexible Ducts: Thermaflex MK-E or equivalent, pre-insulated, spiral wound, metalized exterior jacket.

## 2.09 SPECIAL TOOLS

If any part of equipment furnished under these specifications requires a special tool for assembly, adjustment, setting or maintenance thereof and such tool is not readily available on commercial tool market, furnish necessary tool with equipment as standard accessory.

## PART 3 - EXECUTION

### 3.01 GENERAL REQUIREMENTS

- A. Space reserved for ducts, piping and necessary lighting above furred ceilings are critical. Install ducts and piping as close as possible to slab or structure above. Location of light fixtures cannot be changed. If space allocated is too small for ducts and piping, make necessary move to fit into general pattern. All duct modifications shall be accomplished using 45 degree fittings; 90 degree fittings shall not be used unless prior approval from the Project Architect is obtained. All changes shall be submitted to the Project Architect for approval.
- B. Do not scale drawings. Check all measurements at building and adjust work to fit into space allotted. Close cooperation between trades will be required. Any work without regard for work of other trades shall be moved without extra charge, if necessary to permit proper installation of other work.

- C. Investigate the Contract Documents and make proper provisions to avoid interferences or construction delays. Determine the exact route of each duct and pipe. Make off-sets and changes in direction required to maintain proper head room and pitch or to accommodate the structure and the work of other trades. When changing the size of ductwork, provide ducts having the same friction loss as the size of the duct shown on the Contract Documents. Furnish other trades with information to properly locate and size openings in the structure required for the work under this section. Furnish anchor bolts, sleeves, inserts and support required for the work under this section. Provide access panels for concealed items provided under this section that require maintenance, adjustment or inspection.

### 3.02 INSTALLATION

- A. Perform work using personnel skilled in the trade involved. Provide competent supervision. Furnish new equipment, fixtures, materials and accessories bearing the manufacturer's identification and conforming to recognized commercial standards. Provide OSHA approved guard or rails all around exposed moving machinery parts and around high-temperature equipment and materials. No piping, electrical conduit, ceiling supports or similar items shall be supported from equipment or ductwork. Provide additional materials and labor for a complete, operable (including starting, testing, balancing and adjusting), and fully accepted system at no extra cost to the Owner.
- B. Equipment: Install equipment in the space allotted with manufacturer's specified clearances for proper operation and maintenance. Where equipment differs in arrangement or connections from those shown, provide all required changes in appurtenances. Provide equipment accessories necessary for proper operation and support. Concrete equipment bases and supports are under DIVISION 3 - CONCRETE. Direct trade providing concrete in the proper locations, dimensions, load carrying capacity and anchor bolt locations. Concrete pads shall be not less than four inches beyond the base of the equipment. Provide vibration isolators for all mechanical equipment as indicated hereinbefore. Secure floor mounted isolators to base and to equipment. Provide sway bracing, triangulated cable supports and lateral supports for all equipment, piping and ductwork for Seismic Zone 4.

### 3.03 ELECTRICAL WORK

- A. Conform to the requirements of NFPA-70, National Electrical Code, and to the requirements of DIVISION 16 - ELECTRICAL of these specifications. Obtain equipment manufacturer's control wiring diagrams for the equipment furnished. Prepare a control and interlock control diagram for the complete system. Indicate terminal connection points to factory wired equipment. Submit control diagram to the Project Architect for review. Contractor shall supply and mount all motors and provide all control wiring with conduits and controls for equipment furnished by him except that shown on the Electrical Drawings. All power wiring, including final connection to the mechanical equipment shall be provided by the Electrical Contractor. Refer to DIVISION 16 - ELECTRICAL and to the electrical drawings as well as mechanical drawings for requirements and division of

work for each application. Should any equipment supplied by the Mechanical Contractor require electrical service or wiring than as shown on the Electrical Drawings, advise the Electrical Contractor of such changes and pay all costs for any additions or alterations necessary in the wiring or controls. All control devices must be installed to operate within the manufacturer's rated load and voltage. All control circuits must be through the respective equipment disconnect to insure the control circuit being off when the equipment is off. Wiring materials and methods shall conform to DIVISION 16 - ELECTRICAL, to the applicable codes and to ASA, National Electrical Code and NEMA Standards and Specifications.

- B. Electric Motor Characteristics and Drive: Motor voltages shall be as indicated, and to be verified with the Electrical Contractor and his drawings. Use premium efficiency type motors for all motors larger than 1 HP. Service factor of 1.15 with wick oiled sleeve type bearings or grease packed ball bearings not to exceed 1800 RPM, unless otherwise indicated. V-belt drives designed for 150 percent of motor horsepower with provisions made to adjust belt tension. Where multiple V-belts are used, match the belts. 3/4 HP and larger motors shall have a minimum of two belts. Pulley diameters not smaller than 3 inches O.D. for A-belts, 5 inches for B-belts and 8 inches for C-belts. Drive ration shall not be greater than 1 to 7. All pulley cast iron or steel and properly aligned.
- C. Motor Starters and Wiring:
1. Furnish motor starters, disconnect switches, necessary relays, and other devices, including remote push-button stations; deliver to Electrician for installation and wiring.
  2. Furnish, install, wire and interconnect panels, relays, timers, and other necessary control devices; integrate with motor starting equipment to produce a complete control system.

### 3.04 DUCTWORK

- A. Duct Connections: Flexible at both discharge and inlet of air moving equipment, applied in accordance with manufacturer's instructions. Allow 2-inches of free space between collars connected. Wrap flexible duct connection with 2" thick duct wrap insulation to prevent condensation.
- B. Keep ductwork openings closed with sheetmetal during construction to prevent injury, and take all possible precautions to keep interior of ducts, air intake chambers and fan housings free from dirt and dust. Seal all ducts air tight including all longitudinal seams and transverse joints.
- C. Dampers and Deflectors: Provide splitter, butterfly and louver dampers, deflecting vanes for control of air volume and direction, and for balancing system where indicated, specified and directed.

1. Dampers of galvanized steel, at least one gauge heavier than that for duct size in which damper is installed, reinforced where directed; with indicating quadrant in accessible location, and locking device for adjusting locking damper in position.
  2. Deflectors: Where fixed deflecting vanes are indicated, provide shop-fabricated blades; fit into side strips and screw or rivet to duct elbow in field.
  3. Air Extractors: Provide operable volume extractor at each branch take-off from main duct.
- D. Duct Supports: Place hangers at changes in direction. Use strap hangers for ducts up to 30 inches wide; angle hangers for ducts over 30 inches wide. Strap hanger shall be one inch wide of 16 gauge galvanized sheet steel; extend down both sides of duct and turn under bottom at least 4 inches, fasten to side and bottom with sheetmetal screws. Angle hangers may be formed by extending vertical bracing angles or by rods passing through bottom bracing angles. Duct straps or hangers shall match duct materials.
- E. Erect all ducts with necessary elbows, dampers, etc. and all fans, air outlets, filters, dampers, etc., furnished under other articles of this section. Cross-break ducts exposed to weather to shed water. All 90 degree elbows with turning vanes. All branch taps with air extractors, bell mouth/straight taps or dampers.
- F. Provide sizes, runs and connections of ducts that adhere to drawings as closely as possible. Install to indicate heights as permitted by structure. Fabricate ductwork in workmanlike manner with air tight joints, presenting smooth surface on inside, neatly finished on outside; construct with curves and bends to ease flow of air.
- G. Openings through construction required for ductwork will be provided by others; shop drawings shall locate such duct openings. Obtain approval in ample time to meet building construction schedule. Ductwork shall have rectangular cross section unless otherwise indicated. All exposed to weather ducts shall be cross broken to shed water and top of duct sloped 1/4" per foot, unless round ducts are used.
- H. Low Pressure Ductwork:
1. Details of construction and materials not specified herein shall be in accordance with ASHRAE Guide and SMACNA recommended and as approved.
  2. Unless otherwise indicated, make inside radius of curves and bends not less than width of ducts. Where square elbows are used, provide fixed double radius turning vanes. Construct, brace and support ducts and air chambers so they will not sag or vibrate when fans are operating.
  3. Fabricate, unless other wise indicated or specified, in accordance with SMACNA "Low Velocity and Duct Construction Standards", latest edition. Ducts 18 inches wide and larger which are not insulated shall be cross broken. Distances between joints on any size duct shall not exceed 8 feet. Seal all ductwork airtight. No leakage permitted. Test ducts to 2" static pressure.

4. Duct Insulation: Insulate all supply air ducts with 2 inch thick 1-1/2 lb density fiberglass wrap with vapor barrier. Exhaust ducts do not require insulation unless otherwise indicated.

### 3.05 BALANCE, ADJUST AND TESTING

- A. Scope: The contractor shall obtain the services of an independent, NEBB certified test and balance agency that specializes in, and whose business is the testing and balancing of air conditioning and ventilation systems, to test mechanical systems to determine quantitative performance. After construction has been completed then a post construction test and balance procedure shall be performed. Adjust systems to produce observed quantities that will conform to design quantities within tolerances specified. Balance the flow to conform to design, lock and mark adjustments, and leave systems in balance. Balancing shall include pulley, sheave and belt replacement at no extra cost. Complete preliminary balancing, adjusting and testing prior to final inspection by the Project Architect and also perform final test and balance after building is occupied. Air volumes shall be within 5% of pre-demolition quantities. New air filters to match existing shall be provided for all outside air fans.
- B. Job Conditions: Ventilation and air conditioning equipment shall have been completely installed and shall be put into continuous operation as required to accomplish the test adjustment and balance work specified. Test, adjust and balance shall be performed when outside conditions approximate design conditions indicated for cooling functions.
- C. Certified Reports: Submit test reports on approved forms with certification by the testing agency that the methods used and the results are as specified. Reports shall be on forms as approved by the Project Architect.
- D. Procedures: Air Systems - Test and balance systems in accordance with SMACNA manual for the Balancing and Adjustment of Air Distribution Systems.
  1. Preliminary: Size, type and manufacturer of air terminals and all tested equipment shall be identified and listed. Manufacturer's ratings on all equipment shall be used to make required calculations unless field tests show ratings to be impractical.
  2. Six copies of the complete test report shall be submitted to the Project Architect prior to final acceptance of the project.



- E. Test Data: The Contractor shall provide the Project 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:

Exhaust Fans:

1. Manufacturer and Model.
2. Motor H.P., Voltage, Cycles, Phase and Full Load Amps
3. Actual Running Load Amperes (measured during tests)

3.09 CLEAN UP

Clean up the work provided under this section. Touch up with matching paint all damaged factory finishes. Adjust for quiet and effective operation.

3.10 PAINTING AND IDENTIFYING

The following items furnished under this section are to be painted and identified under Section 09900 - PAINTING. Do not paint over name plates or other identifying labels.

- A. Painting of exposed bare metal surfaces in finished and exposed areas shall be provided herein if it is not specified under Section 09900 - PAINTING. Included in this work shall be bare metal registers, louvers, access panels for mechanical equipment, control covers and thermostat covers, sheetmetal ductwork jacket, piping, hangers, etc. Prepare surface as required in paint schedule. Provide two final coats matching adjoining surface finish.
- B. Provide equipment tag located on equipment near the service panel.

3.11 VALVE TAG AND VALVE LOCATION LOG

None required.

3.12 INSTRUCTIONS

Instruct the Owner in the proper operation and maintenance of the system. Review the maintenance manuals with the Owner's representative. Post starting and stopping instructions adjacent to the equipment, mounted in frame with glass cover plate. Submit a list of manufacturer's warranties for the equipment furnished.

3.13 GUARANTEE

All work in this section shall be guaranteed for a period of one (1) year commencing after 30 consecutive days of trouble free operation after the date of acceptance of the work as a whole by the Project Architect. Warranty period and one-year maintenance service shall start only after 30 consecutive days of trouble free operation after system acceptance. Both periods to run concurrent with same start dates. Start-up and



operation of a system component prior to acceptance of the whole system shall not constitute the start of the one year guarantee of that component. Correction of undue noise or vibration if included in the guarantee. Should any equipment or material fail within this period, the Contractor shall replace or repair at no cost to the Owner. The Contractor shall be responsible for all damage to any part of the premises caused by leaks in piping or equipment for the guarantee period. All work shall produce capacity and performance specified or shown.

### 3.14 ONE YEAR GUARANTEE

- A. In addition to the Guarantee on material and workmanship, the Installer shall submit seven (7) copies of the Maintenance Service Contract, countersigned by the General Contractor, that will validate said Guarantee.
- B. The guarantee and maintenance services 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 to necessary to service the complete system. 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.
  - 2. The system is maintaining operational conditions and other parameters as measured during acceptance tests.

### 3.15 OPERATION AND MAINTENANCE MANUAL

Refer to paragraph entitled "SUBMITTALS", subparagraph "Operations and Maintenance Manuals" in PART 1 - GENERAL.

END OF SECTION

DIVISION 16 - ELECTRICAL

SECTION 16000 - BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Installation of telecommunication equipment, devices, cables, and accessories shall be done by others.

1.02 WORK BY OTHERS

- A. Owner may award separate contracts for supply and installation of work identified (may require coordination with work of this Division).

1.03 PROJECT PHASING

- A. Coordinate electrical schedule and operations with the Owner.

1.04 DRAWINGS

- A. Electrical power and lighting plans are schematic and indicate general layout and approximate locations of outlets, switches, luminaires, service runs, feeder runs, devices, and other electrical equipment. Make minor adjustments in layouts to ensure coordination.
- B. Review contract drawings and specifications, and verify locations of structural members, equipment, apparatus, and other conditions which may affect work. Provide conduit transitions and offsets, junction boxes and similar fittings as necessary to install complete electrical systems.
- C. Coordinate work with wiring and equipment included in other sections and divisions of the specifications.
- D. Design and layouts indicated on drawings are based on specified products and equipment. Provide modifications required to materials, components and equipment to accommodate products and equipment other than specified.
- E. Obtain Architect/Engineer's acceptance of significant deviations from drawing layouts before performing the work.
- F. Architect/Engineer or Owner reserves the right to relocate any device within 10 feet of its indicated location up to the time of its installation without additional cost to the Owner.

#### 1.05 SUBMITTALS

- A. Submit under provisions of Section 01300 - SUBMITTALS.
- B. Submit shop drawings and product data grouped to include complete submittals of related systems, products and accessories in a single submittal.
  - 1. Submit quantities required in Section 01300 - plus one additional copy to be retained by the Engineer.
  - 2. Include Submittals For The Following Items:
    - a. Section 16010 - ELECTRICAL WORK - INTERIOR: Gutters, pullboxes and cabinets.
    - b. Section 16010 - ELECTRICAL WORK - INTERIOR: Switchboard, Panelboards, Circuit Breakers, Disconnect Switches, Time Switches.
    - c. Section 16010 - ELECTRICAL WORK - INTERIOR: Wiring devices.
    - d. Section 16010 - ELECTRICAL WORK - INTERIOR: Lighting fixtures and lamp schedule.
    - e. Any other special or built-to-order equipment.
- D. Mark dimensions and values in units to match those specified.
- E. Record Documents: Provide in accordance with Section 01300 - SUBMITTALS.

#### 1.06 REGULATORY REQUIREMENTS

- A. Conform to International Building Code for the County of Maui.
- B. Conform to NFPA 70 (NEC), National Electrical Safety Code, applicable NFPA regulations, and County of Hawaii Codes.
- C. Comply with ANSI, NEMA, EEL, and IPCEA standards.
- D. Obtain permits and request inspections from authority having jurisdiction. Deliver certificates of final inspection to the Architect.

#### 1.07 PROJECT CONDITIONS

- A. Install work in locations shown on drawings, unless prevented by project conditions.
- B. Prepare drawings showing proposed rearrangement of work to meet project conditions, including changes to work specified in other sections. Obtain permission of Architect/Engineer before proceeding.

1.08 WARRANTIES

- A. Special Warranties: Provide warranties required under the respective specification Sections.
- B. Warrant lamp sources for 50 percent of rated life.
- C. Comply with procedures and requirements specified in Section 01300 - SUBMITTALS.

1.09 ELECTRICAL WORK CLOSEOUT

- A. Prepare the following items and submit to the Architect before final acceptance.
  - 1. Two copies of all test results as required under this section.
  - 2. Two copies of local and/or state code enforcing authorities final inspection certificates.
  - 3. Copies of as-built record drawings as required under the General Conditions and this section.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

## SECTION 16010 - ELECTRICAL WORK - INTERIOR

### PART 1 - GENERAL

#### 1.01 DESCRIPTION OF WORK

- A. Furnish all labor and materials required to complete all electrical work as indicated on the drawings and/or specified herein. In general, the following work is included:
  - 1. Power systems; including panelboards, circuit breakers, and feeder wiring.
  - 2. Power and lighting systems; including branch circuits, outlets, wiring devices, panels, raceways, and wiring.
  - 3. Raceways, boxes, and pull wires for telecommunication system.
  - 4. Raceways, outlets, junction boxes, wires, and cables, equipment and devices for fire alarm system.
  - 5. Installation of equipment furnished by the Owner or by others, including the furnishing of disconnects and power connections.
  - 6. Power wiring for mechanical equipment including furnishing of disconnects.
  - 7. Coordination with utility companies.
  - 8. Submittal of shop drawings.
  - 9. Preparation of "as-built" drawings.
- B. The term "wiring" shall include raceways, outlets, conductors, fixtures, devices, and panelboards.
- C. Wiring and connecting all electrical equipment supplied for installation and use in this contract and not specifically listed as work by others.

#### 1.02 RULES, STANDARDS AND PERMITS

- A. The entire work shall comply with applicable laws of the local electric bureau, the Standards of NEMA and ANSI and National Electrical Safety Code, and the regulations of the local utility companies.
- B. The Contractor shall obtain and pay for the electrical permits required, and shall give notice for inspections as the work progresses. Upon completion, he shall deliver certificates of completion and inspection to the Architect.

### 1.03 DRAWINGS

- A. These specifications are accompanied by floor plans of the building, and diagrammatic electrical layouts showing the approximate location of the outlets, switches, devices and other equipment.
- B. The wiring layouts and schedules show the approximate locations of all outlets, switch control, service runs and other electrical apparatus. These locations are approximate and before installing Contractor shall study adjacent architectural details and make installation in most logical manner. Any device may be relocated within 10'-0" before installation at the direction of the Architect, whose decision shall be final.
- C. Contractor shall maintain in his field office one set of electrical drawings for the sole purpose of recording changes and field deviations as they occur. Each change with explanatory notes shall be entered before the close of the working day, and shall be initialed by the representative of the Architect.

Above reference to deviations shall not be construed to allow deviations without prior approval. Upon completion of the electrical work, the Contractor shall transfer all changes posted on the field set to a set of transparencies to be furnished by the Architect. The final set shall be certified to show "as-built" conditions and both sets delivered to the Architect. This is mandatory.

### 1.04 SUBMITTALS

- A. Submit in accordance with Section 01300 – SUBMITTALS.
- B. Submit for approval six (6) copies of shop drawings or catalog cuts of following equipment and resubmit until approval is received before placing order:
  - 1. Panelboards, circuit breakers, time switches, starters, and safety switches.
  - 2. Gutters, pull boxes, and cabinets.
  - 3. Lighting fixtures and lamp schedule.
  - 4. Wiring devices.
  - 5. Any other special or built-to-order equipment.

### 1.05 GUARANTEE

- A. Installation shall be complete in every detail and ready for use. Any item supplied by Contractor developing defects within one (1) year of final acceptance by Architect, except lamps which shall be guaranteed for fifty percent (50%) of rated life as published by manufacturer, shall be replaced by such materials, apparatus or parts including installation labor to make such defective portion of complete system conform to true intent and meaning of Drawings and Specifications, at no additional charge to the Owner.

PART 2 - PRODUCTS2.01 MATERIALS

- A. Materials and equipment shall be new and those listed by Underwriters' Laboratories shall bear "UL" label of approval. Brand names, manufacturer's names and catalog numbers indicate standards of design and quality required. Substitute materials may be used if qualified by written permission from Architect. List of substitute materials together with qualifying data shall be submitted for approval as provided in Division 1 Sections. Failure to obtain approval of substitute materials prior to bidding shall mean that materials as specified shall be provided.

Example:

	Manufacturer and	Substitute Manufacturer
Item	Catalog No. Specified	and Catalog Number
Cable	Joe Doe - No. 3020	King - No. 2200

Qualifying data shall include cuts, shop drawings, and specifications to show equality with material specified herein and in drawings.

- B. Ground rods shall be copperclad steel, 5/8" x 8' long minimum.
- C. Panelboards shall be with ratings and mounting as indicated, with doors and trims, copper bussed with bolted molded case thermal magnetic breakers, complement as shown on drawings, circuit directory in metal holder, lock and 2 keys. Breakers shall be interchangeable trip type when such is available. All panels shall be keyed alike.
- D. Raceways:
1. Rigid steel, zinc-coated, 3/4 inch minimum diameter, except as noted. Other sizes to conform to NEC Annex C, Table C1, based on RHW wires.
  2. Electrical metallic tubing (EMT) galvanized round bore with compression connectors, 3/4" minimum diameter, other sizes to conform to NEC Annex C, Table C1, based on RHW wires.
  3. Intermediate metal conduit. Steel conduit, zinc coated inside and outside with additional silicone epoxy-ester lubricating coating inside, 3/4 inch minimum diameter.
  4. Ducts shall be polyvinyl chloride plastic schedule 40 with 3" concrete encasement, below grade.
  5. Flexible Conduit: galvanized steel, neoprene jacketed for wet locations. (Use for connections to equipment subject to vibration only.)
- E. Conductors shall be delivered to site in original factory packages or reels. Conductors shall be copper, #12 AWG minimum. Aluminum conductors will not be allowed. No. 10 and No. 12 wires shall be solid conductor.
1. Interior Locations: Branch circuits, Type RHW, TW, THW or THWN.
  2. Fluorescent Fixture Channels: Type THHN or RHH.

3. Exterior Locations: Type RHW - USE, or cross-linked polyethylene Style USE.
4. In Gutters and Feeders: #6 AWG and larger. Type THW or XHHW.

F. Boxes:

1. Outlet and small junction boxes shall be zinc-coated pressed steel of ample size. Light outlets shall be fitted with no-bolt type fixture studs as necessary for fixture support. Minimum size of outlet boxes, 4" square or octagon.
2. Large junction boxes and covers shall be zinc-coated. Screws for cover shall be brass.
3. Exposed boxes and weather exposed boxes - galvanized cast steel with threaded hubs for conduits.

G. Wiring Devices: Specification grade unless otherwise noted.

1. Receptacles, duplex 3 wires, 15 amperes, 125 volts, grounding type specification grade, Arrow No. 5262 or equal.
2. Switches, tumbler, bakelite body, flush, ivory, 20-ampere, 120-volts, quiet operating, poles as indicated, Bryant #490X Series, Hubbell 122X Series, Arrow #1991X-SL Series or equal.
3. Special receptacles shall be of the type and size indicated on the drawings. Provide matching cap for each receptacle. Arrow, Hubbell, Bryant or equal. Provide one matching plug for each receptacle.
4. Equivalent grade and type of wiring devices manufactured by General Electric Company, Sierra or Leviton are approved.
5. Plates shall be 0.040-inch thick, 18-8 stainless steel, except where other metals are noted or specified. Telephone and communication outlets shall have plates with 3/8" diameter, grommetted hole unless larger diameter hole is indicated or required for cord or cable installed to equipment.

H. Lighting Fixtures:

1. Provide all lighting fixtures and lamps as indicated including lamps, ballasts, stems and accessories.
2. LED's shall be 3500K throughout.
3. Filament lamps shall be inside-frosted and rated for 120-volts supply, except lamps for night-lights shall be rated 130-volts.
4. Drivers shall be dimmable.
5. Fixtures shall be manufactured from sheet metal protected by "Bonderite" or "Crysoat" process and baked white finished, 80% minimum reflectance, to resist 300 hours salt spray test. Anodize all aluminum, galvanize or chrome all steel. All ferrous metal surfaces, including edges shall be plated or primed and painted.
6. Fixture Stems: Steel, 3/8" I.D., white enamel finish, self-aligning with 45 degree galvanized steel ball type swivel, pivotal connecting strap, canopy



and adjustable length or as indicated on the drawings. Fixture studs, galvanized malleable iron, enamel finished, or as directed.

7. Time Switch: Fully automatic, 8-hour minimum motor-wound spring carry-over for standby operation during power failure, motor driven movement, 120 volt, two pole type, simultaneous "ON" and "OFF" contacts. Spring drive shall be removed from movement when driven by motor. After standby carry-over spring shall automatically rewind. Unit shall be astronomic dial type for 21 degrees north latitude; 35 amperes, 125 volts contacts and enclosed in a NEMA 1 steel enclosure: Sangamo No. WZ-21, Tork No. 7200 ZL; Paragon, Intermatic are approved equals.
- I. Circuit breakers and safety switches shall be of the rating and type indicated. Circuit breakers shall be of the interchangeable trip type when available. Safety switches shall be heavy duty. For indoor locations enclosures shall be NEMA 1 enclosures. Exterior locations and interior locations exposed to moisture enclosures shall be NEMA 3R.
- J. Panelboard shall be circuit breaker equipped with copper busses. Circuit breakers shall be UL 489 bolt-on type. Provide separate ground bus.
- K. Motor starters shall be across the line, manual or magnetic type as required with overload protection in each phase in NEMA enclosure. Motor starters installed in exterior locations and interior locations exposed to moisture shall have NEMA 3R enclosures.
- L. Hardware, Supports, Backing, Etc.: Provide all hardware, supports, backing and other accessories necessary to install electrical equipment. Wood materials to be termite resistant. Ferrous material shall be galvanized for corrosion protection. Non-ferrous materials shall be brass or bronze.

### PART 3 - EXECUTION

#### 3.01 CONSTRUCTION METHODS

- A. Comply with local ordinances and regulations of the County. Workmanship subject to approval of Architect who shall be afforded every opportunity to determine skill and competency. Concealed work re-opened at random during formal inspection by Architect without additional charge to the Owner.
- B. Construction shall conform to construction practices as recommended by American Electricians Handbook by Croft (latest edition), Edison Electric Institute, National Electrical Code, National Electrical Safety Code and applicable instructions of manufacturers of equipment and materials supplied for project.
- C. Raceways:
  1. All conduits within building shall be rigid steel conduits, intermediate metal conduit or electrical metallic tubing. Electrical metallic tubing may be used only in dry walls and above dry ceilings. Paint steel conduits in or under ground floor slabs with asphaltic corrosion resistance base paint or compound after installation in place. Polyvinyl chloride conduit may be used buried below grade only. Transition to steel conduit elbow shall be

made at floor line. PVC conduit will not be permitted above grade level concrete slab. All conduits below grade level shall be concrete encased. Use watertight couplings to joint EMT in concrete above grade (set screw fasteners type couplings will not be permitted).

2. Cut raceways square, and ream inner edges. Butt together evenly in couplings.
  3. Make bends and offsets with hickey or conduit bending machine. Do not use vise or pipe tee. Bends made so that interior cross-sectional area will not be reduced. Radius of curve of inner edge will not be reduced. Radius of curve of inner edge of field bend not less than ten times internal diameter of raceway. Use of running threads not permitted. Where raceways cannot be joined by standard threaded couplings, use approved watertight raceway unions.
  4. Cap raceways during construction with plastic or metal-capped bushings to prevent entrance of dirt or moisture. Swab all raceways out and dry before wires or cables are pulled in.
  5. Mount raceway free from other piping, valves, or mechanical equipment.
  6. Fish wires, free from other piping, valves, or mechanical equipment.
  7. Install insulating bushings and two locknuts on each end of every run of conduit at enclosures and boxes. Provide grounding bushings as required to grounding receptacles and connect conduits to service ground, per NEC Article 250.
  8. Project adequate number of conduit threads through box for bushings.
  9. Run exposed raceways parallel with, or at right angles to structural or architectural elements.
  10. Securely fasten raceways with galvanized pipe straps with screws or bolts and spaced not more than 7 feet apart, as conditions require. Vertical runs supported at intervals not exceeding 5 feet by approved clamp hangers. Conduit runs with one 90-degree bends or equivalent, 140 feet maximum without pullbox. Conduit runs with two 90-degree bends or equivalent, 100 feet maximum without pullbox. Support raceways from structure. Do not support from or on mechanical pipes, ducts or ceiling suspension wires.
  11. After cables have been installed, seal all ducts with mastic compound to prevent entry of water from ductline to termination of ducts in areas below grade.
  12. Install #10 gage galvanized steel pull wire or nylon line with 200 pound tensile strength in all empty raceways.
- D. Outlet Boxes: Provide outlet boxes to suit conditions encountered. Provide outlet boxes in spaces with extension or raised rings of such depth that metal will be flush with surrounding surfaces of opening. When two or more switches are installed at single location, mount in gang box under single device plate. Use gang boxes wherever 3 or more switches are installed at one location. Concealed boxes shall be pressed steel, galvanized, 4" square by 1-1/2" deep minimum.

- E. Conductor fill in raceways shall conform to NEC Chapter 9, Table 3A (based on Type RHW wires) unless otherwise indicated on the drawings.
- F. Wire Pulling: Mechanical means for pulling shall be torque-limiting type and used for #2 AWG and smaller wires. Pulling tension shall not exceed wire manufacturer's recommendations. Lubricants used for wire pulling in all areas except as noted shall be such that it will not damage conductor insulation or sheathing. For neoprene jacketed and plastic-sheathed conductors, use powdered soapstone.
- G. Wire Splicing:
  - 1. Form wires neatly in enclosures and boxes.
  - 2. Splice in accordance with NEC Article 110. Crimp connect conductors #10 and smaller. Splice conductors #8 through #4/0 with high-pressure compression (indent) copper sleeve connectors. Do not use bolt-on connectors. Reinsulate splices and waterproof splices. Reinsulate splices according to wire manufacturer's instructions. Splice insulation shall be 200% in thickness of original wire insulation and of same electrical and mechanical characteristics. Tape shall be 7-mil minimum thickness vinyl plastic.
- H. Installation of Lighting Fixtures: Support fixtures securely and safely by means of fixture studs in the outlet boxes or other approved means. Ceiling fixtures arranged to hang vertically unless otherwise directed by Architect. 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.
- I. Grounding:
  - 1. Motors, metallic enclosures, raceways and electrical equipment grounded according to requirements of National Electrical Code, Article 250. Ground connection to equipment, raceways, motors, grounding type receptacles and other metallic parts directly exposed to ungrounded electric conductors by continuous metal raceways, or No. 14 AWG minimum, AWG copper, NEC type TW, green insulated. Install ground wire, size in accordance with NEC.
  - 2. All grounding wire runs with buildings shall be in rigid steel conduits. Where practicable, all ground wires shall be run together with circuit conductors.
- J. Equipment Connections: Connect all equipment and appliances. Make power connections to motor on equipment with flexible conduit. Provide disconnect switches for all motorized equipment if none is furnished with the equipment. Furnish starters with overload protection on each leg for all motorized equipment if none is furnished by other trades.
- K. Finishing:
  - 1. Patch, repair and restore all structural and architectural elements cut or drilled for installation of electrical system. Drilling, cutting, patching, repairing and restoring shall be subject to approval of Architect.

2. Attach electrical equipment to wood by wood screws, and attach to concrete by embedded or expansion inserts and bolts. Use power-driven charge with approval only. Close unused knock-outs on boxes or enclosures with metal cap. Powder actuated fasteners shall not be used on precast concrete. Do not use powder-activated fasteners to attach enclosures and boxes to the building.
3. Wipe clean all exposed raceways and enclosures with rags and solvent. Prime paint and finish unfinished raceways and enclosures. Factory finished enclosures shall not be painted. Panelboards, switches, circuit breakers, junction boxes, and equipment shall be identified by stenciling with engraved plastic nameplates on cover or door. Voltage and phase shall be indicated on nameplates for panelboards, switches and circuit breakers.
4. Connect circuits to circuit assignments shown on drawings. Provide neatly typewritten circuit directory for all panelboards. Circuit directory shall indicate location of loads served by each circuit.
5. Label all panels and service equipment with phenolic labels. Tag all empty conduits with fiber disc tags at bushings.

### 3.02 TESTING

- A. All wiring shall be tested to insure proper operation according to functions specified.
- B. Measure insulation resistance of all feeder wires. All feeder cables, #4 or larger shall have insulation resistance of 1.5 megohms or higher. Insulation resistance shall be measured by 500 volts megger. Resistance of feeder cables shall be recorded and turned over in four (4) copies to the Architect during final inspection. Proper operation of all electrical devices shall be demonstrated at request of Architect during final inspection.
- C. Balance loading on each feeder.
- D. Measure ground resistance at service equipment in the presence of the Owner's Representative. Submit four (4) copies of test results to the Architect.

END OF SECTION

## SECTION 16100 - ELECTRICAL WORK - EXTERIOR

### PART 1 - GENERAL

#### 1.01 DESCRIPTION OF WORK

- A. Furnish all labor and materials required to complete all electrical work as indicated on the drawings and/or specified herein. In general, the following work is included:
  - 1. Underground distribution system, including ductlines, and pull strings as indicated on drawings.
  - 2. Concrete pad for MECO transformer.
  - 3. Underground duct systems for MECO, Hawaiian Telecom and Spectrum.
  - 4. Coordination with all utility companies.
  - 5. Submittal of shop drawings.

#### 1.02 RULES AND PERMIT

- A. The installation shall comply with the requirements and recommendations of the National Electrical Safety Code, National Electrical Code, State of Hawaii Public Utilities Commission General Order No. 10, and the utility companies.
- B. The Contractor to obtain and pay for the electrical permit as required by local rules and regulations. He shall arrange for periodic inspection by the local authorities as work progresses so that certificates of completion and inspection may be turned over to the Architect.

#### 1.03 DRAWINGS

- A. Specifications are accompanied by site plans, electrical plans, and diagrams showing locations of ductlines, boxes, concrete pads, and other electrical equipment. Locations are approximate and before installing, Contractor shall study adjacent ground condition and make installation in most logical manner. Any item may be relocated within 10' - 0" before installation at direction of the Architect without additional charge to the Owner.
- B. Before installing, verify all dimensions and sizes of equipment at job site.

#### 1.04 SUBMITTALS

- A. Submit in accordance with Section 01300 - SUBMITTALS.
- B. Submit for approval one (1) set of reproducible transparency and three (3) sets of ozalid prints of shop drawings or six (6) sets of catalog cuts of following equipment and resubmit until approval is received before placing order:

Any other special or built-to-order equipment.

- C. Shop drawings and catalog cuts for substitute materials shall clearly specify compliance with and/or deviation from specified material. Approval of shop drawings and catalog cuts shall not release Contractor from complying with intent of specifications and drawings. Any deviations from approved shop drawings shall have prior approval by the Architect.

#### 1.05 GUARANTEE

- A. Installation shall be complete in every detail and ready for use. Any item supplied by the Contractor developing defects within one (1) year of final acceptance by the Architect shall be replaced by such materials, apparatus or parts including installation labor to make such defective portion of complete system conform to true intent and meaning of drawings and specifications, at no additional charge to the Owner.

### PART 2 - PRODUCTS

#### 2.01 MATERIALS

- A. Materials and equipment shall be new and shall conform to standards of the Underwriters' Laboratories, Inc., NEMA, ANSI, ASTM, IEEE, and EEL. Brand names, manufacturer's names and catalog numbers indicate standards of design and quality required. Substitute materials may be used is qualified by written permission from Contracting Officer. List of substitute materials together with qualifying data shall be submitted for approval in accordance with the Special Provisions of these specifications.

Example:

	Manufacturer and	Substitute Manufacturer
Item	Catalog No. Specified	and Catalog Number
Cable	Joe Doe - No. 3200	King No. 2200

Qualifying data shall include cuts, shop drawings and specifications to show equality with material specified herein and in drawings.

- B. Plastic Conduits: Polyvinyl chloride Schedule 40, for concrete encased ducts and polyvinyl chloride Schedule 80 for direct burial conduits.
- C. Wires: Exterior underground conductors used for control shall be type XHHW or THWN.
- D. Ground Rods: Copper clad steel, 3/4" x 8' long minimum.
- E. Concrete: See Division 3 - CONCRETE.

PART 3 - EXECUTION

3.01 CONSTRUCTION

- A. Workmanship shall be subject to the approval of the Architect and the local utility companies.
- B. Ductlines: Ductlines shall be polyvinyl chloride (PVC) ducts in concrete jackets and shall be installed by qualified electrician.
  - 1. Ductlines shall be polyvinyl chloride (PVC) ducts in concrete jackets and shall be installed by electrician. Lay ducts and/or conduits in trenches on plastic saddles or on concrete spacers. Spacing between ducts shall be as indicated. Slope ducts 4 inches per hundred feet to drain into handholes. After laying, bind ducts with #2 wire and anchor to prevent movement during concrete pouring. Coat tapered ends of ducts or conduits with sealing compound before coupling is applied to insure watertight joint. Reinforcing steel, shoring and forming where required, shall be installed according to Division 3 - CONCRETE. Concrete shall be poured without the use of mechanical vibrators. Tamp concrete manually with wooden rods. Thickness of concrete encasement shown is minimum and may be increased to fit actual shape of trench. Changes in direction of runs exceeding 5 degrees shall be accomplished by using special couplings or bends manufactured for this purpose. If it is necessary to cut tapered end on piece of conduit at site, cut shall be made with saw and tapered with lathe designed to match original taper. After ductline is installed, pull a mandrel not less than 12" long having diameter 1/4" less than inside diameter of conduit through each conduit. After this, pull brush with stiff bristles through to make certain that no particles of earth, sand or gravel have been left in line. Install stranded nylon pull line in all empty raceways. Plug all spare raceways with non-corrodible plugs manufactured for the purpose.
  - 2. After cables have been installed, seal all ducts with mastic compound to prevent entry of water from ductline to termination of ducts in areas below grade.
- C. Handholes: Construct all handholes as detailed or per governing utility standards. Precast handholes are acceptable. Handholes located in concrete walkways shall be flush with finish grade.
- D. Wire Splicing for Cables Rated 600 Volts or Less:
  - 1. Form wire neatly in enclosures and boxes.
  - 2. Splices in underground locations will not be permitted.
- E. Grounding shall conform to applicable requirements in the National Electrical Code, the National Electrical Safety Code, and to requirements herein. Neutral conductors, cable shields, metallic conduits, junction boxes, lightning arresters, and all noncurrent-carrying metallic parts of equipment, shall be grounded. Ground rods shall be driven into the earth at least 8 feet.

### 3.02 TESTS

- A. Operating Test: After the installation has been completed, and at such time as the Architect may direct, the Contractor shall conduct an operating test for approval. The equipment shall be demonstrated to operate in accordance with the requirements of this section of the specifications. The test shall be performed in the presence of the Architect. The Contractor shall furnish the necessary instruments and personnel required for the test.
- B. Ground resistance measurements of each ground rod shall be taken and certified by the Contractor to the Architect. The Contractor shall submit in writing to the Architect upon completion of the project, the measured ground resistance of each ground rod and grounding system, indicating the location of the 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.

- C. Balance loading on each feeder.

END OF SECTION