



***BID AND CONTRACT DOCUMENTS
AND SPECIFICATIONS
FOR***

JOINT OPERATIONS & MAINTENANCE FACILITY

***PROJECT # 36610
RFB # 24-007***

***City of Federal Way
Public Works Department
33325 8th Avenue South
Federal Way, WA 98003***

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CITY OF FEDERAL WAY
OPERATIONS & MAINTENANCE FACILITY
Federal Way, WA.

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**CITY OF FEDERAL WAY
JOINT OPERATIONS & MAINTENANCE FACILITY
FEDERAL WAY, WA.**

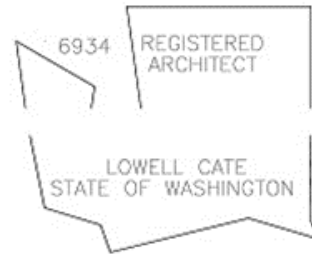


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**SECTION 01 11 00
SUMMARY OF WORK**

PART 1 - GENERAL

1.01 WORK INCLUDED IN CONTRACT DOCUMENTS

A. Description of the Work: On-Site Construction – Schedule ‘A’. (Alternates A1 Thru A5)

1. Site work and construction of multiple buildings for the City of Federal Way’s new Joint Operations and Maintenance Facility at their current and expanded Steel Lake site, 31016 28th Avenue South, Federal Way, WA. The project consists of several independent structures including an Operations Building, containing office, meeting spaces, locker rooms and staff support space; and Fleet Maintenance and Shops Building containing workshops, vehicle wash bay and departmental shops and storage spaces. The project includes several pre-engineered Buildings (PEB) for vehicles, equipment, materials and bulk storage for city Public Works and Parks departments. These Pre-engineered buildings also contain, a SWAT Vehicle storage area and a fuel center canopy. Other structures and equipment on site include facilities associated with general operations by the city including an above ground fuel tank at fuel center, a trash recycle transfer dock area, trash enclosure for the operations building, site generator, a brining facility utilizing existing tanks, EV parking areas and recharging stations. Site improvements include paved drives and parking areas for visitors, staff and city fleet uses, with associated storm and utility improvements. Building sizes can be found on Sheet G002 Site Plan.
2. Structural & building materials for the new buildings include cast-in-place concrete, concrete masonry units, Precast concrete, structural steel, and metal decking. The exterior closure includes Insulated metal wall panels, glazed aluminum entrance doors and storefronts, weather barrier, standing seam metal and single ply roofing. Systems inside the building include an operable partition, electrical, mechanical, plumbing, fire protection, security, fire alarm, telecom, and audiovisual systems.
3. Interior floor finishes include walk-off mat, carpeting, epoxy flooring, wood, rubber, ceramic tile, sealed concrete, and polished concrete. Wall finishes include paint, ceramic tile and PVC wall panels and wall guards. Ceiling finishes include paint, acoustical tile, wood, and PVC panels.
4. Site: Site improvements include a paved plaza, surface parking lots, landscape planting and irrigation, utilities, stormwater drainage and detention, paving, grading, lighting, site furnishings, Security fencing and motorized gates. Existing residential structures on site have been demolished. Demolition of selected existing site elements is included in the Project as well as the demolition of the existing office building after the completion of the new operations buildings.
5. Work consists of providing labor, materials, equipment, services, and administrative services required in conjunction with or incidental to Project Construction, including work provided under other contracts or indicated as 'FOIC'.
6. Provide items required for complete operating systems, including items not necessarily specified or shown in these documents, but that can be reasonably inferred as being necessary.
7. All site conditions and Contract Documents shall have been examined by the Contractor prior to bidding. The Contractor understands the Contract Documents and

the quality and quantities of materials to be provided.

B. Description of the Work: Off-Site Construction – Schedule ‘B’

1. Off-site work includes all work in the Right-of-Way, 28th Avenue S. and S 308th Lane; the Art / Security wall along the western frontage of the site and the landscaping between the Art / Security wall and the Right-of-Way.

C. Permits and Fees: Secure and pay for government fees, licenses, and permits, except as specifically noted in the Contract Documents.

1. Owner has paid for the land use permit, building permits, mechanical permit, and electrical permits.

City of Federal Way Permits for work on-site submitted and paid for by the city to date:

1. Building A Operations Building - 24-100872-CO
2. Building B Fleet & Maintenance - 24-100873-CO
3. Building C Storage Building - 24-100875-CO
4. Building D SWAT & Generator Storage - 24-100876-CO
5. Building E Salt and Sand Shed – 24-100871-CO.
6. Building F Snow Fleet Storage - 24-100888-CO
7. Building G Waste Transfer Dock - 24-100877-CO
8. Building H Fuel Center - 24-100878-CO
9. EN permit - 24-101093-EN
10. Building A Electrical permit #: 24-101608-EL
11. Building B Electrical permit #: 24-101609-EL
12. Lakehaven Water and Sewer District.

1.02 CONSTRUCTION CONTRACT AND RELATED WORK

A. Refer to City of Federal Way Special Provisions for additional information and requirements.

B. Construct Project under single stipulated fixed-price sum contract as incorporated in the Contract Documents. Refer to Section 01 23 00 - Alternates for separate prices for Work which may be incorporated into the Construction at Owner's discretion.

C. The General Contractor will coordinate all trades involved in the project.

D. Work by Others Under Separate Construction Contracts: Work on Project which may be executed prior to, simultaneous with, or after completion of Work of this Contract, and which is excluded from this Contract include:

1. Such work may include building security systems.
2. Fully cooperate and coordinated schedule with separate contractors in order that work of separate contracts may proceed smoothly, without interference or delay of either contract.

- E. For Installation by Contractor: Certain items listed in the Equipment list, the Specifications or designated on the drawings by the abbreviation "FOIC", meaning "Furnished by Owner but Installed by Contractor" will be delivered to the job site receiving area for consignment to the Contractor for installation.
 - 1. The Contractor shall assume custody and responsibility for same after inspecting and determining that they are complete and in acceptable condition for installation.
 - 2. Installation of such items includes uncrating, setting in place, building in, leveling, and attaching to building construction as required, making any connections to building services, and leaving same completely installed and in operable condition satisfactory to the Owner's Representative at time of acceptance of the Work.
- F. Hazardous Materials: Should the Contractor, after work has commenced, discover/disturb any hazardous material on the Project Site that pre-existed the commencement of construction, the Contractor is directed to immediately cease work activity in the area found to be potentially hazardous, notify the Owner's Project Manager, and await their direction.

1.03 WORK BY OWNER

- A. The Owner will award a contract for supply and installation of:
 - 1. Electronic Security System. Surveillance cameras and speakers only.
- B. Items noted NIC (Not in Contract), movable cabinets, furnishings, minor equipment, and will be supplied, move and installed by Owner after substantial approval of the work.
- C. Owner will remove and retain possession of the following items before start of Work:
 - 1. City equipment and materials from the assigned work area of the site.
- D. The Contractor will coordinate the Work with the Owner and with other Contractors on-site during the terms of this Work.

1.04 OWNER SUPPLIED PRODUCTS

- A. Owner's Responsibilities:
 - 1. Arrange for and deliver Owner reviewed shop drawings, product data, and samples to Contractor.
 - 2. Arrange and pay for product delivery to site.
 - 3. On delivery, inspect products jointly with Contractor.
 - 4. Coordinate delivery schedule with Contractor supplied construction schedule.
 - 5. Submit claims for transportation damage and replace damaged, defective, or deficient items.
 - 6. Arrange for manufacturers' warranties, inspections, and service.
- B. Contractor's Responsibilities:
 - 1. Review Owner reviewed shop drawings, product data, and samples.
 - 2. Coordinate delivery schedule with Owner and Contractor construction schedule.

3. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
 4. Handle, store, install, and finish products.
 5. Repair or replace items damaged after receipt.
- C. The following abbreviations are utilized in the Contract Documents:
1. FIO – Furnished and Installed by Owner.
 2. FOIC - Furnished by Owner Installed by Contractor.
 3. FIC – Furnished and Installed by Contractor.
- D. Items furnished by Owner Installed by Contractor. (FOIC):
1. Brine System,
 2. Refer to Drawings and specifications for additional items.

1.05 CONTRACTOR USE OF SITE

- A. While the majority of the site will be open to the contractor for this project there are some limitations on the full use of the site during construction. Contractor to allow for:
1. Owner occupancy of the existing office building and bulk storage area at the south end of the site.
 2. Work by others and work by Owner.
 3. Limited access to the site by the public is needed to the existing office building main entry, off the street and access to the new entry of the operation building once completed, during demolition of the old office building.
 4. Contractor to allow for the limited storage of materials, equipment, and trailers belonging to the Owner and other Contractors during construction.
 5. Contractor to provide Security fencing around Owner's operations and relocate as necessary during staging of work.
- B. Construction Hours: Except in the case of emergency or unless otherwise approved by the Engineer, the normal working hours for the Contract shall be any consecutive 8-hour period between 7:00 a.m. and 6:00 p.m. Monday through Friday, exclusive of a lunch break. If the Contractor desires different than the normal working hours stated above, the request must be submitted in writing prior to the preconstruction conference.
- C. Construction noise is governed by the Federal Way Revised Code 19.105.040 Regulation of work hours. Noise related to construction is allowed from 7:00 a.m. to 8:00 p.m. Monday through Friday and 9:00 a.m. to 8:00 p.m. on Saturday. Construction noise is prohibited on all Sundays and holidays observed by the city. Exceptions to the construction noise hours limitation MAY be granted pursuant to the ordinance cited above, when necessary to accommodate construction which cannot be undertaken during exempt hours.
- D. Utility Outages and Shutdown: Coordinate with Owner. Note all outages and shutdowns on Contractor provided construction schedule. Provide a minimum of 72 hours prior notice to Owner prior to outage or shutdown.

- E. Existing Improvements, Hardscape and Utilities:
 - 1. General: Protect existing structures, sidewalks, curbs, streets, landscaping, utilities, and work of any kind, which is to remain, from damage defacement, or interruption of service, except as may be specially directed or authorized by the Owner's Representative. All damage shall be repaired to approximate original condition within the Contract Sum.
 - 2. Existing Trees: Trees to remain shall be protected and maintained throughout the Construction period.
 - 3. Utilities: Protect and maintain existing utilities from damage or interruption, except as required to make service connections. Verify locations of all utilities and coordinate interruption and relocation with respective utility company.
- F. Coordinate work with Owner's to ensure use of the site during Work, including temporary fencing between Owner and Contractor Operations.
- G. Provide for protection and security of stored and installed materials and work under this Contract.
- H. Contractors' stored materials will be coordinated with the Owner to avoid interference with the Owner's activities and use of the facilities.

1.06 FUTURE WORK

- A. Wherever an item is shown on the drawings or referenced in the specifications as "Future", it is to be considered as included in work of another and later contract.

1.07 WORK SEQUENCE

- A. Construct Work in phases to accommodate Owner's occupancy requirements during the construction period, coordinate construction schedule and operations with Owner Throughout construction process.
 - 1. Phase 1: General Construction on site. Owner will continue to utilize existing office building and bulk storage area at south end of site, while allowing room for construction of New Operations Building and staff parking.
 - 2. Phase 2: With the completion of the new bulk storage facilities and access to those facilities from the street, the Contractor will move the existing storage tent structures to the new site per Owner's directions and the owner will relocate their bulk materials to the new facility. At which time the contractor will remove all remaining site structures no longer needed by the city, make improvements required by the construction documents in those areas and restore the site.
 - 3. Phase 3: Upon completion of new facilities, following the completion of the new Operations Building, the owner will move from their existing office building into the new facility at which time the contractor will demolish the former office building with prior approval of the owner make improvements required by the construction documents in those areas and restore the site.

1.08 OWNER OCCUPANCY

- A. The Owner intends to occupy the current Operations building and a portion of the southern end of the site for its bulk material storage until the new facilities are ready for use.

- B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- C. Schedule the Work to accommodate Owner occupancy.

1.09 EXISTING CONDITIONS

- A. Utilities shown on plans are shown for general locating purposes. The Contractor shall locate all existing utilities prior to starting work and will repair any existing utilities damaged. Notify affected utility companies and comply with their requirements.
- B. Verify all existing conditions prior to starting work.
- C. Existing as-built documents are on file with the Owner. Contractor to coordinate use of documents with Owner and pay for reproduction of any documents requested by the Contractor.

1.10 COMPLETION TIME

- A. See City of Federal Way Special Provisions for time of completion.

1.11 MATERIALS AND INSTALLATION

- A. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- B. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

1.12 CONSTRUCTION DOCUMENTS

- A. Quantities of documents to be provided to the Contractor during construction are as follows:
 - 1. Four (4) sets plan sets and project manuals.
 - 2. Four (4) sets of bound addenda. Contractor shall bind addenda into one (1) set of Construction Documents and have on file on-site.
 - 3. Additional sets of Construction Documents will be made available to the Contractor upon return by bidders.
 - 4. Contractor will pick-up all sets of documents from the Architect and pay for all costs to reproduce and ship any partial or complete sets of documents requested by the Contractor beyond those noted above.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

**SECTION 01 23 00
ALTERNATES**

PART 1 - GENERAL

1.01 SUBMISSION REQUIREMENTS

- A. Alternatives quoted on Bid Forms will be reviewed and accepted or rejected at the Owner's option. Accepted alternatives will be identified in the Owner-Contractor Agreement.
- B. Alternates not incorporated into the Contract may be reinstated into the Contract, at the Owner's option, provided that the Owner so notifies the Contractor within thirty (30) calendar days after the notice to proceed. After thirty (30) calendar days after notice to proceed, Alternates not incorporated into the Contract may be reinstated, at the Owner's option, with an Alternate cost increase consistent with cost inflation factors such as Puget Sound Area Cost Price Index (CPI) or supply chain increases supported by back-up documentation including pre-bid and current bid quotes.
- C. Coordinate related work and modify surrounding work to integrate the Work of each accepted alternate.
- D. Coordination: Coordinate related work and modify or adjust adjacent work as necessary to ensure that work affected by each accepted alternate is complete and fully integrated into the project.
- E. Alternate Proposals: Include all costs for labor, materials, and equipment necessary for a complete working system, assembly, or component as applicable to alternate specified, including costs to modify adjacent materials and/or assemblies affected by the alternate.
 - 1. All costs for Performance Bond and Labor and Material Payment Bond and Insurance shall be included in each Alternate Proposal.
 - 2. Indicate whether Alternate is additive or deductive cost to the base bid.
 - 3. Include as part of each alternate, miscellaneous devices, appurtenances, and similar items incidental to or required for a complete installation, whether or not mentioned as part of the alternate.
 - 4. Alternates may be selected by the Owner in any order.

1.02 SCHEDULE OF ALTERNATES

- A. Refer to City of Federal Way, SPECIAL PROVISIONS, Section 1-02.6 ALTERNATES, for numbering and description of bid Alternates.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

PRE-BID SUBSTITUTION REQUEST FORM

To: HELIX DESIGN GROUP
6021 - 12th Street East, Suite 201
Tacoma, Washington 98424

Project: CITY OF FEDERAL WAY, OPERATIONS & MAINTENANCE FACILITY

MUST BE RECEIVED AT LEAST TEN (10) WORKING DAYS PRIOR TO BID DATE.

SPECIFIED ITEM:

Table with 4 columns: Section, Page, Paragraph, Description

The undersigned requests consideration of the following:

PROPOSED SUBSTITUTION: _____

Attached data includes: (Note that submittals not including all data listed below may be considered non-responsive and may not be reviewed/accepted.)

- Detailed product description, specifications, drawings, photographs, performance, and test data adequate for evaluation of the request with applicable portions of the data clearly identified;
Names and addresses of similar projects where the proposed product has been used and contact information for the Owner and Architect of the identified projects;
Detailed analysis of the difference between the listed product and the proposed product;
Description of the anticipated difference in cost and contract time between the substituted product and the listed product;
Description of changes to Contract Documents, design, detailing, construction, and schedule that proposed substitution will require for its proper installation.

By submitting and signing this form, the undersigned certifies that the following paragraphs are correct.

- The undersigned guarantees that the function, appearance, quality, performance, and warranty of the proposed substitution are equivalent, or superior, to the Specified Item.
The proposed substitution does not affect dimensions shown on Drawings.
The proposed substitution will have no effect on applicable code requirements.
The undersigned will pay for changes to the building design, including architectural or engineering design, detailing, construction costs and schedule impacts caused by the requested substitution.
The proposed substitution will have no adverse effect on other trades, the construction schedule, or specified warranty requirements.
Maintenance and service parts will be locally available for the proposed substitution.
The undersigned must have authority to legally bind the firm to the above statement.

Submitted by:

Signature _____

Firm _____

Address _____

Date _____

Telephone _____

For Use by Design Consultant:

Accepted Accepted as noted Not Accepted Received too late Incomplete

By: _____

Date: _____

Comments: _____

END OF SECTION

SECTION 01 25 00
SUBSTITUTIONS

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section specifies administrative and procedural requirements governing the Contractor's selection for products for use in the Work, and administrative procedures for handling requests for substitutions made before and after receipt of bid.
- B. Owner's forms referenced in this Section include:
 - 1. Substitution Request Form.

1.02 DEFINITIONS

- A. Definitions used in this Section are not intended to negate the meaning of other terms used in the Contract Documents.
 - 1. "Products" are items purchased for incorporation in the Work, regardless of whether they were specifically purchased for the Project or taken from previously purchased stock.
 - 2. "Named Products" are products identified by use of the manufacturer's name for a product, including such items as a make or model designation, as recorded in the most recent published product literature as of the date of the Contract Documents.
 - 3. "Materials" are products that must be cut, shaped, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.
 - 4. "Equipment" is a product with operational parts, whether motorized or manually operated, and in particular, a product that requires service connections such as wiring or piping.

1.03 QUALITY ASSURANCE

- A. Source Limitations: Provide products of same kind, to fullest extent possible, from a single source.
- B. Compatibility of Options: When the Contractor is given the option of selecting between two or more products for use (on the Project) the product selected shall be compatible with products previously selected, even if previously selected products were also options.
- C. Nameplates: Except for labels required by Authorities Having Jurisdiction (AHJ), do not attach or imprint manufacturer's or producer's nameplates, trademarks or operating data on surfaces exposed to view in occupied spaces or on the building exterior.
 - 1. Labels: Locate required product labels and stamps on a concealed surface, or where required by AHJ for observation after installation, on an accessible surface that is not conspicuous.

1.04 PRODUCT SELECTION

- A. General Product Requirements: Unless otherwise indicated, provide products that comply with the Contract Documents and that are undamaged and unused at the time of installation.
 - 1. Provide products complete with all accessories, trim, finish, safety guards and other devices and with details needed for a complete installation for the intended use and effect.
 - 2. Where available, provide standard products of a type and manufacturer used successfully in

similar situations on other projects.

B. Product Selection Procedures: Product selection is governed by the Contract Documents and governing regulations. Procedures governing product selection include the following:

1. Performance Specifications: Performance specifications may be one of the following:
 - a. One or more named reference(s) with no accompanying conditioning language such as “or approved equal” or “no substitutions”; or
 - b. No named reference is specified, and requirements are specified by means of any of the following:
 - 1) Descriptive requirements.
 - 2) Design requirements.
 - 3) Performance requirements.
 - 4) Regulatory requirements and/or industry standards.

References to equipment, material, articles or patented processes by trade name, manufacturer, make or catalog number, are presumed to set a standard of quality so as to encourage competition. The term “equal” is presumed and need not be repeated in the Specifications. Where Specifications set a standard of quality, provide product options complying with or exceeding the provisions of the Contract Documents, and which are recommended by a manufacturer for the applications indicated. No Substitution Request is required. However, Architect may request, and Contractor shall provide, documentation of the manufacturer’s recommendations for a particular product application.

2. Closed Proprietary Specifications: Products by one or more manufacturers are specified, and the specification section includes the term “no substitution(s),” “no other(s),” or “no exceptions.” No other product options will be accepted. Provide products and work as specified.
3. Open Proprietary Specifications: Products by one or more manufacturers are specified in the specification section. “Substitutions: Under provisions of Section 01 60 00.” Submit the Substitution Request Form for other products to Architect under the provisions of this Section.
4. Visual Matching: Where matching an established sample is required, the Architect’s decision will be final on whether a proposed product matches satisfactorily.
 - a. Where there is no product available within the specified product category which matches satisfactorily and also complies with other specified requirements, the contractor shall comply with the provisions of the Contract Documents concerning substitutions for the selection of a matching product in another product category.
5. Visual Selection: Where specified product requirements include the phrase “...as selected from the manufacturer’s standard colors, patterns, textures...” or similar phrases, select a product and manufacturer that complies with other specified requirements. Architect will select the color, patterns and texture from the product line selected.

1.05 PRODUCT SUBSTITUTION

A. General:

1. No substitution request will be considered unless submitted in accordance with the requirements of this Section.
2. If a bidder or Contractor desires approval of some material or product other than that specified by the Contract Documents, it must submit a written request for approval of the proposed substitute item to the Architect in accordance with the following requirements:
 - a. All requests must be made on the Owner's Substitution Request Form.
 - b. After receipt of bid, substitution requests shall be prepared, transmitted, and processed in accordance with Section 01 33 00 "Submittal Procedures."
3. Final decision as to whether an item is an equal or acceptable substitution rests solely with the Architect and Owner.

B. Substitution Requests: Every substitution request must state whether the item offered is equal or superior to the specified product in performance, physical characteristics, warranty and aesthetics. The substitute material or product must be accompanied by its reference in the Contract Documents and complete catalog, technical and other information. If applicable, include samples showing comparison of physical and other pertinent characteristics as required to establish equivalence of acceptability for the proposed application. Where specific test results are required by the Contract Documents, the comparison data for the proposed item shall be based upon the same test methods as those specified, or they shall be correlated to clearly demonstrate comparability. The same warranty of the Work described for the specified product is required for the substitution.

C. During Bid Period:

1. Submit Substitution Request Form shall be submitted at least 10 working days prior to the bid date.
2. Bidders will be notified by addendum of products accepted in addition to those specified. **NO OTHER FORM OF APPROVAL, INCLUDING VERBAL OR IMPLIED, IS ACCEPTABLE AS AN INDICATOR OF ACCEPTED SUBSTITUTION REQUESTS.**

D. After Receipt of Bid: Contractor shall indicate one or more reasons why a product substitution is required with a Substitution Request Form. Architect will notify Contractor in writing of decision to accept or reject the Substitution Request. Substitution Requests will not be considered except for the following reasons, which must be substantiated by the Contractor:

1. Unavailability: Specified item has been discontinued or is unavailable in time to meet Construction Schedule through no fault of the Contractor or Subcontractor.
2. Unsuitability: Subsequent information discloses the specified item as unsuitable, inappropriate, or unable to perform properly or fit the designated space.
3. Regulatory Requirements: A substitution is required to comply with code interpretations by AHJ or insurance regulations.
4. Warranty: A manufacturer or fabricator declares the specified item to be unsuitable for the use intended or refuses to certify or warrant the performance of the specified item for the Project.
5. Owner's Benefit: In the judgment of Contractor, acceptance of the proposed substitution is clearly in Owner's best interest because of cost, quality, or other consideration.

- E. Coordination: In making a Substitution Request, the Contractor certifies that it will coordinate all Subcontractor work required by the substitution and waives all claims for additional costs and/or time which subsequently become apparent as a consequence of the substitution.
- F. Re-design: At the Owner's sole discretion, the Contractor shall bear all Owner costs related to the substitution, including costs of Architect and Consultant services for investigation, evaluation, and re-design, if necessary.
- G. Architect and Owner will not consider:
 - 1. Substitutions, if they are indicated or implied on Shop Drawings or other Project data submittals.
 - 2. Substitutions which, if accepted, will require substantial revisions of Contract Documents; or
 - 3. Substitution Request Forms which do not provide adequate or clearly defined information for complete and timely appraisal.

PART 2 – PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

**SECTION 01 29 76
PROGRESS PAYMENT PROCEDURES**

PART 1 - GENERAL

1.01 FORMAT

- A. Type Schedule on 8-1/2 x 11 in. bond paper.
- B. Contractor's standard form or media-driven printout will be considered on request.
- C. For Specification Divisions 2 through 16 of the Project Manual, follow the Table of Contents for minimum listing of schedule of values. Identify each line item by number and title of each Specification section. Complex line items may be required to be listed in component parts of the line item.
- D. For Specification Division 1, as a minimum, include one (1) line item for each of the following: mobilization, General Conditions, bonds and insurance, punchlist correction, "record" drawings, O&M manuals, operation instructions, and demobilization.

1.02 REQUIREMENTS

- A. Two (2) weeks prior to submission of first Application and Certificate for Payment, submit schedule of values to Architect and Project Manager for review.
- B. List installed value of each major item of Work and each subcontracted item of Work as a separate line item to serve as a basis for computing values for Progress Payments. Round off values to nearest dollar.
- C. List guarantees/warranties as separate line items for each type of Work, such as roofing, painting, etc. Show the value of each of these on the Schedule of Values.
- D. For each major subcontract, list products and operations of that subcontract as separate line items.
- E. For each line item of installed value exceeding \$20,000, show breakdown by major products or operations as separate line items.
- F. Coordinate listings with Progress Schedule.
- G. All line-item listings shall each include a directly proportional amount of Contractor's overhead and profit.
- H. For items on which payments will be requested for stored products, list sub-values for cost of stored products.

1.03 SUBMITTAL

- A. Submit five (5) copies of the Schedule.
- B. Transmit under transmittal letter. Identify project by title and by contract number.

1.04 **SUBSTANTIATING DATA**

- A. When Architect and Project Manager requires substantiating information, submit data justifying line item amounts in question.
- B. Provide one (1) copy of data with cover letter for each copy of Application and Certificate for Payment.

1.05 **APPLICATION AND CERTIFICATE FOR PAYMENT**

- A. See General Conditions of the Contract.
- B. The approved Schedule of Values will be typed by the Contractor onto AIA Document G702 Application and Certificate for Payment forms, unless otherwise instructed.

1.06 **FIRST APPLICATION AND CERTIFICATE FOR PAYMENT**

- A. Complete administrative requirements prior to submission of initial Application for Payment. Application will not be reviewed until requirements are met.
- B. Partial list of requirements follows. Other requirements may be listed elsewhere in the Contract Documents.
 - 1. Performance and Payment Bonds G.C. & S.C.
 - 2. Certificates of Insurance G.C. & S.C.
 - 3. Building and other Permit Copies
 - 4. Schedule of Values 01 29 76.
 - 5. Progress Schedule 01 32 16.
 - 6. List of Subcontractors and Suppliers 01 33 00.
 - 7. List of Contractor's Staff Assignments 01 31 00.
 - 8. Submittals Schedule 01 33 00.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

**SECTION 01 31 00
PROJECT MANAGEMENT AND COORDINATION**

PART 1 - GENERAL

1.01 COORDINATION AND PROJECT CONDITIONS

- A. Refer to City of Federal Way Special Provisions for additional information and requirements.
- B. Coordinate scheduling, submittals, and Work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- C. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- D. Coordinate space requirements, supports, and installation of mechanical and electrical work. Utilize spaces efficiently to maximize accessibility for other installations for maintenance and repairs.
- E. In finished areas conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- F. Coordinate completion and clean up of work in preparation for Substantial Completion and for portions of Work designated for Owner's occupancy.
- G. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.02 FIELD ENGINEERING

- A. Employ a Land Surveyor registered in the State of Washington.
- B. Contractor shall locate and protect survey control and reference points.
- C. Control datum for survey is shown on drawings.
- D. Verify setbacks and easements; confirm drawing dimensions and elevations.
- E. Provide field engineering services. Establish elevations, lines, and levels utilizing recognized engineering survey practices.

1.03 PRECONSTRUCTION CONFERENCE

- A. Project Manager will schedule a meeting after Notice of Award.
- B. Attendance Required: Owner, Project Manager, Architect/Engineer, and Contractor.
 - 1. Agenda:
 - a. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.

- b. Designation of personnel representing the parties in Contract and the Architect.
 - c. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, change orders, and Contract closeout procedures.
 - d. Scheduling and coordinating with Owner.
 - e. Coordination of testing and inspection.
 - f. As-built documents and reviews of as-builts on a regular basis during construction.
 - g. Equipment start-up.
 - h. Use of site and premises by Owner and Contractor.
 - i. Construction facilities provided by Owner.
 - j. Temporary utilities provided by Owner.
 - k. Security and housekeeping procedures.
 - l. Inspection and acceptance of areas to be occupied by Owner prior to completion.
- C. Record minutes and distribute copies within five (5) days after meeting to participants, with e-copies to Architect/Engineer, Project Manager, Owner, & participants, and those affected by decisions made.

1.04 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work at maximum weekly intervals.
- Contractor* will schedule meetings; record minutes, and distribute copies of minutes to Owner, Project Manager, Construction Manager, Consultants, and General Contractor. General Contractor will distribute copies to Subcontractors.
- B. Attendance Required: Job superintendent, major subcontractors, and suppliers, Owner, Project Manager, Architect/Engineer, as appropriate to agenda topics for each meeting.
- C. Meeting Location: Meeting will be held at job site. Arrangements for meeting space will be made by the General Contractor.
1. Agenda:
- a. Review minutes of previous meetings.
 - b. Review of Work progress, planned work, and schedule.
 - c. Field observations, problems, and decisions.
 - d. Identification of problems that impede planned progress.
 - e. Review of submittals schedule and status of submittals.
 - f. Review of off-site fabrication and delivery schedules.
 - g. Maintenance of progress schedule.
 - h. Corrective measures to regain projected schedules.
 - i. Planned progress during succeeding work period.
 - j. Coordination of projected progress.
 - k. Maintenance of quality and work standards.
 - l. Effect of proposed changes on progress schedule and coordination.
 - m. Other business relating to Work.
 - n. Review of as-built documents.
 - o. Field observations.
 - p. Inspection and test reports.
 - q. Two (2) week schedule:

- D. Contractor shall prepare for reviews at the progress meeting, a schedule of two (2) week duration for all work. Revise weekly and provide copies for all meeting attendees. Copy of format for schedule is attached at the end of this section.
- E. Record minutes and distribute copies within five (5) days after meeting to participants, with copies to Owner, Project Manager, Architect/Engineer, participants, and those affected by decisions made.

1.05 **PREINSTALLATION MEETING**

- A. When required in individual specification sections, Contractor shall convene a pre-installation meeting at the work site prior to commencing work of the Section. Resolve all questions related to the Work prior to starting.
- B. Require attendance of parties directly affecting, or affected by, work of the specific section.
- C. Notify Owner, Project Manager, and Architect/Engineer] fourteen (14) days in advance of meeting date.
- D. Contractor shall prepare agenda and preside at meeting:
 - 1. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. Contract Documents.
 - b. Related RFIs.
 - c. Related Change Orders.
 - d. Purchases.
 - e. Deliveries.
 - f. Submittals.
 - g. Review of mockups.
 - h. Possible conflicts.
 - i. Compatibility requirements.
 - j. Time schedules.
 - k. Weather limitations.
 - l. Manufacturer's written instructions.
 - m. Warranty requirements.
 - n. Compatibility of materials.
 - o. Acceptability of substrates.
 - p. Temporary facilities and controls.
 - q. Space and access limitations.
 - r. Regulations of authorities having jurisdiction.
 - s. Testing and inspecting requirements.
 - t. Installation procedures.
 - u. Coordination with other work.
 - v. Required performance results.
 - w. Protection of adjacent work.
 - x. Protection of construction and personnel.
 - 2. Review conditions of installation, preparation, and installation procedures.
 - 3. Review coordination with related work.
 - 4. Record minutes and distribute copies *within two (2) days after meeting to participants, with two (2) copies to Owner, Project Manager, Architect, Owner, participants, and those affected by decisions made.*

5. Review existing conditions, preparation work and installation techniques.

1.06 PROJECT CLOSEOUT MEETING

- A. Contractor shall schedule and conduct a project closeout meeting, at a time convenient to Owner and Architect, but no later than 60 days prior to the scheduled date of Substantial Completion.
 1. Conduct the meeting to review requirements and responsibilities related to Project closeout.
 2. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
 - a. Preparation of as-built documents.
 - b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
 - c. Submittal of written warranties.
 - d. Requirements for preparing operations and maintenance data.
 - e. Requirements for delivery of material samples, attic stock, and spare parts.
 - f. Requirements for demonstration and training.
 - g. Preparation of Contractor's punch list.
 - h. Procedures for processing Applications for Payment at Substantial completion and for final payment.
 - i. Submittal procedures.
 - j. Owner's partial occupancy requirements.
 - k. Installation of Owner's furniture, fixtures, and equipment.
 - l. Responsibility for removing temporary facilities and controls.
 4. Minutes: Contractor shall record and distribute meeting minutes.

1.07 REQUESTS FOR INFORMATION (RFI)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in a form that has been prior approved by the Owner's Representative and Architect.
 1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
 1. Project name.
 2. Date.
 3. Name of Contractor, and subcontractor

4. Name of Architect and Owner.
 5. RFI number, numbered sequentially.
 6. Specification Section number and title and related paragraphs, as appropriate.
 7. Drawing number and detail references, as appropriate.
 8. Field dimensions and conditions, as appropriate.
 9. Contractor's suggested resolution. If Contractor's suggested resolution impacts the
 10. Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 11. Contractor's signature.
 12. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: Form bound found at the end of this section or Software-generated form with substantially the same content as indicated above, acceptable to Architect.
1. Attachments shall be electronic files in PDF format.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow ten working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. PST, will be considered as received the following working day.
1. The following Contractor-generated RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Architect's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.
 2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
 3. Architect's action on RFIs that may result in a change to the Contract Time, or the Contract Sum may be eligible for Contractor to submit a Change Order Request (COR) according to Section 012600 - Contract Modification Procedures.
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect and Owner's Representative in writing within 10 days of receipt of the RFI response.
- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly on a form that is acceptable to the Owner's Representative and Architect.
1. Project name.
 2. Name and address of Contractor.

3. Name of Architect and Owner.
 4. RFI number including RFIs that were returned without action or withdrawn.
 5. RFI description.
 6. Date the RFI was submitted.
 7. Date Architect's and Owner's Representative's response was received.
- F. On receipt of Architect's and Owner's Representative's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect and Owner's Representative within seven days if Contractor disagrees with response.
1. Identification of related Minor Change in the Work, Construction Change Directive (CCD), and Change Order Request (COR), as appropriate

1.08 SITE USE

- A. Provide areas within the area provided by Owner for the work, for storage and handling of all materials and equipment of Subcontractors. Schedule deliveries to minimize storage of materials on-site.
- B. Control mud and dust on-site. Do not contaminate adjacent roads and facilities.
- C. Minimize noise generation. Coordinate with Owner to reduce impact on neighboring property owners and the Owner's use of facilities.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

REQUEST FOR INTERPRETATION FORM

RFI NO. _____ / DATE SUBMITTED: _____

PROJECT NAME/NO: **City of Federal Way, Operations and Maintenance Facility / a23-087**

ATTN: _____

Helix Design Group
6021 - 12th Street East, Suite 201
Tacoma, WA 98424
Phone: 253.922.9037; Fax: 253.922.6499

PROJECT MANUAL OR PLAN REFERENCE: _____

DESCRIPTION: _____

PROVIDE RESPONSE BY: _____ day _____ month _____ year _____ time of day

RFI SUBMITTED BY: _____ Contractor Name _____ Title

Phone: _____

Fax: _____

RESPONSE: _____

RESPONSE BY: _____
Architect/Engineer Name/Title

Phone: _____

DATE PROVIDED: _____
day month year time of day

COPIES SENT TO: _____

This RFI is not an authorization to proceed with work involving added cost and/or time. Obtain written authorization prior to proceeding with this work.

SECTION 01 31 00
PROJECT MANAGEMENT AND COORDINATION

SECTION 01 32 16
CONSTRUCTION PROGRESS SCHEDULES

PART 1 - GENERAL

1.01 GENERAL

- A. Refer to City of Federal Way Special Provisions for additional information and requirements.
- B. The intent of the progress schedule is to assist the Contractor in planning execution of the Work and to assist the Contractor, Architect, Project Manager, and Owner in monitoring the construction progress for the purpose of coordination, communication, evaluation of Applications and Certificates for Payment, and evaluation of time extension requests.
- C. The Project Manager, Architect's review of the schedule will be to ensure that it conforms to the requirements of the Contract Documents. The construction means, methods, sequence, and scheduling of the Work is the Contractor's responsibility and is not reviewed by the Project Manager, Architect or Owner. Contract completion date(s) is as specified in the Contract Documents. The Architect's review of the schedule does not change, revise, or amend that date(s), nor does it constitute an approval of the Contractor's ability to complete the Work within the contract time.

1.02 SCHEDULES

- A. Time-scaled CPM procedure network diagram separate activity bar for each activity. Show order and interdependence of activities and sequence of work. Show how start of an activity depends upon completion of preceding activities and how incompleteness of the activity may delay start of subsequent activities. Show early and late start, early and late finish, float time, and duration. Indicate critical path.
- B. Sheet size: Maximum 24 in. x 36 in.
- C. Lettering 1/8 in. high minimum, legible.
- D. Identify each item by specification section number.
- E. Identify Work of separate stages and other logically grouped activities.
- F. Provide sub-schedules for each stage of Work identified in Section 01 11 00.
- G. Provide sub-schedules to define critical portions of the entire schedule.
- H. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
- I. Provide separate schedule of submittal dates for shop drawings, product data, and samples, including Owner furnished products, and dates reviewed submittals will be required from Architect. Indicate decision dates for selection of finishes.
- J. Indicate product delivery dates, including Owner furnished product.
- K. Include submission and review of Operation and Maintenance Manuals, project record documents, and warranties.

- L. Include time for punchlist review and completion.
- M. Include a minimum of two (2) weeks float time to account for changes in the work and unforeseen conditions.

1.03 REVISIONS TO SCHEDULES

- A. Indicate progress of each activity to date of submittal, and projected completion date of each activity.
- B. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.
- C. Provide narrative report to define problem areas, anticipated delays, and impact on Schedule. Report corrective action taken, or proposed, and its effect including the effect of changes on schedules of separate contractors.

1.04 SUBMITTALS

- A. Submit initial schedules within thirty (30) days after date of Contract Award. After review, resubmit required revised data within ten (10) days.
- B. Submit revised Progress Schedules with each Application for Payment.
- C. Submit one (1) e- copy in PDF format.

1.05 DISTRIBUTION

- A. Distribute copies of reviewed schedules to project site file, subcontractors, suppliers, and other concerned parties.
- B. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

**SECTION 01 32 33
CONSTRUCTION PHOTOGRAPHS**

PART 1 - GENERAL

1.01 GENERAL

Section includes administrative and procedural requirements for the following:

1. Preconstruction photographs.
2. Periodic construction photographs.
3. Final completion construction photographs

1.02 PHOTOGRAPHY

- A. Employ photographer mutually agreeable to Owner and Architect to record and document existing site conditions as required by Section 011000 – Summary of Work.
- B. Preconstruction Photographs: Contractor to provide a minimum twenty (20) preconstruction photographs prior to commencement of Work; locations as approved by the Architect. Before starting construction, take digital photographs of Project site and surrounding properties, including existing items to remain during construction, from 360 degree vantage points, on plan proposed by the Contractor and approved by Architect.
 1. Flag construction limits before taking construction photographs.
 2. Take minimum of 12 photographs to show existing conditions adjacent to property before starting the Work. This includes parking lots, roadways, and vegetation.
 3. Take min of 8 photographs of existing conditions on the property to accurately record physical conditions at start of construction.
 4. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.
- C. Construction Photographs (Periodic):
 1. General: Contractor to provide construction photographs showing the progress of the Work. Views must be approved in advanced by the Architect.
 2. Minimum of 15 photos taken to be included in monthly report, representative of ongoing work.
 3. Photo. Photographs to be taken on a day to coincide with the Payment Application once each month.

PART 2 - PRODUCTS

2.01 DIGITAL IMAGES

- A. Submit a complete set of digital image electronic files as a Project Record Document on CD-ROM or flash drive to the Architect and Owner's Representative. Identify electronic media with date photographs were taken. Submit images that have same aspect ratio as the sensor,

uncropped.

1. Digital Images: Provide images in uncompressed TIFF format, produced by a digital camera with minimum sensor size of 12.0 megapixels, and at an image resolution of not less than 1200 by 1800 pixels.
2. Date and Time: Include date and time in file name for each image

PART 3 – EXECUTION

3.01 ADDITIONAL PHOTOGRAPH

- A. Architect or Owner may issue requests for additional photographs, in addition to those specified.
 1. In emergency situations, take additional photographs within 24 hours of request.
 2. Circumstances that could require additional photographs include, but are not limited to, the following:
 - a. Special installation procedures and assemblies.
 - b. Special events planned at Project site.
 - c. Immediate follow-up when on-site events result in construction damage or losses.
 - d. Photographs to be taken at fabrication locations away from Project site.
 - e. Substantial Completion of a major phase or component of the Work.
 - f. Record photographs at time of final acceptance.

END OF SECTION

**SECTION 01 33 00
SUBMITTALS**

PART 1 - GENERAL

1.01 SUBMITTAL PROCEDURES

- A. Identify Project, Contractor, Subcontractor or Supplier; pertinent drawing and detail number, submittal number corresponding to number contained in submittal schedule and specification section number.
- B. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents. Submittals without Contractor's stamp and signature will be rejected.
- C. Schedule submittals to expedite the Project and deliver to Architect.
- D. For each submittal for review, allow fifteen (15) days excluding delivery time to and from the Contractor.
- E. Notify Architect in writing of any variations from Contract Documents.
- F. Provide space for Contractor and Architect/Engineer review stamps.
- G. When revised for resubmission, identify all changes made since previous submission.
- H. Submittals not requested will not be recognized or processed.
- I. Submit all items requiring color selections as a group within thirty (30) days of contract award.

1.02 PROPOSED PRODUCTS AND SUBCONTRACTOR'S LIST

- A. Prior to first invoice, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product. Provide list of subcontractors with company name, address, phone number, and contact person.
- B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.03 PRODUCT DATA

- A. Product Data For Review:
 - 1. Submitted to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.
 - 2. After review, provide copies and distribute in accordance with Submittal Procedures article above and for record documents purposes described in Section 01 77 00 - Closeout Procedures.
- B. Product Data For Information:

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1. Submitted for the Architect's knowledge as contract administrator or for the Owner.
- C. Product Data For Project Close-out:
 1. Submitted for the Owner's benefit during and after project completion.
- D. Submit the number of copies that the Contractor requires, plus two (2) copies that will be retained by the Architect.
- E. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- F. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- G. After review distribute in accordance with the Submittal Procedures article above and provide copies for record documents described in Section 01 77 00 –Closeout Procedures.

1.04 SHOP DRAWINGS

- A. Shop Drawings For Review:
 1. Title each drawing with project name and number.
 2. Submitted to Architect/Engineer for review for the limited purpose of checking for conformance with the Contract Documents.
 3. After review, produce copies and distribute in accordance with Submittal Procedures article above and for record documents purposes described in Section 01 77 00 – Closeout Procedures.
- B. Shop Drawings For Information:
 1. Submitted for the Architect/Engineer's knowledge as contract administrator or for the Owner.
- C. Shop Drawings For Project Close-out:
 1. Submitted for the Owner's benefit during and after project completion.
- D. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- E. Submit the number of opaque reproductions that Contractor requires, plus two (2) copies that will be retained by the Architect.

1.05 SAMPLES

- A. Samples For Review:
 1. Submitted to Architect/Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.
 2. After review, produce duplicates and distribute in accordance with Submittal

Procedures article above and for record documents purposes described in Section 01 77 00 –Closeout Procedures.

- B. Samples For Information:
 - 1. Submitted for the Architect's knowledge as contract administrator or for the Owner.
- C. Samples For Selection:
 - 1. Submitted to Architect for aesthetic, color, or finish selection.
 - 2. Submit samples of finishes from the full range of manufacturers' standard colors and custom colors, textures, and patterns for Architect selection.
 - 3. After review, produce duplicates and distribute in accordance with Submittal Procedures article above and for record documents purposes described in Section 01 77 00 –Closeout Procedures.
- D. Submit samples to illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
- E. Include identification on each sample, with full Project information.
- F. Submit the number of samples specified in individual specification sections.
- G. Reviewed samples that may be used in the Work are indicated in individual specification sections.

1.06 TEST REPORTS

- A. Submit for the Project Manager and Architect's knowledge as contract administrator or for the Owner.
- B. Submit test reports for information for the limited purpose of assessing conformance with information given and the design concept expressed in the Contract Documents.

1.07 CERTIFICATES AND WARRANTIES

- A. When specified in individual specification sections, submit certificates and/or warranties by the manufacturer, installation/application subcontractor, or the Contractor to Architect.
- B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications.
- C. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect and Project Manager.
- D. Certificate or warranty shall name the project number, location, date, contractor, contractor's address, manufacturer and manufacturer's address.

1.08 MANUFACTURER'S INSTRUCTIONS

- A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to Project Manager and Architect.

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- B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria.

1.09 **ERECTION DRAWINGS**

- A. Submit drawings for the Architect/Engineer's benefit as contract administrator or for the Owner.
- B. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the Contract Documents.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

**SECTION 01 45 00
QUALITY CONTROL**

PART 1 - GENERAL

1.01 QUALITY ASSURANCE - CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship to produce Work of specified quality.
- B. Comply with manufacturers' instructions, including each step-in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform Work by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.02 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

1.03 REFERENCES AND STANDARDS

- A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard by date of issue of Contract Documents, except where a specific date is established by code.
- C. Obtain copies of standards where required by product specification sections.
- D. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of the Architect shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.04 MOCK-UP

- A. Tests will be performed under provisions identified in this Section and identified in the respective product specification sections.
- B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- C. Accepted mock-ups shall be a comparison standard for the remaining Work.
- D. Where mock-up has been accepted by Architect and is specified in product specification sections to be removed; remove mock-up and clear area when directed to do so.

1.05 INSPECTION AND TESTING SERVICES

- A. Owner will appoint and employ services of an independent firm to perform inspection and testing. Owner shall pay for services.
- B. The independent firm will perform inspection and tests specified in individual specification sections and as required by the Architect, Project Manager Owner, or authority having jurisdiction.
- C. Testing and source quality control may occur on or off the project site. Perform off-site testing as required by the Project Manager, Architect, or the Owner.
- D. Reports will be submitted by the independent firm to the Architect, Owner, Project Manager and Contractor, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
- E. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
 - 1. Notify Architect and independent firm twenty-four (24) hours prior to expected time for operations requiring services.
 - 2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.
- F. Inspection and testing does not relieve Contractor to perform Work to Contract requirements.
- G. Site visits and re-testing required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the Architect. Payment for re-testing will be charged to the Contractor by deducting testing charges from the Contract Sum/Price.

1.06 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance of equipment, and to initiate instructions when necessary.
- B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

**SECTION 01 45 23
TESTING AND INSPECTING SERVICES**

PART 1 - GENERAL

1.01 SELECTION AND PAYMENT

- A. Refer to City of Federal Way Special Provisions for additional information and requirements.
- B. Owner will employ and pay for services of an independent testing agency or laboratory to perform specified testing.
- C. Employment of testing agency or laboratory in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

1.03 CONTRACTOR SUBMITTALS

- A. Submit copies of test reports to Architect and Project Manager for review.

1.04 AGENCY REPORTS

- A. After each test, the testing agency shall promptly submit two copies of report to Architect Project Manager, and to Contractor.
- B. Include:
 - 1. Date issued.
 - 2. Project title and number.
 - 3. Name of inspector.
 - 4. Date and time of sampling or inspection.
 - 5. Identification of product and specifications section.
 - 6. Location in the Project.
 - 7. Type of inspection or test.
 - 8. Date of test.
 - 9. Results of tests.
 - 10. Conformance with Contract Documents.
- C. When requested by Architect, Project Manage, provide interpretation of test results.

1.06 LIMITS ON TESTING AUTHORITY

- A. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
- B. Agency or laboratory may not approve or accept any portion of the Work.

- C. Agency or laboratory may not assume any duties of Contractor.
- D. Agency or laboratory has no authority to stop the Work.

1.07 CONTRACTOR RESPONSIBILITIES

- A. Deliver to agency or laboratory at designated location, adequate samples of materials proposed to be used which require testing, along with proposed mix designs.
- B. Cooperate with laboratory personnel and provide access to the Work.
- C. Provide incidental labor and facilities:
 - 1. To provide access to Work to be tested.
 - 2. To obtain and handle samples at the site or at source of Products to be tested.
 - 3. To facilitate tests.
 - 4. To provide storage and curing of test samples.
- D. Notify Architect/Engineer Project Manager, and laboratory 48 hours prior to expected time for operations requiring testing services.
- E. Defective Work: Remove and replace any work found defective or not complying with contract document requirements at no additional cost to the Owner. Where testing personnel take cores or cut-outs to verify compliance, repair prior to acceptance.

1.08 SCHEDULE OF TESTS

- A. Refer to Individual Specification Sections and Structural Drawings for Tests required and standards for testing.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

**SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS**

PART 1 - GENERAL

1.01 GENERAL

- A. Refer to City of Federal Way Special Provisions for additional information and requirements.
- B. This Section indicates the minimum work required. It does not limit the type or amounts of construction facilities or temporary controls.

1.02 TEMPORARY ELECTRICITY

- A. Cost By Contractor: Do not disrupt Owner's use of service. Contractor shall bear the cost for electrical service and make all necessary arrangements with local utility. Exercise measures to conserve energy. Contractor shall make all necessary arrangements for power.
- B. Complement existing power service capacity and characteristics as required.
- C. Provide power outlets for construction operations, with branch wiring and distribution boxes. Provide flexible power cords.
- D. Provide temporary service disconnect and over-current protection at convenient location.
- E. Permanent convenience receptacles may be utilized during construction.

1.03 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

- A. Provide and maintain lighting for construction operations.
- B. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.
- C. Maintain lighting and provide routine repairs.
- D. Permanent building lighting may not be utilized during construction without Owner's prior permission.

1.04 TEMPORARY HEATING

- A. Provide and pay for heating devices and heat as needed to maintain specified conditions for construction operations.
- B. Prior to operation of permanent equipment for temporary heating purposes, verify that installation is approved for operation, equipment is lubricated, and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.
- C. Maintain minimum ambient temperature of 50 degrees F (10 degrees C) in areas where construction is in progress, unless indicated otherwise in product sections.

1.05 TEMPORARY VENTILATION

- A. Ventilate enclosed areas to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- B. Utilize existing ventilation equipment. Extend and supplement equipment with temporary fan units as required to maintain clean air for construction operations.

1.06 TELEPHONE AND FACSIMILE SERVICE

- A. Provide, maintain, and pay for telephone service to field office.

1.07 TEMPORARY WATER SERVICE

- A. Cost By Contractor: Provide, maintain, and pay for suitable quality water service. Do not disrupt Owner's use of service. Contractor shall bear the cost for water service and make all necessary arrangements with local utility.

1.08 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Existing facility use is not permitted.

1.09 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas and to allow for Owner's use of site, and to protect existing facilities and adjacent properties from damage from construction operations.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
- C. Provide protection for trees and plants designated to remain.
 - 1. Preserve and protect existing trees and plants designated to remain.
 - 2. Provide 6-foot-high barriers around trees with access for maintenance.
 - 3. Consult with Architect, to remove agreed-on roots and branches which interfere with construction. Employ qualified tree surgeon to remove roots and branches, and to treat cuts.
 - 4. Protect areas within drip lines from traffic, parking, storage, dumping, chemically injurious materials and liquids, ponding, and continuous running water.
 - 5. Replace trees and plants damaged by construction operations Replace damaged plants.
 - 6. Refer to Landscape Architectural drawings for additional requirements.

1.10 FENCING

- A. Construction: Commercial grade chain link fence.
- B. Provide (8) eight ft high fence around construction site; equip with vehicular and pedestrian gates with locks.
- C. Provide (8) eight ft high fence between Owner's equipment and storage yard and construction site.

1.11 Dust Control:

- A. Contractor shall prevent dust from being generated during construction in compliance with all applicable City, County, State, and Federal regulations. Contractor shall be solely responsible for mitigation of dust during construction, and until Final Acceptance of the Project by the Owner.
- B. Pollution Control: Comply with all pollution control regulations in effect at site for all materials, soils, equipment and work procedures used on the project. If the Contractor causes a release of contaminants, the Contractor shall be responsible for all costs associated with clean-up of that release.

1.12 EROSION AND SEDIMENT CONTROL

- A. Plan and execute construction by methods to control surface drainage as indicated on Civil Drawings.
- B. Minimize amount of bare soil exposed at one time.
- C. Provide temporary measures such as berms, dikes, silt fences, drains, and other soil and erosion control devices required by authorities having jurisdiction.
- D. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
- E. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.
- F. Comply with sediment and erosion control plan shown on drawings.

1.13 WATER CONTROL

- A. Provide methods to control surface water to prevent damage to site or adjoining properties.
- B. Control grading to direct surface drainage away from excavations and other construction areas; and to direct drainage to proper runoff.
- C. Protect site from puddling or running water.
- D. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

1.14 PROTECTION OF INSTALLED WORK

- A. Protect installed Work and provide special protection where specified in individual specification sections.
- B. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects by protecting with durable sheet materials.
- E. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- F. Prohibit traffic from landscaped areas.

1.15 SECURITY

- A. Provide security and facilities to protect Work and existing facilities and Owner's operations from unauthorized entry, vandalism, or theft.
- B. Coordinate with Owner's security program.

1.16 ACCESS ROADS

- A. Construct and maintain temporary roads accessing public thoroughfares to serve construction area.
- B. Extend and relocate as Work progress requires. Provide detours necessary for unimpeded traffic flow.
- C. Provide and maintain access to fire hydrants, free of obstructions.
- D. Track-equipped vehicles not allowed on paved areas.
- E. Provide means of removing mud from vehicle wheels before entering streets.
- F. Keep streets, drives, and walks adjacent to site and haul routes clean and free of dirt, debris, and litter caused by construction operations.

1.17 PARKING

- A. Arrange for temporary surface parking areas to accommodate construction personnel.
- B. When site space is not adequate, provide additional off-site parking.

1.18 PROGRESS CLEANING AND WASTE REMOVAL

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces prior to enclosing the space.
- C. Collect and remove waste materials, debris, and rubbish from site weekly and dispose off-site.

1.19 PROJECT IDENTIFICATION

- A. Provide [8 ft wide x 4 ft high, project sign of exterior grade MDO plywood and wood frame construction, painted, with exhibit lettering by professional sign painter. Sign design shall be approved by Owner and Architect prior to construction.
- B. List title of Project, names of Owner, Architect/Engineer, Contractor, and major subcontractors.
- C. Erect on site at location [established by Architect.
- D. No other signs are allowed without Owner's permission except those required by law.

1.20 FIELD OFFICES AND SHEDS

- A. Office: Weather tight, with lighting, electrical outlets, heating, and equipped with sturdy furniture and drawing display table.

- B. Provide space for project meetings, with table and chairs to accommodate ten (10) persons.

1.21 **REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS**

- A. Remove temporary utilities, equipment, facilities, and materials prior to Final Application for Payment inspection.
- B. Remove underground installations to a minimum depth of 2 ft.
- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore existing and permanent facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

**SECTION 01 56 39
TEMPORARY TREE AND PLANT PROTECTION**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. The Work of this Section Includes: General protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.
- B. Related Requirements:
 - 1. Section 015000 "Temporary Facilities and Controls" for temporary site fencing.
 - 2. Section 311000 "Site Clearing" for removing existing trees and shrubs.
 - 3. Section 329113 "Soil Preparation" for planting soil specifications

1.03 DEFINITIONS

- A. Caliper: Diameter of a trunk measured by a diameter tape at a height 6 inches above the ground for trees up to and including 4-inch size at this height and as measured at a height of 12 inches above the ground for trees larger than 4-inch size.
- B. Caliper (DBH): Diameter breast height; diameter of a trunk as measured by a diameter at a height 54 inches above the ground line.
- C. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction and indicated on Drawings.
- D. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and indicated on Drawings.
- E. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.04 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review methods and procedures related to temporary tree and plant protection including, but not limited to, the following:
 - a. Tree-service firm's personnel and equipment needed to make progress and avoid delays.
 - b. Arborist's responsibilities.
 - c. Quality-control program.

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- d. Coordination of Work and equipment movement with the locations of protection zones.
- e. Trenching by hand or with air spade within protection zones.
- f. Field quality control.

1.05 SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings:
 - 1. Include plans, elevations, and sections showing trees and plants to be protected, locations of protection-zone fencing and signage, and the relationship between equipment-movement routes and material storage locations with protection zones.
 - 2. Detail fabrication and assembly of protection-zone fencing and signage.
 - 3. Indicate extent of utility boring and trenching by hand or with air spade within protection zones.
- C. Samples: For each type of the following:
 - 1. Organic Mulch: 1-pint volume of organic mulch; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch.
 - 2. Protection-Zone Signage: Full-size PDF of each size and text, ready for installation.
- D. Tree-Pruning Schedule: Written schedule detailing scope and extent of pruning of trees to remain that interfere with or are affected by construction.
 - 1. Species and size of tree.
 - 2. Location on site plan. Include unique identifier for each.
 - 3. Reason for pruning.
 - 4. Description of pruning to be performed.
 - 5. Description of maintenance following pruning.
- E. Qualification Statements: For arborist and tree service firm.
- F. Certification: From arborist, certifying that trees indicated to remain have been protected during construction in accordance with recognized standards and that trees were promptly and properly treated and repaired when damaged.
- G. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing the Work.
- H. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.
 - 1. Use sufficiently detailed photographs or video recordings.

2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

1.06 **QUALITY ASSURANCE**

- A. Arborist Qualifications: Certified Arborist as certified by.
- B. Tree-Service Firm Qualifications: An experienced tree-service firm that has successfully completed temporary tree- and plant-protection work similar to that required for this Project and that will assign an experienced, qualified arborist to Project site during execution of the Work.
- C. Quality-Control Program: Prepare a written program to systematically demonstrate the ability of personnel to properly follow procedures and handle materials and equipment during the Work without damaging trees and plantings. Include dimensioned diagrams for placement of protection-zone fencing and signage, the arborist's and tree-service firm's responsibilities, instructions given to workers on the use and care of protection zones, and enforcement of requirements for protection zones.

1.07 **FIELD CONDITIONS**

- A. The following practices are prohibited within protection zones:
 1. Storage of construction materials, debris, or excavated material.
 2. Moving or parking vehicles or equipment.
 3. Foot traffic.
 4. Erection of sheds or structures.
 5. Impoundment of water.
 6. Excavation or other digging unless otherwise indicated.
 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- B. Do not direct vehicle or equipment exhaust toward protection zones.
- C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.
- D. Take precautions to protect plants from airborne contaminants, such as paint or fireproofing overspray.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Backfill Soil: Planting soil of suitable moisture content and granular texture for placing around tree; free of stones, roots, plants, sod, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth.
1. Mixture: Well-blended mix of 2 parts stockpiled soil to 1 part planting soil.
 2. Planting Soil: Planting soil as specified in Section 329113 "Soil Preparation".
- B. Organic Mulch: Free from deleterious materials and suitable as a top dressing for trees and shrubs, consisting of one of the following:
1. Type: Wood and bark chips.
 2. Size Range: 3 inches maximum, 1/2 inch minimum.
 3. Color: Natural.
- C. Protection-Zone Fencing: Fencing fixed in position and meeting one of the following requirements: Previously used materials may be used when approved by Landscape Architect.
1. Chain-Link Protection-Zone Fencing: Galvanized-steel, Polymer-coated steel, or Polymer-coated galvanized-steel fencing fabricated from minimum 2-inch opening, 0.148-inch- diameter wire chain-link fabric; with pipe posts, minimum 2-3/8-inch- OD line posts, and 2-7/8-inch- OD corner and pull posts; with 1-5/8-inch- OD top rails and 0.177-inch- diameter bottom tension wire; with tie wires, hog ring ties, and other accessories for a complete fence system.
 - a. Height: 60 inches minimum.
 - b. Polymer-Coating Color: Black.
 2. Gates: Single-swing access gates matching material and appearance of fencing, to allow for maintenance activities within protection zones; leaf width 36 inches.
- D. Protection-Zone Signage: Shop-fabricated, rigid plastic or metal sheet with attachment holes prepunched and reinforced; legibly printed with nonfading lettering and as follows:
1. Size and Text: "TREE PROTECTION FENCE - No soil disturbance, parking, storage, dumping, or burning of materials is allowed within the Tree Protection Fence."
 2. Lettering: 3-inch- high minimum, black characters on white background.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

3.02 PREPARATION

- A. Locate and clearly identify trees, shrubs, and other vegetation to remain. Flag each tree trunk at 54 inches above the ground.
- B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

3.03 TREE PROTECTION

- A. Tree-Protection Zones: Mulch areas inside tree-protection zones and other areas indicated. Do not exceed indicated thickness of mulch.
 - 1. Apply 4-inch uniform thickness of organic mulch unless otherwise indicated. Do not place mulch within 12 inches of tree trunks.

3.04 PROTECTION ZONES

- A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones before materials or equipment are brought on the site and construction operations begin in a manner that will prevent people from easily entering protected areas except by entrance gates. Construct fencing so as not to obstruct safe passage or visibility at vehicle intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.
 - 1. Chain-Link Fencing: Install to comply with ASTM F567 and with manufacturer's written instructions.
 - 2. Posts: Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing paving or concrete to remain, provide appropriate means of post support acceptable to Landscape Architect.
 - 3. Access Gates: Install one gate per tree protection area and adjust to operate smoothly, easily, and quietly; free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.
- B. Protection-Zone Signage: Install protection-zone signage in visibly prominent locations in a manner approved by Landscape Architect. Install one sign spaced approximately every 50 ft. on protection-zone fencing, but no fewer than four signs with each facing a different direction.
- C. Maintain protection zones free of weeds and trash.
- D. Maintain hydration of plants to assure plant survival.

- E. Maintain protection-zone fencing and signage in good condition as acceptable to Architect and remove when construction operations are complete and equipment has been removed from the site.
 - 1. Do not remove protection-zone fencing, even temporarily, to allow deliveries or equipment access through the protection zone.
 - 2. Temporary access is permitted subject to preapproval in writing by arborist if a root buffer effective against soil compaction is constructed as directed by arborist. Maintain root buffer so long as access is permitted.

3.05 EXCAVATION

- A. General: Excavate at edge of protection zones and for trenches indicated within protection zones in accordance with requirements in Section 312000 "Earth Moving" unless otherwise indicated.
- B. Trenching within Protection Zones: Where utility trenches are required within protection zones, excavate under or around tree roots by hand or with air spade, or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots as required for root pruning. If excavating by hand, use narrow-tine spading forks to comb soil and expose roots.
- C. Redirect roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and redirect them without breaking. If encountered immediately adjacent to location of new construction and redirection is not practical, cut roots approximately 3 inches back from new construction and as required for root pruning.
- D. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

3.06 ROOT PRUNING

- A. Prune tree roots that are affected by temporary and permanent construction. Prune roots as follows:
 - 1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
 - 2. Cut Ends: Do not paint cut root ends.
 - 3. Temporarily support and protect roots from damage until they are permanently covered with soil.
 - 4. Cover exposed roots with burlap and water regularly.
 - 5. Backfill as soon as possible in accordance with requirements in Section 312000 "Earth Moving."
- B. Root Pruning at Edge of Protection Zone: Prune tree flush with the edge of the protection zone by cleanly cutting all roots to the depth of the required excavation.

- C. Root Pruning within Protection Zone: Clear and excavate by hand or with air spade to the depth of the required excavation to minimize damage to tree root systems. If excavating by hand, use narrow-tine spading forks to comb soil to expose roots. Cleanly cut roots as close to excavation as possible.

3.07 CROWN PRUNING

- A. Prune branches that are affected by temporary and permanent construction. Prune branches as directed by Landscape Architect or arborist.
 - 1. Prune to remove only injured, broken, dying, or dead branches unless otherwise indicated. Do not prune for shape unless otherwise indicated.
 - 2. Do not remove or reduce living branches to compensate for root loss caused by damaging or cutting root system.
 - 3. Pruning Standards: Prune trees in accordance with ANSI A300 (Part 1).
- B. Unless otherwise directed by arborist and acceptable to Architect, do not cut tree leaders.
- C. Cut branches with sharp pruning instruments; do not break or chop.
- D. Do not paint or apply sealants to wounds.
- E. Chip removed branches and spread over areas identified by Landscape Architect.

3.08 REGRADING

- A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.
- B. Lowering Grade within Protection Zone: Where new finish grade is indicated below existing grade around trees, slope grade away from trees as recommended by arborist unless otherwise indicated.
 - 1. Root Pruning: Prune tree roots exposed by lowering the grade. Do not cut main lateral roots or taproots; cut only smaller roots. Cut roots as required for root pruning.
- C. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.
- D. Minor Fill within Protection Zone: Where existing grade is 1 inches or less below elevation of finish grade, fill with backfill soil. Place backfill soil in a single uncompacted layer and hand grade to required finish elevations.

3.09 FIELD QUALITY CONTROL

- A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

3.10 REPAIR AND REPLACEMENT

- A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or to be relocated that are damaged by construction operations, in a manner approved by Architect.
 - 1. Submit details of proposed pruning and repairs.
 - 2. Perform repairs of damaged trunks, branches, and roots within 24 hours in accordance with arborist's written instructions.
 - 3. Replace trees and other plants that cannot be repaired and restored to full-growth status, as determined by Architect.

- B. Trees: Remove and replace trees indicated to remain that are more than 50 percent dead or in an unhealthy condition or are damaged during construction operations that Landscape Architect determines are incapable of restoring to normal growth pattern.
 - 1. Small Trees: Provide new trees of same size and species as those being replaced for each tree that measures 6 inches or smaller in caliper size.
 - 2. Large Trees: Provide one new tree of 2-inch caliper size for each tree being replaced that measures more than 6 inches in caliper size.
 - a. Species: As selected by Architect.
 - 3. Plant and maintain new trees as specified in Section 329300 "Plants."

- C. Soil Aeration: Where directed by Landscape Architect, aerate surface soil compacted during construction. Aerate 10 ft. beyond drip line and no closer than 36 inches to tree trunk. Drill 2-inch- diameter holes a minimum of 12 inches deep at 24 inches o.c. Backfill holes with an equal mix of augered soil and sand.

3.11 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove excess excavated material, displaced trees, trash, and debris and legally dispose of them off Owner's property.

END OF SECTION

**SECTION 01 60 00
PRODUCT REQUIREMENTS**

PART 1 - GENERAL

1.01 PRODUCTS

- A. Refer to City of Federal Way Special Provisions for additional information and requirements.
- B. All materials to be new material, equipment, fixtures, and systems. Include all trim, accessories and incidental items to complete the Work.
- C. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.
- D. Provide interchangeable components of the same manufacturer for components being replaced.

1.02 TRANSPORTATION AND HANDLING

- A. Transport and handle products in accordance with manufacturer's instructions.
- B. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.03 STORAGE AND PROTECTION

- A. Store and protect products in accordance with manufacturers' instructions.
- B. Store with seals and labels intact and legible.
- C. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- D. For exterior storage of fabricated products, place on sloped supports above ground.
- E. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.
- F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- G. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- H. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

1.04 **PRODUCT OPTIONS**

- A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Products of manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named in accordance with the following article.

1.05 **SUBSTITUTIONS**

- A. Section 01 11 00 specifies time restrictions for submitting requests for Substitutions during the bidding period.
- B. Substitution requests may be considered after contract award in accordance with Section 01 25 00.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

PRE BID SUBSTITUTION REQUEST FORM

To: HELIX DESIGN GROUP
6021 - 12th Street East, Suite 201
Tacoma, Washington 98424

Project:

MUST BE RECEIVED AT LEAST TEN (10) DAYS PRIOR TO BID DATE.

SPECIFIED ITEM:

Section	Page	Paragraph	Description
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The undersigned requests consideration of the following:

PROPOSED SUBSTITUTION: _____

Attached data includes product description, specifications, drawings, photographs, performance, and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes description of changes to Contract Documents that proposed substitution will require for its proper installation.

The undersigned states that the following paragraphs are correct.

1. The undersigned guarantees that the function, appearance, and quality of the proposed substitution are equivalent or superior to the Specified Item.
2. The proposed substitution does not affect dimensions shown on Drawings.
3. The undersigned will pay for changes to the building design, including architectural or engineering design, detailing and construction costs caused by the requested substitution.
4. The proposed substitution will have no adverse affect on other trades, the construction schedule, or specified warranty requirements.
5. Maintenance and service parts will be locally available for the proposed substitution.
6. The undersigned must have authority to legally bind the firm to the above statement.

Submitted by:

Signature _____

Firm _____

Address _____

Date _____

Telephone _____

For Use By Design Consultant:

Accepted Accepted as noted

Not Accepted Received too late

By _____

Date _____

Remarks _____

END OF SECTION

**SECTION 01 73 29
CUTTING AND PATCHING**

PART 1 - GENERAL

1.01 SUBMITTALS

- A. Submit written request in advance of cutting or alteration which affects:
 - 1. Structural integrity of any element of Project.
 - 2. Integrity of weather exposed or moisture resistant element.
 - 3. Efficiency, maintenance, or safety of any operational element.
 - 4. Visual qualities of sight exposed elements.
 - 5. Work of Owner or separate contractor.

- B. Include in Request:
 - 1. Identification of Project.
 - 2. Location and description of affected Work.
 - 3. Necessity for cutting or alteration.
 - 4. Description of proposed Work and products to be used.
 - 5. Alternatives to cutting and patching.
 - 6. Effect on work of Owner or separate contractor.
 - 7. Written permission of affected separate contractor.
 - 8. Date and time Work will be executed.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Primary Products: Those required for original installation.

- B. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 60 00.

PART 3 - EXECUTION

3.01 **EXAMINATION**

- A. Examine existing conditions prior to commencing Work, including elements subject to damage or movement during cutting and patching.
- B. After uncovering existing Work, assess conditions affecting performance of Work.
- C. Beginning of cutting or patching means acceptance of existing conditions.

3.02 **PREPARATION**

- A. Provide temporary supports to ensure structural integrity of the Work. Provide devices and methods to protect other portions of Project from damage.
- B. Provide protection from elements for areas which may be exposed by uncovering work.
- C. Maintain excavations free of water.

3.03 **CUTTING**

- A. Execute cutting and fitting including excavation and fill to complete the Work.
- B. Uncover work to install improperly sequenced work.
- C. Remove and replace defective or non-conforming work.
- D. Remove samples of installed work for testing when requested.
- E. Provide openings in the Work for penetration of mechanical and electrical work.
- F. Employ skilled and experienced installer to perform cutting for weather exposed and moisture-resistant elements and sight-exposed surfaces.
- G. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- H. Notify Architect if Work exposes mechanical, electrical, or structural elements to view that are not indicated on the Drawings.

3.04 **PATCHING**

- A. Execute patching to complement adjacent Work.
- B. Fit products together to integrate with other Work.
- C. Execute Work by methods to avoid damage to other Work, and which will provide appropriate surfaces to receive patching and finishing.
- D. Employ skilled and experienced installer to perform patching for weather exposed and moisture-resistant elements, and sight-exposed surfaces.
 - 1. For materials and systems under warranty, work shall be performed as required to maintain the original warranty.

- E. Restore Work with new products in accordance with requirements of Contract Documents.
- F. Fit Work to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- G. At penetrations of fire rated walls, partitions, ceiling, or floor construction completely seal voids with fire rated material to full thickness of the penetrated element.
- H. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

END OF SECTION

SECTION 01 74 19
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Owner desires that this Project shall generate the least amount of waste possible and that processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors shall be employed.
- B. Of the inevitable waste that is generated, as many of the waste materials as economically feasible shall be reused, salvaged, or recycled.
- C. With these goals the Contractor shall develop, for the Architect's and Owner's review, a Waste Management Plan for this Project. Attachments are included which may be used in the development of this plan.

1.02 WASTE MANAGEMENT PLAN

- A. Draft Waste Management Plan: Within fourteen (14) working days after receipt of Notice of Award of Bid, or prior to any waste removal, whichever occurs sooner, the Contractor should submit three (3) copies of the Draft Waste Management Plan to the Architect. The Draft Plan should contain the following:
 - 1. A list of each material proposed to be salvaged, reused, or recycled during the course of the project.
 - 2. Estimated quantities for each waste stream.
 - 3. Separation requirements.
 - 4. On-site storage method for each waste stream.
 - 5. Transportation method for each waste stream.
 - 6. Destination of each waste stream.
 - 7. Estimated tip fee or rebate for each material.

The list of these materials is to include, at a minimum:

- a. Cardboard
- b. Clean dimensional wood
- c. Land clearing debris
- d. Concrete
- e. Bricks
- f. Concrete Masonry Units (CMUs)
- g. Asphalt
- h. Metals from banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.

- i. Gypsum
 - j. Excavated soils
8. Include the names for each subcontractor who will transport solid or hazardous waste from the site and name of the Receiving Facility that will accept waste for disposal.
- B. The following resources are available from the King County Solid Waste Division Construction Recycling and Green Building Program. These materials may be used for development of the Waste Management Plan. In addition, the Contractor may request specific technical assistance from the CDL program in the development of the Waste Management Plan, for on-site contractor and subcontractor training and on-site inspections.
- 1. "Construction Recycling Directory" lists area haulers and processors available for recycling CDL materials.
 - 2. Sample Specification and Waste Management Plan and Project Waste Analysis Worksheet.
 - 3. The "Contractor's Guide" provides detailed information and work sheets for setting up job site recycling.
 - 4. Case studies that exemplify how job site recycling has been successful on other projects.
- C. Final Waste Management Plan: Once the Owner has determined which of the recycling options addressed in the above Draft Waste Management Plan are acceptable, the Contractor shall submit, within fourteen (14) days, a Final Waste Management Plan. The Final Waste Management Plan shall contain the following:
- 1. Analysis of the proposed jobsite waste to be generated, including types and quantities.
 - 2. A list of all materials from the Project that will be separated for reuse, salvage, or recycling.
 - 3. Separation and Storage Requirements for Each Waste Type: A description of the means by which any waste materials identified in Item 3 above will be protected from contamination, and a description of the means employed in recycling the above materials consistent with requirements for acceptance by designated facilities.
 - 4. Recycling Vendor: Name of the recycling processor for each material and estimated tip fees or rebate.
 - 5. Receiving Facilities: The name of the Receiving Facilities intended for receipt of non-recycled CDL materials, the applicable tipping fees, and the projected cost of disposing of all project waste.
 - 6. Transportation: A description of the means of transportation of the recyclable or waste materials and the approximate cost of transportation. Include the names of haulers.
 - 7. Meetings: A description of information to be addressed at project meetings regarding

training and updates on waste management requirements.

1.03 MANAGEMENT PLAN IMPLEMENTATION

- A. **Manager:** The Contractor shall designate an on-site party (or parties) responsible for instructing workers and overseeing and documenting results of the Waste Management Plan for the project.
- B. **Distribution:** The Contractor shall distribute copies of the Waste Management Plan to the Job Site Foreman, each subcontractor, the Owner, and the Architect.
- C. The Contractor shall provide on-site instruction of appropriate separation, handling separation, handling, and recycling, salvage, reuse and return methods to be used by all parties at the appropriate stages of the Project.
- D. **Separation Facilities:** The Contractor shall lay out and label a specific area to facilitate separation of materials for potential recycling, salvage, reuse, and return. Recycling and waste bin areas are to be kept clean and clearly marked in order to avoid contamination of materials.
- E. **Hazardous Wastes:** Hazardous wastes shall be separated, stored, and disposed of according to local regulations.
- F. **Submission of Progress Reports:** The Contractor shall submit with each Progress Report a summary of waste generated at the Project. The summary shall be submitted on a form acceptable to the Owner and shall contain the following information:
 - 1. For each material recycled, reused, or salvaged from the Project, the amount (in tons or cubic yards), the date removed from the jobsite, the receiving party, the transportation cost, the amount of any money paid or received for the recycled or salvaged material, and the net total cost or savings of salvage or recycling the material. Attached manifests, weight tickets receipts, or invoices.
 - 2. The amount (in tons or cubic yard) of material landfilled from the Project, the location of the Receiving Facility, the total amount of tip fees paid at the landfill, and the total disposal cost. Include manifests, weight tickets, receipt, and invoices.

1.04 SAMPLE WASTE MANAGEMENT PLAN

Northwest Best Construction Waste Management Plan
Northwest Bank Building, Kent, Washington
Demolition/new construction
Recycling Coordinator: John Doe

- I. This project shall generate the least amount of waste possible by planning and ordering carefully, following all proper storage and handling procedures to reduce broken and damaged materials, and reusing materials wherever possible. Of the inevitable waste that is generated, as many of the waste materials as economically feasible shall be salvaged for donation or resale or separated

II. The following chart identifies the waste materials that will be generated on this project, the disposal method for each material and any handling procedures.

- III. Waste prevention and recycling activities will be discussed at the beginning of each safety meeting. As each new subcontractor comes on-site, the recycling coordinator will present him/her with a copy of the Waste Management Plan and provide a tour of the recycling areas. The subcontractor will be expected to make sure all the crew complies with the Waste Management Plan. All

for recycling.

recycling containers will be clearly labeled and lists of acceptable/ unacceptable materials will be posted throughout the site.

Sample Waste Management Plan

Material	Qty.	Disposal Method	Handling Procedure
<i>Demolition</i>			
Asphalt from parking lot	100 tons	Ground on-site, reused as fill.	
Wood framing	6 tons	Recycled - Wood Recycling NW.	Separate clean wood in "clean wood" dumpster.
Decorative wood beams	300 bd. ft.	Salvaged - Timber Frame Salvaging.	Remove by hand, store on-site, on pallets for pick up.
Remaining wastes (painted wood, broken glass, misc.)	8 tons	Garbage - Sound Disposal.	Dispose of in "trash" dumpster.
<i>New Construction</i>			
Concrete	2 tons	Recycled - Puget Sound Concrete.	Break up any wastes or mistakes and put in "concrete" dumpster. Rebar OK.
Forming boards		Reused as many times as possible then recycled - Wood Recycling NW.	Stack next to supply of new form boards for reuse. Recycle clean unusable forms in "clean wood" recycling dumpster.
Clean wood scrap	12 tons	Scraps reused for form work, fine-breaks, etc. Then recycled - Wood Recycling NW.	Stack reusable pieces next to dumpster for reuse. Separate unusable clean wood in "clean wood" recycling dumpster
Scrap metal	5 tons	Recycled - Seattle Metals.	Deposit all metals in "metal" dumpster.
Drywall	10 tons	Subcontractor will recycle and submit reports to recycling coordinator.	Either provide container or collect in vehicle for recycling.
Electrical/Plumbing subcontractors' metal and other recyclables		Subcontractors will recycle and submit reports to recycling contractor.	Either provide container or collect in vehicle for recycling.
All other wastes	14 tons	Garbage - Sound Disposal	Dispose of in "trash" dumpster.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.01 **WASTE DIVERSION**

- A. Collection Containers: Provide separate collection containers for recyclable and non-recyclable wastes pursuant to WAC 173-345-040.
- B. Waste Diversion Report: Track waste disposal and provide a waste diversion report to the building official as required by Appendix P of the Washington State amendments to the International Building Code (IBC) and local jurisdiction.

END OF SECTION

**SECTION 01 75 00
STARTING AND ADJUSTING**

PART 1 - GENERAL

1.01 STARTING SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect Project Manager, and Owner seven (7) days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify that wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable manufacturer's representative and Contractors' personnel in accordance with manufacturers' instructions.
- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

1.02 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of Products to Owner's personnel two (2) weeks prior to date of Owner occupancy.
- B. Demonstration of project equipment by a qualified representative who is knowledgeable about the Project.
- C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six (6)] months.
- D. Utilize Operation and Maintenance Manuals as basis for instruction. Review contents of Manual with Owners' personnel in detail to explain all aspects of operation and maintenance.
- E. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment.
- F. Prepare and insert additional data in Operations and Maintenance Manuals when need for additional data becomes apparent during instruction.

1.03 TESTING, ADJUSTING, AND BALANCING

- A. Owner will appoint, employ, and pay for services of an independent firm to perform testing, adjusting, and balancing.
- B. The independent firm will perform services specified in Division 23.

- C. Reports will be submitted by the independent firm to the Architect, indicating observations and results of tests and indicating compliance or non-compliance with the requirements of the Contract Documents.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

**SECTION 01 77 00
CLOSEOUT PROCEDURES**

PART 1 - GENERAL

1.01 CLOSEOUT PROCEDURES

- A. Refer to City of Federal Way Special Provisions for additional information and requirements.
- B. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Architect/Engineer's review.
- C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

1.02 FINAL CLEANING

- A. Execute final cleaning prior to final project assessment.
- B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- C. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- D. Replace filters of operating equipment.
- E. Clean debris from roofs, gutters, downspouts, and drainage systems.
- F. Clean site; sweep paved areas, rake clean landscaped surfaces.
- G. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.03 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

1.04 PROJECT RECORD DOCUMENTS

- A. Maintain on site one (1) set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed Shop Drawings, Product Data, and Samples.

6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
 1. Manufacturer's name and product model and number.
 2. Product substitutions or alternates utilized.
 3. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
 1. Measured depths of foundations in relation to finish main floor datum.
 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 4. Field changes of dimension and detail.
 5. Details not on original Contract drawings.
- G. Submit documents along with an electronic copy in pdf format to Architect and Project Manager, with claim for final Application for Payment.

1.05 OPERATION AND MAINTENANCE DATA

- A. Submit data bound in 8-1/2 x 11 in. text pages, three D side ring binders with durable plastic covers.
- B. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project and subject matter of binder when multiple binders are required.
- C. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
- D. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, typed on 20 pound white paper, in three parts as follows:
 1. Part 1: Directory: listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.
 2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of subcontractors and suppliers. Identify the following:
 - a. Significant design criteria.

- b. List of equipment.
 - c. Parts list for each component.
 - d. Operating instructions.
 - e. Maintenance instructions for equipment and systems.
 - f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
3. Part 3: Project documents and certificates, including the following:
- a. Shop drawings and product data.
 - b. Air and water balance reports.
 - c. Certificates.
 - d. Originals of warranties and bonds.
- E. Submit one (1) draft copy of completed volumes thirty (30) days prior to final inspection along with an electronic copy in pdf format. This copy will be reviewed and returned [after final inspection], with Architect/Engineer comments. Revise content of all document sets as required prior to final submission.
- F. Submit two (2) sets of revised final volumes along with an electronic copy in pdf format, within ten (10) days after final inspection.

1.06 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Provide spare parts, maintenance, and extra products in quantities specified in individual specification sections.
- B. Deliver to Project site and place in location as directed by Owner; obtain receipt from Owner.

1.07 WARRANTIES AND BONDS

- A. Provide duplicate notarized copies.
- B. Execute and assemble transferable warranty documents from subcontractors, suppliers, and manufacturers.
- C. Provide Table of Contents and assemble in three D side ring binder with durable plastic cover, along with an electronic copy in pdf format.
- D. Submit prior to final Application for Payment.
- E. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within ten (10) days after acceptance, listing date of acceptance as start of warranty period.

1.08 RE-REVIEW FEES

- A. Architect will do a Substantial Completion Inspection and a Final Inspection. Re-inspections after the Final Inspection, due to Contractor failure to correct deficient work, will require the

deduction of an amount for Architect compensation from the final payment to the Contractor.

1.09 **FINAL ADJUSTMENT OF ACCOUNTS**

- A. Submit final adjusted pay application to Architect.
- B. Submit all closeout documents to Architect for review and acceptance prior to Final Pay Application.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

**SECTION 01 78 36
WARRANTIES**

PART 1 – GENERAL

1.01 SUMMARY

- A. This section specifies general administrative and procedural requirements for warranties required by the Contract Documents, including manufacturer's standard warranties on products and special warranties.
1. Refer to the following General Conditions for terms of the Contractor's warranty of Work:
 - a. Part 12.2 "Correction of Work"
 - b. Part 3.5 "Warranty"
 - 1) If there is any discrepancy in the Contract Documents regarding the warranty period or its date of commencement, the specified passage granting the Owner the longest warranty period ending on the latest date shall govern.
 2. General closeout requirements are included in Section 01 77 00 "Closeout Procedures."
 3. Specific requirements for warranties for the Work and products and installation that are specified to be warranted are included in the individual sections of the Specifications.
 4. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.
- B. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and Subcontractors that are required to countersign special warranties with the Contractor.
- C. The Contractor (GC/CM) will be utilizing ProCore for communications and documents controls on this Project.

1.02 DEFINITIONS

- D. "Standard Product Warranties" are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.
- E. "Special Warranties" are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

1.03 WARRANTY REQUIREMENTS

- F. General: Upon determination that Work covered by a warranty has failed, correct or replace the Work to an acceptable condition complying with requirements of Contract Documents.
- G. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced

to provide access for correction of warranted Work.

- H. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected or replaced and retested and/or re-commissioned reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- I. Costs: The Contractor is responsible for the cost of correcting or replacing including the cost for retesting and/or re-commissioning defective Work, regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.
- J. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.
 - 1. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.
 - 2. Right to Refuse Work: The Owner reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

1.04 SUBMITTALS

- K. Submit written warranties to the Architect and Owner's Representative. Provide a draft for Architect and Owner's review and comment prior to final execution. Warranties shall identify:
 - 1. Scope description of what is covered (indicate labor and/or materials requirements);
 - 2. The Specification reference stating the warranty;
 - 3. The date of the warranty's start and finish (indicate the specified warranty duration);
 - 4. Service and maintenance contracts, when specified in the Contract Documents;
 - 5. Supplier's name, address, e-mail address, and telephone number;
 - 6. Proper procedure in case of failure; and
 - 7. Instances which might affect validity of warranty.
- L. When a special warranty is required to be executed by the Contractor, or the Contractor and a Subcontractor, supplier, or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties.
 - 1. Refer to individual sections of the Specifications for specific content requirements, and particular requirements for submittal of special warranties.
- M. Include warranties in the Operations and Maintenance Manual (see Section 01 77 00 "Closeout Procedures").
- N. Review and acceptance, by the Architect or Owner's Representative, of submitted warranties does

not relieve the Contractor of the warranty requirements of the Contract Documents.

- O. The Owner may generate and keep electronic copies of original executed warranties, certifications, and other similar commitments and such copies shall be considered as originals.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

**SECTION 01 83 23
THE AIR BARRIER SYSTEM**

PART 1 - GENERAL

1.01 REFERENCES

- A. AAMA/WDMA/CSA 101/1.5.2/A440 – North American Fenestration Standard/Specification for Windows, Doors, and Skylights
- B. ANSI/RESNET/ICC 380 - Standard for Testing Airtightness of Building, Dwelling Unit, and Sleeping Unit Enclosures; Airtightness of Heating and Cooling Air Distribution Systems; and Airflow of Mechanical Ventilation Systems
- C. ASTM E 1186 – Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems
- D. ASTM E 1677 – Standard Specification for Air Barrier (AB) Material or System for Low-Rise Framed Building Walls
- E. ASTM E 1827 - Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door
- F. ASTM E 2178 – Standard Test Method for Air Permeance of Building Materials
- G. ASTM E 2357 – Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
- H. ASTM E 283 – Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
- I. ASTM E 3158 - Standard Test Method for Measuring the Air Leakage Rate of a Large or Multizone Building
- J. ASTM E 779 – Standard Test Method for Determining Air Leakage Rate By Fan Pressurization
- K. ASTM E 783 – Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors
- L. NFRC 400 – Procedure for Determining Fenestration Product Air Leakage
- M. WAC 51-11C – Washington State Energy Code, Commercial Provisions.

1.02 SUMMARY

- A. This section includes administrative and procedural requirements for accomplishing an airtight building enclosure that controls infiltration or exfiltration of air.
 - 1. The airtight components of the building enclosure and the joints, junctures and transitions between materials, products, and assemblies forming the air-tightness of the building enclosure are called “the air barrier system”. Services include coordination between the trades, the proper scheduling and sequencing of the work, preconstruction meetings, inspections, tests, and related actions, including reports performed by Contractor, by independent agencies, and by governing authorities. They do not include contract enforcement activities performed by Architect.

2. The Contractor shall ensure that the intent of constructing the building enclosure with a continuous air barrier system to control air leakage into, or out of the conditioned space is achieved. The air barrier system shall have the following characteristics:
 - a. It must be continuous, with all joints sealed.
 - b. It must be structurally supported to withstand positive and negative air pressures applied to the building enclosure.
 - c. Connection shall be made between:
 1. Foundation and walls.
 2. Walls and windows or doors.
 3. Different wall systems.
 4. Wall and roof.
 5. Wall and roof over unconditioned space.
 6. Walls, floor and roof across construction, control and expansion joints.
 7. Walls, floors and roof to utility, pipe and duct penetrations.
 3. Air Barrier Penetrations: All penetrations of the air barrier and paths of air infiltration/exfiltration shall be sealed.
- B. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with Contract Document requirements.
- C. Requirements of this section relate to the coordination between subcontractors required to provide an airtight building enclosure, customized fabrication and installation procedures, not production of standard products.
1. Continuity of the air barrier materials and products with joints to provide assemblies. Continuity of all the enclosure assemblies with joints and transition materials to provide a whole building air barrier system.
 2. Specific quality-control requirements for individual construction activities are specified in the sections of the specifications. Requirements in those sections may also cover production of standard products. It is the Contractor's responsibility to ensure that each subcontractor is adequately and satisfactorily performing the quality assurance documentation, tests and procedures required by each section.
 3. Specified inspections, tests, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with Contract Document requirements.

Requirements for Contractor to provide an airtight building enclosure is not limited by quality-control services required by Architect, Owner, or authorities having jurisdiction and are not limited by provisions of this section.

1.03 RESPONSIBILITIES

- A. Contractor Responsibilities: Unless otherwise indicated as the responsibility of another identified entity, Contractor shall provide coordination of the trades, and the sequence of construction to ensure continuity of the air barrier system joints, junctures and transitions between materials and assemblies of materials and products, from substructure to walls to roof. Provide quality assurance procedures, testing and verification as specified herein. Facilitate inspections, tests, and other quality-control services specified elsewhere in the Contract Documents and required by authorities having jurisdiction or by the Owner. Costs for these services are included in the Contract Sum.
1. Organize preconstruction meetings between the trades involved in the whole building's air barrier system to discuss where each trade begins and ends and the responsibility and sequence of installation of all the air-tight joints, junctures, and transitions between materials, products and assemblies of products specified in the different sections, to be installed by the different trades.
 2. Build a mock-up before proceeding with the work, satisfactory to the Architect, of each air-tight joint type, juncture, and transition between products, materials and assemblies.
- B. Associated Services: Cooperate with agencies performing required inspections, tests, and similar services, and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include, but are not limited to, the following:
1. Provide access to the Work.
 2. Furnish incidental labor and facilities necessary to facilitate inspections and tests.
 3. Take adequate quantities of representative samples of materials that require testing or assist the agency in taking samples.
 4. Deliver samples to testing laboratories.
 5. Provide security and protection of samples and test equipment at the Project Site.
- C. Duties of the Testing and Inspection Agency: The independent agency engaged to perform inspections, sampling, and testing of air barrier materials, components and assemblies specified in individual Sections shall cooperate with the Architect and the Contractor in performance of the agency's duties. The testing agency shall provide qualified personnel to perform required inspections and tests.
1. The agency shall notify the Architect and the Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. The agency is not authorized to release, revoke, alter, or enlarge requirements of the Contract Documents or approve or accept any portion of the Work.
 3. The agency shall not perform any duties of the Contractor.
- D. Coordination: Coordinate the sequence of activities to accommodate required services with a minimum of delay. Coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.
1. The Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities.

1.04 PERFORMANCE REQUIREMENTS

- A. Compliance Criteria:
1. Materials: materials used for the air barrier system in the opaque envelope shall have an air permeance not to exceed 0.004 cfm/ft² under a pressure differential of 0.3 in. water (75 Pa) when tested in accordance with ASTM E 2178.
 2. Assemblies of materials and components: shall have an air permeance not to exceed 0.04 cfm/ft² under a pressure differential of 0.3 in. water (75 Pa) when tested in accordance with ASTM E 2357, ASTM E 1677 or ASTM E 283.
 3. Fenestration assemblies, including windows, doors, skylights, storefront and curtain wall, shall be tested in accordance with ASTM E 283, NFRC 400 or AAMA/WDMA/CSA 101/1.C.2/A440 for maximum air leakage rate and testing pressure differential.
 4. The entire building: The air leakage of the entire building shall not exceed 0.25 cfm/ft² (1.27 L/s.m²) under a pressure differential of 0.3 in. water gauge (75 Pa) at the upper 95 percent confidence level when tested according to ASTM E 779, ANSI/RESNET/ICC 380, ASTM E3158 or ASTM E1827. A test above 0.25 cfm/ft² (1.27 L/s.m²) will not be accepted.

1.05 SUBMITTALS

- A. The testing agency shall submit a certified written report, in duplicate, of each inspection, test, or similar service to the Architect through the Contractor.
1. Submit additional copies of each written report directly to the authority having jurisdiction, when the authority so directs.
 2. Report Data: Written reports of each inspection, test, or similar service include, but are not limited to, the following:
 - a. Date of issue.
 - b. Project title and number.
 - c. Name, address, and telephone number of testing agency.
 - d. Dates and locations of samples and tests or inspections.
 - e. Names of individuals making the inspection or test.
 - f. Designation of the Work and test method.
 - g. Identification of product and Specification Section.
 - h. Complete inspection or test data.
 - i. Test results and an interpretation of test results.
 - j. Ambient conditions at the time of sample taking and testing.
 - k. Comments or professional opinion on whether inspected or tested Work complies with Contract Document requirements.

- I. Name and signature of laboratory inspector.
- m. Recommendations on retesting.

1.06 QUALITY ASSURANCE

- A. Qualifications for Air Barrier Testing and Inspection Agencies: Engage air barrier inspection and testing service agencies, including independent testing laboratories, that are qualified and that specialize in the types of air barrier system inspections and tests to be performed.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.01 REPAIR AND PROTECTION

- A. Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes. Comply with Contract Document requirements for Division 1 Section "Cutting and Patching."
- B. Protect construction exposed by or for quality-control service activities and protect repaired construction.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

3.02 TESTING AND INSPECTION

- A. The Contractor shall hire a testing and inspection agency to provide observation and inspection during installation of the air barrier system. The testing and inspection agency will provide the following listed services:
 - 1. Qualitative Testing and Inspection:
 - a. Reports of observations, with copies to the Owner, Contractor, and Architect.
 - b. Continuity of the air barrier system throughout the building enclosure with no gaps, holes.
 - c. Structural support of the air barrier system to withstand design air pressures.
 - d. Masonry and concrete surfaces are smooth, clean, and free of cavities, protrusions and mortar droppings.
 - e. Site conditions for application temperature and dryness of substrates.
 - f. Maximum length of exposure time of materials to ultra-violet deterioration.
 - g. Surfaces are properly primed.

- h. Laps in material are 2" minimum, shingled in the correct direction (or mastic applied on exposed edges), with no fish-mouths.
 - i. Mastic applied on cut edges.
 - j. Roller has been used to enhance adhesion.
 - k. Measure application thickness of liquid-applied materials to manufacturer's specifications for the specific substrate.
 - l. Materials used for compatibility.
 - m. Transitions at changes in direction, and structural support at gaps.
 - n. Connections between assemblies (membrane and sealants) for cleaning, preparation and priming of surfaces, structural support, integrity and continuity of seal.
 - o. All penetrations sealed.
2. Quantitative tests:
- a. Provide written test reports of all tests performed, with copies to the Owner, Contractor and Architect.
 - b. Material compliance for maximum air permeance.
 - c. Assemblies, compliance for maximum allowable air leakage.
 - d. Whole building, floors, or suites, testing in accordance for maximum allowable air leakage, ASTM E779, Determining Airtightness of Buildings Air Leakage Rate by Single Zone Air Pressurization.

3.03 CORRECTION OF DEFICIENCIES

- A. Conduct a visual inspection of the building envelope air barrier if the building exceeds the maximum allowable air leakage rate specified, using one of the following methods, in accordance with ASTM E 1186.
- 1. Infrared scanning with pressurization/depressurization.
 - 2. Smoke pencil with pressurization/depressurization.
 - 3. Pressurization/depressurization with use of anemometer
 - 4. Generated sound with sound detection
 - 5. Tracer gas measurement of decay rate
 - 6. Chamber pressurization/depressurization in conjunction with smoke tracers.
 - 7. Chamber depressurization using detection liquids.

B. Sealing of Leaks

Seal leaks indicated by the visual inspection to the extent practicable. Submit a report to the Owner, Architect and Code Official identifying all corrective actions taken. Further building air leakage testing will not be required if tested air leakage rate does not exceed .25 cfm/ft². If the tested rate exceeds 0.25 cfm/ft², corrective actions shall be made, and the test completed again.

END OF SECTION

**SECTION 01 91 13
COMMISSIONING**

PART 1 - GENERAL

1.01 SUMMARY

- A. Comply with the commissioning provisions specified in this section and elsewhere in the Contract Documents.
- B. General
 - 1. Unless noted otherwise, functional performance tests (FPT) apply to all equipment and systems identified to be tested in the Contract Documents.
 - 2. Submittals shall be in accordance with Section 01 33 00 "Submittal Procedures" and for CAD (Computer Aided Drafting) Record Drawings, in accordance with Section 01 77 00 "Closeout Procedures."
 - 3. The Contractor shall ensure that the Commissioning Authority, or other Owner-designated witness, is provided safe access to witness the performance of the equipment or systems being commissioned and is reasonably furnished ladders, scaffolding, and staging, if required, for witnessing.
- C. Refer to Electrical and Mechanical specification sections for additional information and requirements related to commissioning of building systems.

1.02 COMMISSIONING DOCUMENTATION

- A. Commissioning Plan: The Contractor shall prepare and submit a "Commissioning Plan" that identifies how commissioning activities will be integrated into the construction Progress Schedule and how commissioning responsibilities are distributed. Include, as a minimum, the following:
 - 1. An organizational chart showing lines of communication and authority of the Test Engineer relative to key Contractor positions and to key Subcontractors.
 - 2. Who will be responsible for producing the various procedures, reports, Owner notifications, and forms required by the Contract Documents.
 - 3. A list of all control systems software required by the Contract Documents.
 - 4. The commissioning schedule.
 - 5. Commissioning forms and other documentation.
 - 6. Description of start-up and test procedures.
 - 7. A list of Subcontractors who will participate in each of the tests.
 - 8. The instrumentation required for each test and who will provide the instrumentation.

9. Operational description for each test. (This shall include, for example, the commissioning basis-of-design criteria provided by the commissioning authority, code requirements, the specifics of the equipment to be provided, sequences of operation, operating priorities, and other necessary information.)
 10. One-line system and riser diagrams.
- B. Mechanical and Electrical Commissioning Binders (M&E): The M&E “Commissioning Binders” shall include the submittals, test equipment, commissioning procedures, installation verification audits, and FPT procedures documentation described in this section.

1.03 SUBMITTALS

- A. Start-up plans: Submit start-up plans, with start-up test procedures and documentation forms, for the equipment and systems for which a start-up is specified in the Contract Documents. Start-up plans shall include the following:
1. Start-up schedule.
 2. Names of firms/individuals required to participate.
 3. Detailed start-up procedures.
 4. Start-up forms.
 5. Operations and maintenance product data.
- B. Start-up installation verification audit report: Submit installation verification audit reports prior to start-up of equipment and systems for which a start-up is specified in the Contract Documents. Identify:
1. Equipment and/or systems, to be started-up;
 2. Prestart-up tests performed, including manufacturer’s factory tests;
 3. Deficiencies noted;
 4. Corrective action taken; and
 5. Dates and initials of persons making the entries.
- C. Start-up deficiency report form: Submit start-up deficiency report forms within five (5) days following the start-up of each equipment or system to report any deficiencies discovered in conjunction with start-up. Identify:
1. Equipment and/or systems started-up;
 2. Location and identification of the deficient equipment and/or materials;
 3. Date of observation and initials of observer;
 4. Deficiencies noted;

5. Corrective action taken; and
 6. Date of correction and initials of the person making the correction.
- D. Test equipment identification list: Submit a list of all test equipment used in commissioning, sorted according to intended use. Provide an updated list, if any equipment is added to the commissioning, while testing is in progress. The list shall include the following information:
1. Manufacturer.
 2. Model number.
 3. Serial number.
 4. Date of most recent calibration.
 5. Range.
 6. Accuracy.
 7. Resolution.
 8. Intended use.
- E. Testing, Adjusting and Balancing (TAB) progress reports: Submit weekly TAB progress reports after TAB activities have begun. Identify the following:
1. Systems or subsystems for which preliminary balancing is complete.
 2. Systems or subsystems for which final balancing is complete.
 3. Status of deficiencies and balancing problems encountered, including corrective actions taken.
 4. Updated schedule of remaining TAB activities.
- F. FPT procedure documentation: Submit FPT procedure documentation for FPT specified in the Contract Documents. The documentation shall include the following:
1. FPT procedure description.
 2. Procedures that are based upon the actual equipment and/or systems configuration.
 3. The value for all set points and inputs, positions of adjustable devices, valves, dampers and switches.
 4. The acceptable test range for each FPT.
 5. Updated one-line system and riser diagrams.
 6. An alphanumeric designator for each procedure.

7. Reference to the applicable Specifications section upon which the procedure is based.
- G. FPT data forms: Submit FPT data forms to document the equipment or systems FPT specified in the Contract Documents.
1. Identify each FPT data form by a unique designator, consisting of an applicable FPT procedure designator followed by a dash and digit suffix to distinguish multiple repetitions of the same procedure.
 2. The FPT data form shall identify:
 - a. Who needs to be in attendance for the tests, including but not limited to, Subcontractors, Commissioning Authority or other Owner-designated witness, regulatory agencies, and others as appropriate; and
 - b. The sequence of the tests to be performed.
 3. Include space to record the following:
 - a. Description of the procedure.
 - b. Whether the form is for a retest of a failed procedure.
 - c. Identification and location of the equipment being tested.
 - d. Identification of instrumentation used, by type and serial number.
 - e. Observed conditions at each step of the procedure.
 - f. Acceptable results, as specified.
 - g. Date of the test.
 - h. Names of technicians performing the procedure.
 - i. Name and signature of the Contractor's Test Engineer.
 - j. Name and signature of the Commissioning Authority or Owner-designated witness.
 - 1) Signature of witness shall only indicate concurrence with reported results and observations. Acceptance of the results will be reported separately by the Commissioning Authority after review of the FPT data forms.

1. Associated FPT data form number and description.
 2. Equipment identification and location.
 3. Date of test.
 4. Name of person reporting the deficiency.
 5. Description of the observations associated with the failure of the test.
 6. Cause of the failure, if apparent at the time of the test.
 7. Date and description of corrective action taken.
 8. Name and signature of person taking corrective action.
 9. Schedule for retest.
- I. One-line system and riser diagrams: Submit one-line system and riser diagrams with the Commissioning Plan, updated one-line system and riser diagrams with the FPT procedure documentation, and as-built one-line system and riser diagrams with the final M&E Commissioning Binders. One-line system and riser diagrams shall be submitted for the following, when included in the work of the Contract Documents:
1. Owner-provided one-line system and riser diagrams in CAD format for Contractor's use:
 - a. Hot water heating.
 - b. Domestic water.
 - c. Steam and condensate.
 - d. Chilled water.
 - e. Condenser water.
 - f. Supply air.
 - g. Return air.
 - h. Exhaust air.
 - i. Electrical normal and emergency power.
 2. Subcontractor-provided one-line system and riser diagrams CAD Shop Drawings for Contractor's use:
 - a. Environmental control systems (ECS).

- b. Fire alarm/smoke evacuation/life safety graphics and riser diagrams.
 - c. Lighting control system diagrams.
 - d. Electrical distribution equipment and spot or network substations schematic diagrams.
3. The actual cost of each required one-line diagram required by Divisions 02 through 49 shall be included in the subcontract bid packages.

PART 2 – PRODUCTS

2.01 TEST EQUIPMENT

- A. Provide industry standard test equipment required for performing the tests specified in the Contract Documents.
- B. Instrumentation shall meet the following standards:
1. Be of sufficient quality and accuracy to test and measure system performance within the tolerances required to determine adequate performance.
 2. Be calibrated on the manufacturer's recommended intervals with calibration tags permanently affixed to the instrument being used.
 3. Be maintained in good repair and operational condition throughout the duration of use on this Project.
 4. Be recalibrated/repared if dropped or damaged in any way since last calibrated.
- C. For all temperature measurements, including air, liquids, and surfaces of pipes and components, use appropriate probes that meet the following requirements:
1. Range: Minimum +14 °F to 248 °F.
 2. Type: Thermometer, digital electronic.
 3. Minimum accuracy: +/- 0.5 °F.
 4. Calibration Interval: Per manufacturer instruction, not to exceed every twelve (12) months.
- D. For hydronic systems pressure and differential pressure measurement instruments, the test equipment shall meet the following requirements:
1. Range: 0 to 30 psi (1 pound per square inch), 0 to 60 psi, and 0 to 200 psi.
 2. Type: Calibrated test gauges, 3 inch, or electronic digital device (TSI Performance Measurement Tools or similar) meeting accuracy and calibration interval requirements.

3. Minimum accuracy: 2% with a gauged scale; 3% with an electronic reading.
 4. Calibration interval: Per manufacturer's recommendation, not to exceed every twelve (12) months.
 5. Note: Use lowest range instrument or scale.
- E. For air pressure measurement instruments, the test equipment shall meet the following requirements:
1. Range: 0 to 1 inch WC (water column), 0 to 4 inch WC, 0 to 10 inch WC.
 2. Type: Use properly leveled and zeroed manometer, magnehelic or electronic instrument meeting accuracy requirements.
 3. Minimum accuracy for electronic devices: 2 percent with a magnehelic reading; 3 percent with an electronic reading.
 4. Calibration interval for electronic devices: Per manufacturer's recommendation, not to exceed every twelve (12) months.
 5. Note: Use lowest range instrument or scale.
- F. Refer to electrical inspection, calibration, and testing requirements for instrumentation related to electrical systems and equipment.

PART 3 – EXECUTION

3.01 COMMISSIONING PROCEDURE

- A. Sequence of testing: Commissioning shall proceed from lower to higher levels of complexity. For each system, testing at the lower level shall be completed prior to starting the next higher level of tests. In general, the order of testing, from lowest to highest is as follows:
1. Static tests (e.g., duct leakage tests).
 2. Motors, actuators, sensors, and other system components requiring start-up and FPT.
 3. Point-to-point (PTP) testing.
 4. Balancing.
 5. System functional performance tests.
 6. Cross-systems functional performance tests.
- B. Retesting: Repeat, at no additional cost to the Owner, the complete functional test procedure for each test in which acceptable results are not achieved. Repeat tests until acceptable results are achieved. Fill out a new FPT data form for each retest.

- C. Correction of deficiencies:
 - 1. Correct FPT deficiencies promptly and schedule retest.
 - a. Corrections during FPT are generally prohibited to avoid consuming the time of personnel waiting for the test, but not involved in making the correction. Exceptions will be allowed if the cause of the failure is obvious and corrective action can be completed in less than five (5) minutes. If corrections are made under this exception, the failure shall be noted on the FPT data form. A new FPT data form, marked "retest," shall be submitted after the correction has been made. The entire FPT procedure shall be repeated.

3.02 INSTALLATION VERIFICATION AUDIT

- A. Conduct an installation verification audit before equipment or system start-up begins. The audit shall include, but not be limited to, a check of the following equipment or systems:
 - 1. Piping specialties, including balance, control, and isolation valves.
 - 2. Ductwork specialty items, including turning devices; balance, fire, smoke and control dampers; and access doors.
 - 3. Control sensors by type and locations.
 - 4. Piping, valves, starters, gauges, thermometers, and other components of the Work specified for formal start-up in the Contract Documents.
 - 5. Accessibility to equipment in 1 through 4 above.
 - 6. Verification of final programmed variable frequency drives (VFD) settings.
- B. If any part of the Work is found to be incomplete, inaccessible, incorrect, or non-functional, the Contractor shall make note of deficiencies, and correct deficiencies before system start-up work proceeds.
- C. Coordinate with the electrical testing contractor (ETC) for the audit of electrical systems required by the Contract Documents.

3.03 TESTING, ADJUSTING, AND BALANCING (TAB)

- A. Complete all PTP testing prior to start of TAB.
- B. Coordinate and perform air and hydronic balancing. Advise the TAB firm when systems are complete and ready for balancing. Start TAB as early as possible following system start-ups and component FPT, in order to be essentially complete prior to system FPT. Coordinate TAB activities with other construction schedule activities.
- C. Verify completion of PTP testing and the accuracy of the TAB work prior to commencing any FPT activities which may be adversely affected by incomplete PTP testing and improper balancing.

3.04 FUNCTIONAL PERFORMANCE TEST PROCEDURES

- A. FPT procedures must confirm the performance of systems to the extent required by the Contract Documents.
 - 1. Emphasis shall be placed on testing procedures which will conclusively determine actual system performance and compliance with the design.
- B. FPT procedures shall demonstrate the actual performance of specified safety shut-offs in a real or closely simulated condition of failure. Failure conditions shall include adequate oil pressure, proof-of-flow, non-freezing conditions, maximum head pressure, and other conditions common to the equipment.
- C. Systems may include safety devices and components that control a variety of equipment operating as a system. Interlocks may be hard-wired or installed via software. FPT procedures shall demonstrate these interlocks.

3.05 ECS SOFTWARE REVIEW

- A. Review ECS software and required ECS cross-systems software routines prior to the installation of control devices. The review shall include:
 - 1. Obtaining ECS program documentation.
 - 2. Review of the programming approach.
 - 3. Interface with other systems, including but not limited to:
 - a. Lighting.
 - b. Fire alarm.
 - c. Security.
 - d. Clock.
 - e. Emergency generator monitoring.
 - f. Sump pumps.
 - 4. Distributed and mechanical utility metering.
- B. Discrepancies in programming approaches shall be resolved with the Owner to provide the most appropriate, simple, and straightforward approach to software routines.
- C. The actual cost of the ECS software review required by Divisions 02 through 49 shall be included in the subcontract bid packages.

3.06 COMMISSIONING MEETINGS

- A. The Contractor shall participate in the following meetings with the Commissioning Authority. Other Subcontractors may, at Owner's sole discretion, be required to attend as necessary.
1. Pre-commissioning kick-off meeting.
 2. Commissioning meetings described in Section 01 31 19 "Project Meetings."
 3. ECS software review, and design intent clarification meeting.
 4. Preliminary O&M Manual review meeting.

3.07 EQUIPMENT OPERATING INSTRUCTIONS AND TRAINING AGENDA

- A. Each training session shall include an agenda addressing the following:
1. Introduction of presenters.
 2. Using the O&M information:
 - a. What is the equipment?
 - b. Basic operating procedures (including start-up/shut-down).
 - c. Preventative maintenance procedures.
 - d. Troubleshooting procedures.
 3. What does it do or serve.
 4. Any special features.
 5. Safety precautions.
 6. Maintaining warranties, guarantees, and warranty periods.
 7. Instruction on how to use proprietary instrumentation or operating equipment.
 8. Recommended spares.
 9. Review of start-up reports and FPT results.
 10. Jobsite walk-through.

END OF SECTION

**SECTION 02 41 16
BUILDING DEMOLITION**

PART 1 - GENERAL

1.01 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Shop Drawings: Indicate demolition and removal sequence and location of salvageable items, location and construction of barricades, fences, and temporary work.

1.02 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Section 01 77 00.
- B. Accurately record actual locations of capped utilities and subsurface obstructions.

1.03 REGULATORY REQUIREMENTS

- A. Conform to applicable codes for demolition work and disposal of debris.
- B. Obtain required permits from authorities.
- C. Notify affected utility companies before starting work and comply with their requirements.
- D. Conform to applicable regulatory procedures when discovering hazardous or contaminated materials.
- E. Coordinate disruption of Building Utility, Fire or Life safety systems with Owner ten (10) days prior to disruption.

1.04 SEQUENCING

- A. Sequence Work under the provisions of Section 01 11 00.
- B. Sequence activities to demolish the Work in the following [order] [stages]:
 - 1. Removal of any remaining physical features from the site, with the exception of the structures need by the owner for continuing operation of the southern end of the site during construction, Coordinate with owner.
 - 2. Relocation of existing sand, salt and bulk storage materials, tents, and ecology blocks to new location at north end of site after completion of new facilities, with approval and coordination with owner to maintain city operations.
 - 3. Demolition of existing operations building following relocation of owner to new facility. And approval by owner in writing.

1.05 SCHEDULING

- A. Schedule Work under the provisions of Section 01 32 16.

- B. Schedule Work to coincide with new construction and remodel work.
- C. Describe demolition removal procedures and schedule.
- D. Perform work between the hours of 8:00 am and 5:00 pm.

1.06 **ALTERNATES**

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.01 **PREPARATION**

- A. Provide, erect, and maintain temporary barriers and security devices at locations indicated.
- B. Protect existing landscaping materials and structures that are not to be demolished, Refer to Landscape architecture documents for additional requirements and protection measures.
- C. Prevent movement or settlement of adjacent structures. Provide bracing and shoring.
- D. Protect existing material, structure, and finishes that are not to be demolished.
- E. Disconnect, remove, and cap utility lines within demolition areas. Protect and maintain utilities required to serve occupied portions of building.
- F. Provide means to control dust and prevent from exiting through windows, doors, etc. Contain all dust within construction area.
- G. Mark location of utilities and protect from disconnection and/or damage.

3.02 **DEMOLITION REQUIREMENTS**

- A. The general scope of demolition work shall include:
 - 1. Demolition and removal of all items required to accommodate new work.
- B. Conduct demolition to minimize interference with adjacent and occupied areas or buildings.
- C. Cease operations immediately if adjacent structures appear to be in danger. Notify Architect. Do not resume operations until directed.
- D. Conduct operations with minimum interference to public or private accesses. Always maintain egress and access.
- E. Obtain written permission from adjacent property owners when demolition equipment will traverse, infringe upon, or limit access to their property.
- F. Sprinkle Work with water to minimize dust. Provide hoses and water connections for this purpose.

3.03 **DEMOLITION**

- A. Disconnect, remove, and cap utilities within demolition areas.
- B. Demolish in an orderly and careful fashion. Protect existing supporting structural members, and existing building components, finishes, materials, equipment, furniture, etc., not to be demolished.
- C. Except where noted otherwise, remove demolished materials from site. Deposit material at approved dumping sites. Do not bury or burn material on site.
- D. Demolition of existing work/items shall include removal of all connections and fasteners, foundations, soffits, facework, etc., associated with the work or item to be demolished.
- E. Sawcut all edges of concrete or asphalt pavements to be removed. Sawcut openings in concrete or masonry wall for doors or windows.
- F. Do not modify or cut any structural member, wall, or condition unless specifically detailed on structural drawings or approved by structural engineer in writing.
- G. Remove materials to be reinstalled or retained in manner to prevent damage. Store and protect in accordance with requirements of Section 01 60 00.
- H. Backfill areas excavated as a result of demolition.
- I. Rough grade and compact areas affected by demolition to maintain site grades and contours. Refer to Landscape architecture document for add additional site restoration requirements
- J. Leave site in clean condition.
- K. Remove temporary work.

3.04 **SCHEDULES**

- A. Relics, antiques, and similar objects remain the property of Owner. Obtain direction regarding method of removal.
- B. Items to be removed, stored, and protected for reinstallation:
 - 1. Items as indicated on drawings.
- C. Items to be removed by Contractor and be retained by Owner; deliver to location on Site as designated by Owner.
 - 1. Items as indicated on drawings.
 - 2. Bulk materials, bulk material tents and Ecology blocks.
- D. Items to be removed and kept by the Owner:
 - 1. Items as indicated on drawings, Contractor to coordinate all work with owner to insure items to be retained by owner are protected. Owner to move items to be retained such as equipment as needed. Contractor to provide 7-day advanced notice of intent to work in a specific area. To allow owner time to move items and equipment out of the way of construction activities.

- E. Items to be protected:
1. Items as indicated on drawings.
 2. Owners' vehicles and equipment on site
 3. Trees and landscaping to be retained.

END OF SECTION

**SECTION 03 11 00
CONCRETE FORMING**

PART 1 - GENERAL

1.01 REFERENCES

- A. ACI 301 - Structural Concrete for Buildings.
- B. ACI 318 - Building Code Requirements for Reinforced Concrete.
- C. ACI 347 - Recommended Practice for Concrete Formwork.
- D. PS 1 - Construction and Industrial Plywood.

1.02 DESIGN REQUIREMENTS

- A. Design, engineer and construct formwork, shoring, and bracing to conform to design and code requirements; resultant concrete to conform to required shape, line, and dimension.

1.03 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 347.

1.04 REGULATORY REQUIREMENTS

- A. Conform to International Building Code and Local Building Department requirements for design, fabrication, erection, and removal of formwork.

1.05 DELIVERY, STORAGE, AND PROTECTION

- A. Section 01 60 00 – Product Requirements: Transport, handle, store, and protect products.
- B. Store off ground in ventilated and protected manner to prevent deterioration from moisture.

1.06 ALTERNATES

- A. See Section 01 23 00 for bidding alternates affecting the Work of this Section.

PART 2 - PRODUCTS

2.01 WOOD FORM MATERIALS

- A. Conform to ACI 347.
- B. Form Panels: For concrete exposed to view use HDO plywood with high-density phenolic overlay, Swanson Group "Multipour® Concrete Form". Form panels for all other concrete shall be B-B Grade form plywood.

2.02 **FORMWORK ACCESSORIES**

- A. Form Ties: Provide snap-off metal form ties, designed to prevent form deflection, and to prevent spalling concrete surfaces upon removal. Ties are to be placed in a uniform layout, as shown approved on shop drawings, for all exposed surfaces. The portion of tie remaining within concrete after removal of exterior parts shall be recessed 3/4 inch from the outer concrete surface and will not leave a hole larger than 1 inch diameter in the concrete surface. Form ties shall be manufactured items with stress value published.
- B. Form Release Agent: Colorless mineral oil that will not stain concrete or absorb moisture. Form release agent shall be compatible with form liner materials.
- C. Chamfers and Reveals:
1. Manufacturer: Sika Greenstreak
 2. Chamfer triangle continuous PVC strip with 3/4 inch leg.
 3. Sika, Rustication strip with 1-1/2 inch face; reusable ABS plastic.
 4. Provide 3/4"-inch chamfer at all exterior corners, vertically and horizontally.
- D. Form Liners: Provide form liner materials to produce form surfaces with face design, texture, arrangement, and configuration as shown on drawings.

Pattern A.

1. Pattern A. – Exposed Concrete Finish on exterior of Buildings A, B, C D & F, as well as On-Site side of Art / Security Wall) Basis of Design: Fitzgerald Light Sandblast. 0.0625 inch Maximum depth, no aggregate exposed. Pattern No. 16990.
2. Pattern B. – Art / Security Wall (Street side of wall), Basis of Design: Rickil Formliner, Pattern Design 1/10 Pellworm, pattern No. 1010
3. Form Liner Manufacturers:
 - a. Sika Greenstreak Group, Inc.
 - b. Rickil Formliners
 - c. Fitzgerald Formliners
 - d. Scott Systems Formliners
 - e. Substitutions: Under provisions of Section 01 60 00

2.03 **FUEL CENTER ISLAND FORMS**

1. Manufacturer:
 - a. Basis of Design: Universal Valve Company, 12 Ga. 304 Stainless Steel with brushed finish, Island Forms, 9-inch tall with full radius ends, side rails and cross bracing.
 - b. OPW Retail Fueling, A Dover Company

- c. Riverside Steel Inc.
- d. Substitutions: Under provisions of Section 01 60 00

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify lines, levels, and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.02 EARTH FORMS

- A. Hand trim sides and bottom of earth forms. Remove loose soil prior to placing concrete.

3.03 ERECTION - FORMWORK

- A. Erect formwork, shoring, and bracing to achieve design requirements in accordance with requirements of ACI 301.
- B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.
- C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.
- D. Align joints and make watertight. Keep form joints to a minimum.
- E. Obtain approval before framing openings in structural members that are not indicated on drawings.
- F. Provide 3/4 inch chamfer at all external corners.
- G. Coordinate this Section with other sections of work that require attachment of components to formwork.
- H. If formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement before proceeding, request instructions from Architect / Engineer.

3.04 FORM LINER INSTALLATION

- A. Seal form liner joints and tie holes to prevent cement paste from bleeding.
- B. Provide solid backing at form liner butt joint to prevent deflection.
- C. Install form liners and accessories as required to achieve architectural concrete textured finish indicated.
- D. Anchor liners to form in accordance with manufacturer's instructions.
- E. Provide back-up strips as required to prevent deflection of the liner due to form pressure. Form pressure shall not exceed 1,000 psf.

3.05 APPLICATION - FORM RELEASE AGENT

- A. Apply form release agent on formwork or form liner in accordance with manufacturer's recommendations.
- B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.
- C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.06 INSERTS, EMBEDDED PARTS, AND OPENINGS

- A. Provide formed openings where required for items to be embedded in passing through concrete work.
- B. Locate and set in place items that will be cast directly into concrete.
- C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other Work.
- D. Install accessories in accordance with manufacturer's instructions, straight, level, and plumb. Ensure items are not disturbed during concrete placement.
- E. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.
- F. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.07 FORM CLEANING

- A. Clean forms as erection proceeds, to remove foreign matter within forms.
- B. Clean formed cavities of debris prior to placing concrete.
- C. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.
- D. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.08 FORMWORK TOLERANCES

- A. Construct formwork to maintain tolerances required by ACI 301.

3.09 FIELD QUALITY CONTROL

- A. Section 01 45 00 - Quality Control: Field inspection and testing.
- B. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with

formwork design, and that supports, fastenings, wedges, ties, and items are secure.

3.10 **FORM REMOVAL**

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.
- B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.
- C. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.

END OF SECTION

**SECTION 03 20 00
CONCRETE REINFORCING**

PART 1 - GENERAL

1.01 REFERENCES

- A. ACI 301 - Structural Concrete for Buildings.
- B. ACI 315 - Details and Detailing of Concrete Reinforcement.
- C. ACI 318 - Building Code Requirements for Structural Concrete.
- D. ACI SP-66 - American Concrete Institute - Detailing Manual.
- E. ASTM A82 - Cold Drawn Steel Wire for Concrete Reinforcement.
- F. ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement.
- G. AWS D1.4 - Structural Welding Code for Reinforcing Steel.
- H. AWS D12.1 - Welding Reinforcement Steel, Metal Inserts and Connections in Reinforced Concrete Construction.
- I. CRSI - Concrete Reinforcing Steel Institute - Manual of Practice.
- J. CRSI 63 - Recommended Practice For Placing Reinforcing Bars.
- K. CRSI 65 - Recommended Practice For Placing Bar Supports, Specifications and Nomenclature.
- L. IBC - International Building Code.
- M. Structural General Notes on Structural Drawings.

1.02 SUBMITTALS

- A. Section 01 33 00 - Submittals: Procedures for submittals.
- B. Shop Drawings: Indicate bar sizes, spacing, locations, and quantities of reinforcing steel and wire fabric, bending and cutting schedules, supporting, and spacing devices and other arrangements and assemblies as required for fabrication and placement of reinforcement for all cast-in-place concrete work.

1.03 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of references listed in Paragraph 1.01 (above), except where more stringent requirements are shown or specified. Refer also to Structural General Notes on Structural Drawings.

1.04 REGULATORY REQUIREMENTS

- A. Conform to International Building Code and Local Building Department requirements for testing, inspection, etc. during construction.

1.05 **ALTERNATES**

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

PART 2 - PRODUCTS

2.01 **REINFORCEMENT**

- A. Reinforcing Steel: Refer to Structural General Notes on Structural Drawings.
 - 1. Welded Steel Wire Fabric: Refer to Structural General Notes on Structural Drawings.

2.02 **ACCESSORIES**

- A. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions including load bearing pad on bottom to prevent vapor barrier puncture.
- B. Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather Exposed Concrete Surfaces: Plastic coated steel type; size, and shape as required.

2.03 **FABRICATION**

- A. Fabricate concrete reinforcing in accordance with CRSI Manual of Practice.
- B. Detail and fabricate in accordance to ACI 315 and ACI 318.
- C. Fabrication: Conform with CRSI. Provide all bars in longest lengths available or required; conform to sizes, shapes, and dimensions shown on Structural Drawings.

PART 3 - EXECUTION

3.01 **PLACEMENT (REINFORCING STEEL)**

- A. Place in accordance with CRSI. Place, support and secure reinforcement against displacement. Do not deviate from required position.
- B. Place in accordance to ACI 315 and ACI 318.
- C. Do not displace or damage vapor barrier.
- D. Accommodate placement of formed openings.
- E. Unless shown otherwise, maintain minimum 3/4-inch space between all formwork and reinforcement, tie wires, etc.
- F. Provide concrete cover over reinforcement as follows, unless noted otherwise:
 - 1. Concrete cast against Earth: 3 inches.

SECTION 03 20 00
CONCRETE REINFORCING

- | | | |
|----|---|---------------|
| 2. | Concrete exposed to Weather or Earth: | 2 inches. |
| 3. | Ties on Beams and Columns: | 1-1/2 inches. |
| 4. | Walls and Slabs not exposed to Weather: | 3/4 inch. |

END OF SECTION

**SECTION 03 30 00
CAST-IN-PLACE CONCRETE**

PART 1 - GENERAL

1.01 REFERENCES

- A. ACI 117 – Tolerances for Concrete Construction and Materials
- B. ACI 301 – Structural Concrete for Buildings.
- C. ACI 302 – Guide for Concrete Floor and Slab Construction.
- D. ACI 303R – Guide to Cast-In-Place Architectural Concrete Practice.
- E. ACI 304 – Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete.
- F. ACI 305R – Hot Weather Concreting.
- G. ACI 306R – Cold Weather Concreting.
- H. ACI 308 – Standard Practice for Curing Concrete.
- I. ACI 315 – Details and Detailing of Concrete Reinforcement.
- J. ACI 318 – Building Code Requirements for Structural Concrete.
- K. ASTM C 309 – Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
- L. ASTM C 805/C 805M – Standard Test Method for Rebound Number of Hardened Concrete.
- M. ASTM C 1315 – Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete
- N. ASTM E 1155 – Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers
- O. ASTM E 1643 – Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs
- P. ASTM E 1745 – Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs
- Q. ASTM D 2047 – Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine.
- R. ASTM D 4060 – Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abrader.
- S. IBC – International Building Code.
- T. Structural General Notes on Drawings.

1.02 REGULATORY REQUIREMENTS

- A. Conform to International Building Code and local Building Department requirements for testing, inspection, etc. during construction.

1.03 TESTS

- A. Testing and analysis of concrete will be performed under provisions of Section 01 45 00.
- B. Provide copy of concrete mix design submittal for each class of concrete to Testing Lab ten (10) days prior to commencement of work.

1.04 SUBGRADE APPROVAL

- A. Subgrade Approval: Do not proceed with on-grade concrete placement over any subgrade condition until the Soils Engineer and testing lab have approved existing subgrade, structural backfill, and utility trench backfill.
- B. Coordination: Contractor shall contact and schedule review of subgrade with Soils Engineer and testing laboratory ten (10) days (minimum) prior to any on-grade concrete placement.

1.05 SUBMITTALS FOR REVIEW

- A. Substitutions: Under provisions of Section 01 60 00.
- B. Section 01 33 00 - Submittals: Procedures for submittals.
- C. Product Data: Provide data on joint devices, attachment accessories, cast in place floor drains, admixtures and finishes products.
- D. Shop drawings: Trench drain systems, Form liner walls and walls exposed to view.
- E. Mockup: Provide mockups for formed concrete surfaces exposed to public view and architectural concrete surfaces in accordance with ACI 301.

1.06 QUALITY ASSURANCE

- A. Quality Control: Conform to requirements of Section 01 45 00.
- B. Codes and Standards: Comply with provisions of references listed in Paragraph 1.01 (above), except where more stringent requirements are shown or specified. Refer also to Structural General Notes on Structural Drawings.
- C. Concrete and Formwork: Performed by company experienced for five (5) years (minimum) in construction of top quality, site cast concrete work, familiar with and capable of producing concrete work in accordance with referenced standards listed in Paragraph 1.01 (above) and these specifications and drawings.
- D. Densifier and Seale: Performed by applicator experienced for five (5) years (minimum), in application of liquid concrete floor hardeners of similar type to that specified.
 - 1. Approved by manufacturer.

- E. Architectural Concrete: Perform Work in accordance with ACI 301 and ACI 303R.

1.07 **ALTERNATES**

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

1.08 **COLORS**

- A. Colors are specified on the Colors and Materials Schedule on drawings.

PART 2 - PRODUCTS

2.01 **CONCRETE MATERIALS AND MIX**

- A. Concrete: Refer to Structural General Notes on Structural Drawings.

- B. Quality:

- 1. Concrete shall have the following minimum compressive strengths at twenty-eight (28) days. Concrete shall be proportioned within the following limits unless approved otherwise after submittal of a mix design.

<u>Minimum of psi @ 28 days</u>	<u>Minimum Cement Content/C.Y.**</u>	<u>Maximum Slump</u>
3000	564 lbs./C.Y.	3-1/2"

** Mixes utilizing less cement content may be approved upon submittal of compression test reports.

The minimum compressive strengths tabulated are the strength at twenty-eight (28) days for ordinary concrete, or the strength at seven (7) days for high-early strength concrete. For plant-mix concrete, a certificate showing proportions and the seven (7) day strength of the concrete mix being furnished shall be obtained from the supplier and furnished to the Engineer.

- 2. Concrete made with coarse aggregate of less than Washington State Department of Transportation standard "Grading No. 5" as described in Paragraph 9-01.1(3)C, shall have an extra 49 lbs. of cement added to the minimum indicated in the table above.
- 3. All classes of concrete may contain an appropriate amount of Fly Ash as a pozzolanic material. Concrete mix designs, including Fly Ash, shall be prepared by a certified laboratory and have the approval of the Engineer prior to use.

- C. Cement:

- 1. All cement shall be Portland cement conforming to ASTM Designation C150, Type I or Type II, and shall be the product of one (1) manufacturer.

- D. Aggregates:

- 1. Aggregates for standard Portland cement concrete shall conform to the quality requirements of the State of Washington Standard Specifications for Road, Bridge, and Municipal Construction.

- E. Water: Water used for mixing concrete shall conform to the quality requirements of Paragraph 9-25.1 of the Washington State Standards.

2.02 CONCRETE REINFORCING

- A. Concrete Reinforcing: Refer to Section 03 20 00 Concrete Reinforcing.

2.03 EXTERIOR CONCRETE PAVING

- B. Exterior Concrete Paving: Refer to Section 32 13 13 Exterior Concrete Paving.

2.04 ADMIXTURES

- A. Admixtures: Only upon Structural Engineer's approval.
- B. Air Entertainment Admixture: ASTM C260 at all exterior concrete.
- C. Integral Color Admixture: Solomon Colors Inc. Colorflo Liquid Color.

2.05 ACCESSORIES

- A. Bonding Agent: 100% acrylic emulsion; "Acrylic Bond" manufactured by the Meadow Burke or approved. Use for all plug or patch work on cured concrete to increase bond strength.
- B. Non-Shrink Grout (Non-Structural): Premixed compound consisting of non-metallic aggregate, cement, water reducing, and plasticizing agents, capable of 4500 PSI at seven (7) days.
- C. Non-Shrink Grout (Structural): See Structural General Notes on Structural Drawings.

2.06 JOINT DEVICES AND FILLER MATERIALS

- A. Joints: Refer to Structural General Notes and Details on Structural Drawings.
- B. Joint Filler: ASTM D994; asphalt impregnated fiberboard or felt, 1/4 inch thick; full depth of slab.
- C. Waterstops:
 - 1. PVC (Polyvinylchloride) Waterstops: Greenstreak, Inc. Provide manufacturer's fabricated transitions and intersections. Field weld splices.
 - a) Movement Joints: Flat Ribbed Centerbulb type. Minimum 6 inch wide, minimum 1/4 inch thickness; select size, profile and type appropriate for condition, head pressure requirement and to accommodate expected joint movement.
 - 1. Install at contraction joints, expansion joints and isolation joints.
 - b) Non-Moving Joints: Flat Ribbed type. Minimum 6 inch wide, minimum 1/4 inch thickness; select size, profile and type appropriate for condition and head pressure requirements.

2.07 VAPOR BARRIER

A. Materials:

1. Vapor barrier shall exceed all of the following performance criteria:
 - a. Permeance: Less than 0.01 Perms [grains/(ft² · hr · inHg)] as tested in accordance with ASTM E 1745 Section 7.
 - b. Other performance criteria:
 - 1) Strength: ASTM E 1745 Class A.
 - 2) Puncture Resistance: ASTM D 1709.
 - 3) Tensile Strength: ASTM D 882.
 - 4) Thickness: 15 mils minimum.
2. Vapor Barrier: Basis of Design: Stego Wrap 15-mil Vapor Barrier.
Manufacturer: Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.

B. Accessories: Provide all manufacturer's accessories for complete installation including:

1. Seam Tape: Stego Tape by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.
2. Vapor-proofing mastic: Stego Mastic by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.

2.08 CURING MATERIALS

- A. Water: Clean and drinkable.
- B. Curing Membrane: White 4 mil polyethylene film or a combination sheet plastic and paper, 20 ft minimum roll width.
- C. Concrete Curing Compound: A transparent curing, sealing, and dust proofing compound for interior and exterior concrete.
 1. No oils, saponifiable resins waxes or chlorinated rubbers.
 2. Coordinate work with 07 92 00 - Sealants.
 3. Apply to concrete as recommended by manufacturer's product data. Verify compatibility with flooring adhesives where floor covering is scheduled.
- D. Absorptive Mat: Burlap-polyethylene minimum 8 oz./sq yd., bonded to prevent separation during use.

2.09 CONCRETE DENSIFIERS AND SEALER

A. Manufacturers:

Standard Cast in Place:

1. W.R. Meadows, Inc.: VOCOMP-20.
2. Dayton Superior: Cure & Seal 1315 J22WB.
3. BASF Corporation: MasterKure CC 200 WB.
4. OR approved.

Building A – Operations Building:

5. Basis of Design: Sika USA, Scofield. Formula One Polished Concrete System
6. W. R. Meadows, Inc. Polished Concrete Flooring, Induroshine system with Liqui-Hard Concrete Densifier and Chemical Hardener

Building B – Fleet Maintenance:

7. Basis of Design: Nox-Crete Product Group, Duro-Nox
- B. Sealers shall be non-yellowing, clear, penetrating, non-flammable, odorless, low VOC, water-based conforming to ASTM C309, Type 1, Class B. Acrylic polymer minimum 20% solids by resins weight.

2.10 ARCHITECTURAL POLISHED CONCRETE

- A. Architectural Polished Concrete: Refer to Section 03 35 20.

2.11 ARCHITECTURAL FORMLINER CONCRETE FINISH

- A. Concrete Forming, Refer to Section 03 11 00.

2.12 TRENCH DRAINS

- A. Manufacturer: Basis of Design: Wade Hydroflow cast in place Trench Drain system, Slope floor to drain at 1/4-inch per foot. Set grate flush with adjacent concrete floor surface.
- B. Wash Bay Drain: (12 inch wide) - Wade Hydroflow 2940SS-VB-SBS (SBS is the only Class C SS grate with an H-20 rating). 4-inch diameter no-hub connection out of the end plate of the trench drain (Suffix Option – S04).
- C. Rolling Service Doors:(6 inch wide) – Wade Hydroflow 2930CS-VB-HDG (HDG is Class C rated with a galvanized finish, the drain body is HDPE material). 4-inch bottom no-hub connection (Suffix Option – 4NH).

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify site conditions under provisions of Section 01 31 00.
- B. Verify requirements for concrete cover over reinforcement.

- C. Verify that anchors, seats, plates, reinforcement, and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.

3.02 PREPARATION

- A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.
- B. In locations where new concrete is dowelled to existing work, drill holes in existing concrete, insert steel dowels, and pack solid with non-shrink grout or epoxy.
- C. Coordinate the placement of joint devices with erection of concrete formwork and placement of form accessories.
- D. Vapor Retarder: Place vapor retarder in accordance with manufacturer's recommendations and ASTM E 1643. Ensure all penetrations and seams are sealed and defects repaired.
- E. Responsibility: Contractor is responsible for correcting at his own expense, any moisture related floor-coating failures due to improper installation and protection of vapor barrier.
- F. Embedded Items:
 - 1. No aluminum items shall be embedded in any concrete.
 - 2. All embed plates shall be securely fastened in place.
 - 3. All embedded steel items exposed to earth shall be galvanized.
 - 4. All embedded steel items exposed to weather shall be painted unless noted as galvanized.
 - 5. Embedded conduit is not permitted in concrete slabs on metal deck unless specifically noted on the structural drawings.
 - 6. Embedded flexible conduit is permitted in other cast in place concrete slabs with a thickness greater or equal to 5-1/2 inches. Where permitted it may be placed on top of the bottom mat of reinforcing. The outside diameter of the conduit shall not be greater than 1-inch. A minimum of 2-inches clear shall be provided between conduit and parallel reinforcing. Space conduits a minimum of 12-inches apart, where this is not possible notify engineer for additional reinforcing requirements.
 - 7. Embedded Trench drain system, set flush with adjacent finished floor.
- G. Waterstops: Install waterstops in accordance with manufacturer's instructions and recommendations for continuous watertight installation. Install waterstops at construction joint, contraction joint, expansion joint and isolation joint locations; at below grade concrete structures (walls, slabs, footings, columns), below grade foundations (walls, slabs, footings, columns), concrete retaining walls, concrete structures where liquids are to be contained or controlled (vaults, storage tanks) and at locations indicated on Contract Documents.
 - 1. Prime concrete surfaces and provide minimum 2" concrete cover for Swellstop waterstops. Butt ends of waterstop tightly without lapping. Protect waterstop from moisture, dirt, oil and sunlight during the progress of the work. Remove release paper immediately prior to concrete placement. Inspect waterstop for premature swelling discontinuity and debris contamination prior to concrete pour and replace unacceptable waterstop. Do not disturb or displace waterstop during concrete

placement and vibration.

3.03 NOTIFICATION PRIOR TO PLACING CONCRETE

- A. Notify Architect/Engineer minimum twenty-four (24) hours prior to commencement of concreting operations.
- B. Notify Owner's testing lab prior to concrete placement and coordinate their field inspections.
- C. Notify Building Department in accordance with their requirements prior to concrete placement.

3.04 PLACING CONCRETE

- A. Place concrete in conformance with ACI 304. Conform to ACI 305R for hot weather concreting and ACI 306R for cold weather concreting. Conform to ACI 303R for Architectural concreting.
- B. Notify Architect/Engineer minimum twenty-four (24) hours prior to commencement of operations.
- C. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints, are not distributed during concrete placement.
- D. Install vapor barrier under interior slabs on grade. Lap joints minimum 6 inch and seal watertight by taping edges and ends.
- E. Repair vapor barrier damaged during placement of concrete reinforcing. Repair with vapor retarder material; lap over damaged areas minimum 6 inch and seal watertight.
- F. Separate slabs on grade from vertical surfaces with thick joint filler.
- G. Place joint filler in pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.
- H. Extend joint filler from bottom of slab to within 1/8 inch of finished slab surface.
- I. Install joint devices in accordance with manufacturer's instructions.
- J. Install construction joint devices in coordination with pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.
- K. Install joint device anchors. Maintain correct position to allow joint cover to be flush with floor and wall finish.
- L. Install joint covers in longest practical length when adjacent construction activity is complete.
- M. Place concrete continuously between predetermined expansion, control, and construction joints.
- N. Do not interrupt successive placement; do not permit cold joints to occur.
- O. Place floor slabs in pattern indicated on drawings.
- P. Saw cut joints within twenty-four (24) hours after placing. Use 3/16-inch-thick blade, cut into 1/4 depth of slab thickness.

3.05 **CONCRETE FINISHING**

A. Unformed Surfaces

1. Finish concrete floor surfaces in accordance with ACI 301.
2. Wood float surfaces that will receive tile flooring with full bed setting system.
3. Steel trowel surfaces that will receive carpeting, resilient flooring, seamless flooring, or thin set quarry tile.
4. Steel trowel surfaces that are scheduled to be exposed.
5. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains.

B. Formed Surfaces

1. Tolerances: Tolerances in accordance with ACI 117 and as indicated.
2. As-Cast Rough Form: Provide for surfaces not exposed to public view a surface finish SF-1.0. Patch holes and defects in accordance with ACI 301.
3. Standard Smooth Finish: Provide for surfaces exposed to public view a surface finish SF-3.0. Patch holes and defects in accordance with ACI 301.
4. Smooth Rubbed Finish: Provide a smooth-rubbed finish per ACI 301 Section 5

C. Architectural Concrete Finishes

1. Concrete finishes shall conform to the approved finishes. Finishing shall be accomplished at the time of concrete placement or immediately after formwork removal, as follows:
 - a. Smooth finish: (1) As cast using flat smooth nonporous forms. (2) As cast using textured form liners.
 - b. Textured finish: (1) Textured form liners applied to inside of forms.

3.08 **TOLERANCES**

A. Floor slab surfaces shall be finished to meet floor surface classification of "flat" in accordance with ACI 117, the floor surface classifications listed below. Floor levelness testing is not required for sloped slabs.

1. Floor flatness shall be tested in accordance with ACI 117, using the manual straight-edge method to meet the following requirements:
 - a. Provide "Conventional" Surface Flatness for exposed concrete floors (non-public areas, mechanical rooms, under raised pedestal computer flooring, under thick-set tile: $\frac{1}{2}$ inch max. gap 90%, $\frac{3}{4}$ inch max. gap 100%.

- b. Provide "Moderately Flat" Surface Flatness under carpeting and for industrial floors with low-speed vehicular traffic): 3/8-inch max. gap 90%, 5/8 inch max. gap 100%.
 - c. Provide "Flat" Surface Flatness under resilient flooring and thin-set tile, and for exposed concrete in public areas: 1/4-inch max. gap 90%, 3/8-inch max. gap 100%.
- B. Finished Floor Slab: Surfaces that do not meet the required tolerance shall be corrected by localized grinding of high spots or by a concrete topping / cementitious underlayment to fill low areas.

3.09 CURING AND PROTECTION

- A. Cure floor surfaces in accordance with ACI 308.
- B. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- C. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
- D. Spraying: Spray water over floor slab areas and maintain wet for seven (7) days.

3.10 CONCRETE DENSIFIERS AND SEALER

- A. Prior to installation of sealer, check and repair any defects in the slab surface. Grind high spots and cut out and re-pour low spots.
- B. Install specified sealer in strict compliance with manufacturer's specifications. Contractor to dispose of all waste materials resulting from sealer application in accordance with applicable regulations.
- C. Install clear sealer at interior concrete floor slabs. exposed interior vertical concrete surfaces] and exposed exterior vertical concrete surfaces.

3.11 VAPOR BARRIER

- A. Preparation: Ensure that base material is approved by Architect or Geotechnical Engineer.
 - 1. Level and compact base material.
- B. Installation: Install vapor barrier in accordance with manufacturer's instructions and ASTM E 1643.
 - 1. Unroll vapor barrier with the longest dimension parallel with the direction of the concrete placement.
 - 2. Lap vapor barrier over footings and/or seal to foundation walls.
 - 3. Overlap joints 6 inches and seal with manufacturer's tape.
 - 4. Seal all penetrations (including pipes) per manufacturer's instructions.
 - 5. No penetration of the vapor barrier is allowed except for reinforcing steel and

permanent utilities.

6. Repair damaged areas by cutting patches of vapor barrier, overlapping damaged area 6 inches and taping all sides with tape.

3.12 PATCHING

- A. Allow Architect/Engineer to inspect concrete surfaces immediately upon removal of forms.
- B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Architect/Engineer upon discovery.
- C. Patch imperfections in accordance with ACI 301 and ACI 303R.

3.13 DEFECTIVE CONCRETE

- A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
- B. Repair or replacement of defective concrete will be determined by the Architect/Engineer.
- C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect/Engineer for each individual area.
 1. Architectural Concrete: Replace defective exposed architectural concrete as directed by the Architect.

3.14 PROTECTION

- A. Protect all concrete from mechanical damage or contamination by any substance which would adversely affect the strength, integrity, appearance, usefulness or successful performance of coatings, finishes, or floor coverings applied to the concrete.
- B. Contractor is solely responsible for the means and methods employed to afford this protection.

END OF SECTION

SECTION 03 35 20
ARCHITECTURAL POLISHED CONCRETE
(DIAMOND POLISHING SYSTEMS)

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Dye stained finishing of exposed concrete slab-on-grade. Grinding and polishing concrete floor slab surfaces.
- B. Surface treatment with penetrating liquid dye, densifier and finishing system.
- C. Where indicated on drawings as “Architectural Polished Concrete”; provide surface treatment for exposed colored and polished concrete slabs.

1.02 REFERENCES

- A. ACI 301 – Structural Concrete for Buildings.
- B. ACI 302 – Guide for Concrete Floor and Slab Construction.
- C. ACI 303R – Guide to Cast-In-Place Architectural Concrete Practice.
- D. ACI 310 - Specifications for Polished Concrete Slab Finishes.
- E. ASTM D 523 – Standard Test Method for Specular Gloss
- F. ASTM E1155 – Determining Floor Flatness and Levelness Using the F-Number System (Inch-Pound Units).

1.03 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Product Data: Provide data on penetrating liquid dye, densifier and finishing treatment, compatibilities, and limitations.
- C. Submit installation instructions for placing concrete, treatment and finishing of exposed architectural polished concrete floors.
- D. Samples: Submit quart sized sample container of aggregate for Architect approval.

1.04 MAINTENANCE DATA

- A. Submit under provisions of Section 01 77 00.
- B. Maintenance Data: Provide data on maintenance renewal of applied finishing coating.

1.05 QUALITY ASSURANCE

- A. Perform work in accordance with ACI 301, ACI 302 and ACI 303R.
- B. Approved Floor Finishers:

1. Diamond Polishing Systems. Puyallup, WA. Phone: (253) 770-0508.
2. Substitutions: "Or Equal". Under provisions of Section 01 60 00.

1.06 MOCKUP

- A. Provide mockup for architectural polished concrete slab under provisions of Section 01 45 00.
- B. Construct mockup area under conditions similar to those that will exist during actual placing, 8 ft x 8 ft area; including applied coatings, surface treatments and floor finishing.
 1. Allow for two (2) mockups; if first mockup is not approved by Owner and Architect; construct a second mockup as directed by Architect addressing mockup review comments.
- C. Locate where directed by General Contractor, Owner and Architect.
- D. Mockups may not remain as part of the Work.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store, protect, and handle products to site under provisions of Section 01 60 00.
- B. Deliver materials in manufacturer's packaging including application instructions.

1.08 ENVIRONMENTAL REQUIREMENTS

- A. Temporary Lighting: Minimum 200 W light source, placed 8 ft above the floor surface, for each 425 sq. ft of floor being finished.
- B. Temporary Heat: Ambient temperature of 60 degrees F minimum.
- C. Ventilation: Sufficient to prevent injurious gases from temporary heat or other sources affecting concrete.

1.09 COORDINATION

- A. Coordinate work under provisions of Section 01 31 00.
- B. Coordinate the work with concrete floor placement and concrete floor curing.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design: Sika USA, Scofield. Formula One Polished Concrete System.
- B. W. R., Meadows, Induroshine Polished Concrete floor system.
- C. AmeriPolish. Architectural Concrete Products.
- D. Prosoco. Concrete floor finishing.
- E. Substitutions: "Or Equal". Under provisions of Section 01 60 00.

2.02 TREATMENT

- A. Penetrating Liquid Dye: Formula One Liquid Dye Concentrate.
 - 1. Color as specified in Colors and Materials Schedule.
- B. Densifier: Formula One Lithium Densifier MP.
- C. Specialty Finish: Formula One Guard-S Concentrate.
- D. Substitutions: "Or Equal". Under provisions of Section 01 60 00.

2.03 CONCRETE MIX DESIGN RECOMMENDATIONS

- A. Target Sump: 4 inches.
- B. Fly Ash: 5% maximum.
- C. Target Water Cement Ratio: 0.50.
- D. Slab Fiber Reinforcement: Not permitted.
- E. Slab Reinforcing Steel: Refer to Structural Drawings General Notes.

2.04 MATERIALS

- A. Joint Filler Material: Spal-Pro RS 88, Polyurea joint filler; manufactured by Spal-Pro. Color to match colored concrete slab.
- B. Substitutions: "Or Equal". Under provisions of Section 01 60 00.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Verify site conditions under provisions of Section 01 31 00.
- B. Verify that floor surfaces are acceptable to receive the work of this Section.

3.02 FLOOR FINISHING

- A. Finish concrete floor surfaces in accordance with ACI 301 and ACI 302.
- B. Steel trowel surfaces that are scheduled to be exposed.
- C. Grind the concrete floor with metal bond diamonds removing construction debris until the specified Grade is obtained. The first cut must be performed with metal bond diamond.
- D. After the 400 grit resin bond diamond has been used apply liquid dye and liquid densifier according to the manufacturer's current literature. Allow 12 hours to cure before continuing.
- E. After the polishing process has been completed apply protection guard finish material according to the product manufacturer's current technical bulletin. Allow to cure 2-4 hours.

- F. Use a high-speed burnishing machine and diamond impregnated pads, burnish the surface to the desired gloss level.
- G. Finish honing and polishing the floor to desired Class.
- H. Slab Exposure: Grade III – Full Aggregate Exposure.
- I. Slab Reflectivity: Class II – Medium Reflectivity. 800 Resin Finish.

3.03 FLOOR SURFACE TREATMENT

- A. Apply Formula One Liquid Dye Concentrate in accordance with manufacturer's instructions as scheduled on floor surfaces.
- B. Apply Formula One Lithium Densifier MP in accordance with manufacturer's instructions as scheduled on floor surfaces.
- C. Apply Formula One Guard-S Concentrate in accordance with manufacturer's instructions as scheduled on floor surfaces.
- D. Install polyurea joint filler material at control joints in accordance with manufacturer's instructions.

3.04 TOLERANCES

- A. Surface Flatness for Exposed Concrete Floors: Ff=30.
- B. Surface Levelness for Exposed Concrete Floors: Fl=20.

3.05 PROTECTION

- A. The General Contractor is responsible for using temporary floor protection throughout the project to safeguard the surface quality of concrete slabs before and after application of decorative finishes.
- B. Temporary Floor Protection will be Proguard Duracover as manufactured by Sika USA, Scofield. Seaming of the temporary floor protection will be performed with Scofield Proguard Heavy Duty Seaming Tape. Do not apply the heavy-duty tape to bare or finished floors or wall surfaces at any time. It will permanently damage the floor.

END OF SECTION

**SECTION 03 41 00
PRECAST CONCRETE**

PART 1 - GENERAL

1.01 REFERENCES

- A. ACI 301 Structural Concrete for Buildings.
- B. ACI 315 – Details and Detailing of Concrete Reinforcement.
- C. ACI 318 Building Code Requirements for Structural Concrete.
- D. ASTM A497 - Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete
- E. ASTM A615 - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
- F. ASTM A706 - Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement
- G. ASTM C33 – Concrete Aggregates.
- H. ASTM C150 – Portland Cement.
- I. ASTM C260 – Air-Entraining Admixtures for Concrete.
- J. PCI MNL-117 – Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products.
- K. PCI MNL-122 – Architectural Precast Concrete.

1.02 SUBMITTALS FOR REVIEW

- A. Section 01 33 00 - Submittals: Procedures for submittals.
- B. Shop Drawings: Indicate profiles, sizes, anchorage.
- C. Sample for color and finish.

1.03 QUALITY ASSURANCE

- A. Perform work in accordance with PCI MNL-117 and PCI MNL-122.
- B. Fabricator: Company specializing in performing the work of this Section with minimum five (5) years documented experience.
- C. Provide precast concrete units and connections capable of withstanding design loads associated with its use.

1.04 DELIVERY, STORAGE, AND PROTECTION

- A. Section 01 60 00 – Product Requirements: Transport, handle, store, and protect products.

1.05 **COLORS**

- A. Natural concrete.

PART 2 – PRODUCTS

2.01 **ECOLOGY BLOCK, WHEEL STOPS AND BULK MATERIAL BUNKER WALL SYSTEM.**

- A. Bulk Material Bunker Wall System: **(Bid Alternate A1-1)**
 - 1. Basis of Design; Hanson, Hanson Salt & Sand Storage System, 10 ft. tall wall. Panel height. Provide Bidder design system including structural design as required by local jurisdiction base on product submitted.
- B. Ecology Block: **(Bid Alternate A1-2)**
 - 1. Basis of Design; Oldcastle Infrastructure, Ecology Block, 6 ft. x 2 ft. x 2 ft. and half blocks.
- C. Wheel Stops, Basis of Design:
 - 1. Basis of Design, Oldcastle Infrastructure, Bumper Curb-Parking Stop 6 ft. Length.

2.02 **MANUFACTURERS**

- A. Oldcastle Infrastructure
- B. Salmon Bay Sand & Gavel
- C. Ultrablock Walls
- D. Jensen Precast
- E. Concrete Technology Coporation
- F. Puget Sound Precast
- G. Hanson Silo Company
- H. Wieser Concrete
- I. Keyston Concrete Products
- J. Substitution: Under provisions of Section 01 60 00.

2.03 **MATERIALS**

- A. Cement: ASTM C150 Type IA – Air Entraining, Portland type.
- B. Concrete Materials: ASTM C33, water and sand.
- C. Air Entrainment Admixture: ASTM C260.

2.04 **MIX**

- A. Concrete: Minimum 5000 psi, twenty-eight (28) day strength, air entrained to 5 to 7 percent in accordance with ACI 301.

2.05 FABRICATION

- A. Fabricate in accordance with PCI MNL-117.
- B. Maintain plant records and quality control program during production of precast units. Make records available upon request.
- C. Use rigid molds, constructed to maintain precast unit uniform in shape, size, and finish.
- D. Cure units to develop concrete quality, and to minimize appearance blemishes such as non-uniformity, staining, or surface cracking.
- E. Minor patching in plant is acceptable, providing structural adequacy and appearance of units is not impaired.

2.06 FINISH – PRECAST UNITS

- A. Ensure exposed-to-view finish surfaces of precast units are uniform in color and appearance.

2.07 FABRICATION TOLERANCES

- A. Maximum Out of Square: 1/8 in. in 10 ft, non-cumulative.
- B. Variation From Dimensions Indicated on Drawings: Plus or minus 1/8 in.
- C. Maximum Bowing of Units: Length of bow/360.

2.08 SOURCE QUALITY CONTROL AND TESTS

- A. Provide testing and analysis of concrete mix.

PART 3 - EXECUTION

3.01 ERECTION

- A. Erect units without damage to shape or finish. Replace or repair damaged panels.
- B. Erect units level and plumb within allowable tolerances.
- C. Align and maintain uniform horizontal and vertical joints as erection progresses.

3.02 ERECTION TOLERANCES

- A. Maximum Variation from Plane of Location: 1/4 in. in 10 ft, non-cumulative.

END OF SECTION

**SECTION 03 45 00
PRECAST ARCHITECTURAL CONCRETE**

PART 1 - GENERAL

1.01 REFERENCES

- A. ASTM C33 – Concrete Aggregates.
- B. ASTM C150 – Portland Cement.
- C. ASTM C260 – Air-Entraining Admixtures for Concrete.
- D. PCI MNL-117 – Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products.
- E. PCI MNL-122 – Architectural Precast Concrete.

1.02 SUBMITTALS FOR REVIEW

- A. Section 01 33 00 - Submittals: Procedures for submittals.
- B. Samples: Submit two (2) samples illustrating surface finish, color, and texture.
- C. Shop Drawings: Indicate profiles, sizes, anchorage.

1.03 QUALITY ASSURANCE

- A. Perform work in accordance with PCI MNL-117 and PCI MNL-122.
- B. Fabricator: Company specializing in performing the work of this Section with minimum five (5) years documented experience.

1.04 DELIVERY, STORAGE, AND PROTECTION

- A. Section 01 60 00 – Product Requirements: Transport, handle, store, and protect products.
- B. Protect units to prevent staining, chipping, or spalling of concrete.

1.05 COLORS

- A. Colors are specified on the Colors and Materials Schedule on drawings.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Cement: ASTM C150 Type IA – Air Entraining, Portland type.
- B. Concrete Materials: ASTM C33, water and sand.
- C. Air Entrainment Admixture: ASTM C260.

2.02 MIX

- A. Concrete: Minimum 5000 psi, twenty-eight (28) day strength, air entrained to 5 to 7 percent in accordance with ACI 301.

2.03 FABRICATION

- A. Fabricate in accordance with PCI MNL-117.
- B. Maintain plant records and quality control program during production of precast units. Make records available upon request.
- C. Use rigid molds, constructed to maintain precast unit uniform in shape, size, and finish.
- D. Cure units to develop concrete quality, and to minimize appearance blemishes such as non-uniformity, staining, or surface cracking.
- E. Minor patching in plant is acceptable, providing structural adequacy and appearance of units is not impaired.

2.04 FINISH – PRECAST UNITS

- A. Ensure exposed-to-view finish surfaces of precast units are uniform in color and appearance.

2.05 FABRICATION TOLERANCES

- A. Maximum Out of Square: 1/8 in. in 10 ft, non-cumulative.
- B. Variation From Dimensions Indicated on Drawings: Plus or minus 1/8 in.
- C. Maximum Bowing of Units: Length of bow/360.

2.06 SOURCE QUALITY CONTROL AND TESTS

- A. Provide testing and analysis of concrete mix.

PART 3 - EXECUTION

3.01 ERECTION

- A. Erect units without damage to shape or finish. Replace or repair damaged panels.
- B. Erect units level and plumb within allowable tolerances.
- C. Align and maintain uniform horizontal and vertical joints as erection progresses.

3.02 ERECTION TOLERANCES

- A. Maximum Variation from Plane of Location: 1/4 in. in 10 ft, non-cumulative.

END OF SECTION

**SECTION 04 05 10
MASONRY MORTARING AND GROUTING**

PART 1 - GENERAL

1.01 REFERENCES

- A. ASTM C5 - Quicklime for Structural Purposes.
- B. ASTM C94 - Ready-Mixed Concrete.
- C. ASTM C144 - Aggregate for Masonry Mortar.
- D. ASTM C150 - Portland Cement.
- E. ASTM C207 - Hydrated Lime for Masonry Purposes.
- F. ASTM C270 - Mortar for Unit Masonry.
- G. ASTM C387 - Packaged, Dry, Combined Materials for Mortar and Concrete.
- H. ASTM C476 - Grout for Reinforced and Non-Reinforced Masonry.
- I. The National Masonry Systems Guide (Northwest Edition), Masonry Institute of Washington, Seattle, Washington (206) 582-5072.
- J. Structural General Notes on Structural Drawings.

1.02 TESTS

- A. Testing of mortar and grout will be performed under provisions of Section 01 45 00.

1.03 SUBMITTALS

- A. Submit product data under provisions of Section 01 33 00.
- B. Include mortar and grout design mix and admixtures.

1.04 ENVIRONMENTAL REQUIREMENTS

- A. Conform to recommendations of Masonry Systems Guide during cold, hot, or wet weather.

1.05 ALTERNATES

- A. See Section 01 23 00 for bidding alternates affecting work of this Section.

1.06 COLORS

- A. Colors are specified on the Colors and Materials Schedule on drawings.

PART 2 - PRODUCTS

2.01 MORTAR AND GROUT MIXES

- A. General:
 - 1. Refer to Structural General Notes on Structural Drawings.
 - 2. Do not add admixtures, including color pigments, air-entraining agents, accelerators, retarders, water repellent agents, anti-freeze compounds, or other admixtures unless otherwise indicated.
 - 3. Do not use calcium chloride in mortar or grout.
- B. Mortar for Unit Masonry: Comply with ASTM C270, Type S.
 - 1. Add water repellent agent to mortar: Dry-Block™ mortar admixture by GCP Applied Technologies (W.R. Grace).
- C. Mortar Color Pigment: Solomon Colors Inc. SGS H series color units. Iron oxide pigments for Portland cement and Lime mortar mixtures.
- D. Grout for Unit Masonry and Architectural Precast: Comply with ASTM C476 for grout for use in construction of reinforced and non-reinforced unit masonry.
- E. Mixing: Combine and thoroughly mix cement, water, and aggregates in a mechanical batch mixer; comply with referenced ASTM standards for mixing time and water content.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Mortar and grout installation is specified in Section 04 20 00.
- B. Work grout into cores and cavities to eliminate voids.
- C. Do not displace reinforcing steel or anchors when placing grout.
- D. Clean concrete grout spaces of excess mortar and debris.

END OF SECTION

**SECTION 04 20 00
UNIT MASONRY**

PART 1 - GENERAL

1.01 REFERENCES

- A. ACI 315 - Standard Practice for Detailing Reinforced Concrete Structures.
- B. ASTM C90 - Hollow Load-Bearing Concrete Masonry Units.
- C. MIW - Masonry Institute of Washington - Northwest Masonry Guide.
- D. IBC - International Building Code.
- E. CRSI - Concrete Reinforcing Steel Institute - Manual of Standard Practice.
- F. Structural General Notes on Structural Drawings.

1.02 SUBMITTALS

- A. Submit product data and shop drawings under provisions of Section 01 33 00.
- B. Submit product data on CMU and wall ties.
- C. Indicate bar sizes, spacings, locations, and quantities of reinforcing steel, bending and cutting schedules, and supporting and spacing devices.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to jobsite on palates with weatherproof covering.
- B. Store masonry units on palates that allow air circulation under stacked unit.
- C. Cover and protect against wetting and weather prior to use.

1.04 ENVIRONMENTAL REQUIREMENTS

- A. Conform to recommendations of MIW - Northwest Masonry Guide for Masonry Construction during cold, hot, or wet weather.

1.05 ALTERNATES

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

1.06 COLORS

- A. Colors are specified on the Colors and Materials Schedule on drawings.

PART 2 - PRODUCTS

2.01 **MANUFACTURERS - CONCRETE MASONRY UNITS**

- A. Concrete Masonry Units: Baselite Concrete Products, Mutual Materials
- B. Substitutions: Under provisions of Section 01 60 00.

2.02 **CONCRETE MASONRY UNITS (CMU)**

- A. General: Provide hollow concrete masonry units conforming to ASTM C90, Grade N, medium weight 50/50 (above-grade) and normal weight sand and gravel (below-grade). Linear shrinkage shall not exceed 0.065%. Provide both load bearing and non-load bearing (vener) units in sizes and locations shown on Drawings. Nominal modular face size of 8 in. x 16 in.
- B. Shapes: Provide shapes necessary to achieve the design shown on the Drawings and provide finish face at all conditions/surfaces exposed to view. Provide solid bottom lintels at head of openings in walls where exposed to view. Provide 8 in. corner returns on veneer corner block.
- C. Face Configuration: Provide both load bearing units and non-load bearing (vener) units with face configuration: smooth.
- D. Concrete masonry units shall incorporate GCP Applied Technologies (W.R. Grace) "Dry-Block" integral water repellent admixture.

2.03 **REINFORCEMENT**

- A. Reinforcing Steel: Refer to Structural General Notes on Structural Drawings.
- B. Reinforcing Steel Position Ties: 9 gauge galvanized steel, Dur-O-Wall or approved.

2.04 **MASONRY VENEER TIES AND JOINT REINFORCEMENT**

- A. Veneer Ties (Wood Frame Structure): Hohmann and Barnard, Inc. #345-BT flexible tie, byna-tie configuration (size as required to fit condition). Tie shall be hot-dipped galvanized. Provide #187 seismiclip connectors. Provide #12 x 2-1/2 in. long hot-dipped galvanized wood screw for attachment to wood studs.
- B. Veneer Ties (CMU Wall Structure): Hohmann and Barnard #BWT, box wall tie, 3/16 inch diameter hot-dipped galvanized wire. Provide #187 seismiclip connectors.
- C. Veneer Ties (Existing Masonry and Concrete Tilt-Up Walls): Hohmann and Barnard #363-BT hot-dipped galvanized anchor with #362-C continuous hot-dipped galvanized channel, both 14 gauge with 1/4 in. x 2-1/4 in. concrete anchors. Provide #187 seismiclip connectors.
- D. Joint Reinforcement: No. 9 gauge, continuous hot-dipped galvanized wire, Hohmann and Barnard, Inc. (or approved).

2.05 **CAVITY WALL RIGID INSULATION**

- A. 3-inch Insulated Metal Panel or approved. See Section 07 42 13 for Insulated Metal Wall Panels

2.06 **MASONRY FLASHING AND ACCESSORIES**

- A. Flashing: "Perm-A-Barrier Wall Flashing" as manufactured by GCP Applied Technologies (W.R. Grace). Flexible, self-sealing, self-healing 40 mil thick.

- B. Mortar Diverter: Mortar net drainage system by Mortar Net.
- C. Weep Vents: Mortar net weep vents by Mortar Net.

2.07 MORTAR

- A. Mortar mix shall incorporate GCP Applied Technologies (W.R. Grace) "Dry-Block" integral water repellent admixture.

2.08 MASONRY CLEANER AND WATER REPELLENT SEALER

- A. Cleaner: Type "V" as manufactured by Fabrikem or Sure-Klean "Vana Trol" as manufactured by ProSoCo, Inc.
- B. Water Repellent Sealer: Sure-Klean Weather Seal Siloxane PD, manufactured by ProSoCo, Inc. or Fabrishield 763, manufactured by Fabrikem
- C. Water Repellent Sealer: Product as specified in Section 09 91 00.

2.09 ACCESSORIES

- A. Control Joints: Extruded rubber material, ASTM D-2000 2AA-805. Model: RS series. Types: RS-12, RS-8 and RS Standard. Hohmann & Barnard Inc or equal.
 - 1. Install in accordance with manufacturer's installation instruction.
- B. Weep Holes: 3/8-inch O.D. x 4 inch long, round polyethylene plastic tubes, with both wick and screen insert. Stainless steel screen. Hohmann & Barnard, Inc. #341W/S.
- C. Mortar Trap: High-density polyethylene (HDPE) strands woven into 90% open mesh construction. Provide in thickness of 1-1/2 inch. Mortar trap provided in 10-inch-high x 4 feet long sections. Hohmann & Barnard, Inc. Mortar Trap.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Verify items provided by other Sections of work are properly sized and located.
- B. Establish lines, levels, and coursing. Protect from disturbance.
- C. Provide temporary bracing during erection of masonry work. Maintain in place until building structure provides permanent bracing.
- D. All concrete unit masonry exposed to view shall have undamaged faces, discard units with chipped or scratched faces.

3.02 VENEER TIE/JOINT REINFORCEMENT INSTALLATION

- A. Install one (1) veneer tie for every 2 sq ft of veneer wall, 24 in. o.c. maximum horizontal spacing. Align vertical spacing of ties to correspond with cavity wall insulation joints. Rigidly connect veneer to structural wall behind.
- B. Install continuous joint reinforcement in horizontal joints of veneer connected to veneer ties

with seismicclips.

- C. Conform to IBC Section 3006(d)1(i).

3.03 COURSING

- A. Place masonry to lines and levels indicated.
- B. Maintain masonry courses to uniform width. Make vertical and horizontal joints equal and of uniform thickness.
- C. Match existing CMU coursing adjacent.
- D. Lay concrete unit masonry in running bond.

3.04 PLACING AND BONDING

- A. Lay masonry in full bed of mortar, properly jointed with other work. Buttering corners of joints, and deep or excessive furrowing of mortar joints are not permitted.
- B. Fully bonded intersections and external and internal corners.
- C. Do not shift or tap masonry units after mortar has taken initial set. Where adjustment must be made, remove mortar and replace.
- D. Remove excess mortar; strike mortar flush with face of ribbed units to match appearance of existing masonry joints. (Wait until mortar is quite stiff to prevent mortar slumping in joint or any concave shape to joint.) Joints shall not have any "shelf" or crack which could collect water.
- E. Perform jobsite cutting with proper tools to provide straight unchipped edges. Take care to prevent breaking masonry unit corners or edges.
- F. Tool all mortar joints to compress mortar and provide consistent, uniform finish on mortar free of voids or irregularities.
- G. All masonry exposed to view shall have finish face (saw cuts or grouted cells not acceptable).
- H. Lay sound absorbing CMU in strict accordance with manufacturer's requirements in order to achieve published sound absorption coefficients.
- I. Construct control joints where shown on drawings and where recommended by MIW in accordance with MIW recommendations.

3.05 REINFORCEMENT

- A. See Structural Drawings.
- B. Place reinforcement in accordance with CRSI.
- C. Locate reinforcing splices at points of minimum stress. Review location of splices with Architect/Engineer.
- D. Place reinforcing bars supported and secured against displacement. Maintain position within 1/2 in. of true dimension. Use reinforcing steel position ties at top, bottom, and intervals in-between not exceeding 192 bar diameters in accordance with the IBC.

- E. Verify reinforcement is clean, free of scale, dirt, or other foreign coatings that would reduce bond to grout.

3.06 GROUTING

- A. Solid grout all CMU cells and void spaces containing reinforcing steel, embedded items, or thru-bolts; see Structural Drawings.
- B. Solid grout cells of all CMU below grade and the first full course of all CMU above grade.
- C. Solid grout all cells of integrally-colored CMU to receive a clear water repellent sealer. Cells of CMU to receive a paint finish may be ungrouted, unless grouting is otherwise required.
- D. Set anchor bolts and imbedded items required in fresh grout prior to initial set.

3.07 TOLERANCES

- A. Variation from Unit to Adjacent Unit: 1/32 inch maximum.
- B. Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- C. Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- D. Variation from Level Coursing: 1/8 inch in 3 ft; 1/4 inch in 10 ft; 1/2 inch maximum.
- E. Variation of Joint Thickness: 1/8 inch in 10 ft.

3.09 BUILT-IN WORK

- A. As work progresses, build-in metal doorframes, anchor bolts, plates, veneer support angles and other items to be built in the work supplied by other Sections.
- B. Build-in items plumb and level.
- C. Bed anchors of metal doorframes in mortar joints. Fill frame voids solid with mortar.
- D. Do not build-in organic materials subject to deterioration.
- E. Coordinate installation of sleeves for openings and conduit run in walls with those sections responsible.

3.10 CUTTING AND FITTING

- A. Cut CMU with masonry saw to accommodate work of other trades and to fit configuration and layout shown on Drawings. Coordinate with other Sections of work to provide correct size, shape, and location.
- B. Obtain approval prior to cutting or fitting any area not indicated or where appearance or strength of masonry work may be impaired.

3.11 WALL FLASHING

- A. Install continuous, unbroken masonry flashing in locations shown on Drawings and wherever recommended by MIW for weatherproof masonry construction including, but not limited to, at bottom of all masonry walls, and at the head of all openings, horizontal angles or floor slabs projecting into masonry wall.

- B. Lap all joints in flashing 6 inch minimum seal with lap sealant.
- C. Install weep holes 2 ft 0 in. on center maximum at all flashings to direct water to building exterior. Keep cavity clean to prevent debris blocking weep hole drainage.

3.12 CAVITY WALL RIGID INSULATION

- A. Install rigid insulation between veneer and structural back-up wall as shown on Drawings.
- B. Align insulation horizontal joints with veneer ties.
- C. Butt insulation metal panel joints tight, cut and notch to fit tight so that entire installation is free of voids or openings of any kind.
- D. Align face of insulation panels and secure to structural back-up wall if required to maintain alignment.

3.13 CAVITY SPACE

- A. Do not let mortar fall into cavity air space or plug weep holes; clean out promptly. [Provide mortar barrier through wall flashing to prevent mortar from plugging weep holes.
- B. Install weep holes in veneer at 32-inch o.c. horizontally above through-wall flashings.
- C. Install mortar trap continuous within cavity space. Provide and install mortar trap for full width of cavity space.
- D. Install accessories in accordance to manufacturer's installation instructions.

3.14 CLEANING AND REPAIR

- A. Fill all holes, chipped corners, or edges and defects on exposed faces of CMU with mortar.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with a solution that will not harm masonry or adjacent materials. Consult masonry manufacturer for acceptable cleaners.
- D. Use non-metallic tools in cleaning operations.
- E. Remove any visible mortar or grout from exposed faces of CMU.

3.15 PROTECTION

- A. Protect finished installation from damage and stains.
- B. Maintain protective boards at exposed external corners that may be damaged by construction activities.
- C. Provide protection without damaging completed work.
- D. At day's end, cover unfinished walls to prevent moisture infiltration.

END OF SECTION

**SECTION 05 12 00
STRUCTURAL STEEL FRAMING**

PART 1 - GENERAL

1.01 REFERENCES

- A. ANSI/AISC 303 Code of Standard Practice for Steel Buildings and Bridges – Section 10 Architecturally Exposed Structural Steel (AESS).
- B. ANSI/AISC 360 - Specification for Structural Steel Buildings.
- C. ASTM A36/A36M - Structural Steel.
- D. ASTM A53 - Hot-Dipped, Zinc-coated Welded and Seamless Steel Pipe.
- E. ASTM A108 - Steel Bars, Carbon, Cold-Finished, Standard Quality.
- F. ASTM A123 - Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.
- G. ASTM A307 - Carbon Steel Externally Threaded Standard Fasteners.
- H. ASTM A325 - High Strength Bolts for Structural Steel Joints.
- I. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.
- J. ASTM A501 - Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
- K. ASTM A780 – Repair of Damaged and Uncoated Areas of Hot Dip Galvanized Coatings.
- L. AWS A2.4 - Symbols for Welding, Brazing, and Nondestructive Examination.
- M. AWS D1.1 - Structural Welding Code.
- N. SSPC (Steel Structures Painting Council) - Painting Manual.
- O. UL - Fire Resistance Directory.
- P. Structural General Notes on Structural Drawings.

1.02 SUBMITTALS

- A. Section 01 33 00 - Submittals: Procedures for submittals.
- B. Shop drawings shall detail all structural members showing sizes, spacing, cambers, connections, openings, welds, etc. showing all aspects of fabrication.

1.03 QUALITY ASSURANCE

- A. Fabricate structural steel members in accordance with AISC Code of Standard Practice.
- B. Perform Work in accordance with AISC Code of Standard Practice

- C. Fabricator: Company specializing in performing the work of this Section with minimum five (5) years documented experience.
- D. Erector: Company specializing in performing the work of this Section with minimum five (5) years documented experience.
- E. Welder(s): Qualified within previous twelve (12) months for type of welding required for this project in accordance with AWS D1.1 and AWS D1.4 and/or WABO (Washington Association of Building Officials) certified as required by local Building Department.

1.04 SPECIAL INSPECTIONS

- A. Coordinate and pay for special inspections required by governing agencies.

1.05 TESTS

- A. Testing of field welding will be performed under provisions of Section 01 45 00.

1.06 ALTERNATES

- A. See Section 01 23 00 for bidding alternates affecting work of this Section.

1.07 COLORS

- A. Colors are specified on Colors and Materials Schedule on drawings.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Structural Steel Members: Refer to structural notes on structural drawings and architectural notes on architectural drawings.]
- B. Structural Tubing: Refer to structural notes on structural drawings.
- C. Bolts, Nuts and Washers: Refer to structural notes on structural drawings.
- D. Bolts, Nuts and Washers: Refer to structural notes on structural drawings and architectural notes on architectural drawings.
- E. Welding Materials: Refer to structural notes on structural drawings.
- F. Non-Shrink Grout: Refer to structural notes on structural drawings.
- G. Shop and Touch-Up Primer: SSPC 15, Type 1, red oxide. Provide for steel surfaces that are not indicated or specified to be galvanized and are not indicated or specified to be finish painted in accordance with Section 09 91 00.
- H. Touch-up Primer for Galvanized Surfaces: SSPC 20, Type 1, inorganic, zinc rich.

2.02 FABRICATION

- A. Field verify actual dimensions and conditions on site prior to shop fabrication.

- B. Fabricate in accordance with AISC Specifications.
- C. Continuously seal joined members by continuous welds. Grind exposed welds smooth.
- D. Welding shall conform to AWS D1.1.

2.03 **EXPOSED STRUCTURAL STEEL FABRICATION**

- A. Field verify actual dimensions and conditions on site prior to shop fabrication.
- B. Fabricate in accordance with AISC Code of Standard Practice
- C. Fabricate and assemble in the shop to the greatest extent possible.
- D. Locate field joints in assemblies at concealed locations or as approved by Architect.
- E. Detail assemblies to minimize field handling and expedite erection.
- F. Provide a continuous appearance to all welded joints including tack welds that are not incorporated in final welds. Provide joint filler at intermittent welds. Provide continuous welds, as indicated on the drawings, of uniform size and profile.
- G. Welding shall conform to AWS D1.1.
- H. Fabricate exposed surfaces smooth, square and of surface quality consistent with the approved mock-up. Use special care in handling and shipping of both before and after shop painting.
- I. Fabrication straightness tolerance shall be one-half of that specified for standard structural steel. Fabrication straightness tolerance for built-up members shall be as specified in AWS D1.1. Matching of abutting cross sections shall be required.
- J. For butt and plug welds, the weld shall be made flush to the surface of each side to be within 1/16 inch of plate thickness. Butt and Plug welds shall be ground smooth. Fillet welds to be ground contoured, or blended, oversize welds as required and grind to provide smooth transition.
- K. Minimize weld show through at locations where welding on the far side of an exposed connection occurs, grind distortion and marking of the steel to a smooth profile with adjacent material.
- L. Joint gap tolerance; maintain a uniform gap of 1/8 inch.
- M. Fabricate such that piece marks are fully hidden in the final structure or made with such media to permit full removal after erection.
- N. Fabricator shall deliver steel with no mill marks (stenciled, stamped, raised, etc) in exposed locations. Mill marks shall be omitted by cutting of mill material to appropriate lengths where possible. Where not possible, the fabricator shall fill and/or grind to a surface finish consistent with the approved mock-up.
- O. Fabricator shall grind all edges of sheared, punched or flame-cut steel to match approved mock-up. Eased edges to be smooth, straight and uniform in appearance.

- P. Members to be rolled to a final curved shape shall be fully shaped in the shop and tied during shipping to prevent stress relieving.
- Q. Assemble and weld built-up sections by methods that will maintain alignment of members without warp exceeding specified tolerances.
- R. Seal weld open ends of round and rectangular hollow structural sections with 3/8 inch closure plates. Provide venting as required for galvanized members. Provide continuous, sealed welds at angle to gusset-plate connections and similar locations where AESS is exposed to weather.
- S. Special care in shipping, unloading, handling and erecting to protection shop applied paint finishes of steel surfaces shall be taken to avoid damage.
- T. Erect pre-painted finish pieces using padded slings or other methods such they are not damaged. Provide padding as required to protect while rigging and aligning member's frames.
- U. Remove blemishes or unsightly surfaces resulting from temporary braces or fixtures. Remove all backing and run out tabs. Remove all weld spatter, slivers and similar surface discontinuities.
- V. Install all bolts on the same side of the connection, consistent from one connection to another.

2.04 FINISH

- A. Prepare structural component surfaces in accordance with SSPC SP-3 for interior locations. SSPC SP-6 for exterior locations.
- B. Protective Coatings:
 - 1. Shop prime structural steel members with primer paint. Do not shop prime steel that is indicated or specified to be galvanized. For steel that is indicated or specified to be field finish painted, coordinate shop primer with the paint system specified in Section 09 91 00.
 - a. Shop prime surfaces to be embedded in concrete or mortar to a depth of 2 inches.
 - b. Do not shop prime surfaces to be field welded.
 - c. Do not shop prime surfaces to be high-strength bolted with slip-critical connections.
 - 2. Galvanized Coating: All structural members on building exterior, exposed to outdoor atmosphere or shown on drawings shall be hot-dip galvanized in accordance with ASTM A123; provide minimum 2.0 oz/sq. ft. galvanized coating. Do not apply pre-treatments or passivation to steel members that are indicated to be primed and painted.
- C. Field-Applied Finish: As specified in Section 09 91 00.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Beginning of installation means erector accepts existing conditions.
- C. The erector shall check all members upon delivery for twist, kinks, gouges or other imperfections which might result in rejection of the appearance of the member. Coordinate remedial action with fabricator prior to erecting steel. Notify Architect of members with imperfections and proposed remedial action prior to erecting steel.

3.02 ERECTION

- A. Allow for erection loads and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.
- B. Erection shall comply with AISC – Code of Standard Practice.
 - 1. Do not enlarge unfair holes in members by burning or by using drift pins. Ream holes that must be enlarged to admit bolts. Replace connection plates that are misaligned where holes cannot be aligned with acceptable final appearance.
- C. Field weld components in accordance with AWS D1.1.
- D. Splice members only where indicated.
- E. After erection, prepare any unprimed bare metal surfaces on primed or galvanized steel in accordance with SSPC SP-3 and prime/paint.
- F. Do not field cut or alter structural members without approval of Design Consultant.
- G. Grout under baseplates.

3.03 ERECTION TOLERANCES

- A. Maximum Variation from Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset from True Alignment: 1/4 inch.
- C. Structural Steel Members: As specified in AISC - Code of Standard Practice for Steel Buildings and Bridges - Section 7 – Erection.
- D. Architecturally Exposed Structural Steel: Members and components are plumbed, level and aligned to a tolerance not to exceed one-half the amount permitted for structural steel.

3.04 ADJUSTING AND CLEANING

- A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded area. Repairs to galvanized surfaces shall be performed in accordance with ASTM A780.

END OF SECTION

**SECTION 05 21 00
STEEL JOIST FRAMING**

PART 1 - GENERAL

1.01 REFERENCES

- A. AWS D1.1 - Structural Welding Code.
- B. FS TT-P-636 - Primer Coating, Alkyd, Wood and Ferrous Metal.
- C. SJI - Standard Specifications for Open Web Steel Joists J and H Series.
- D. SJI - Standard Specifications for Longspan Steel Joists LH and LJ Series and Deep Longspan Steel Joists DLH and DLJ Series.
- E. SSPC - Steel Structures Painting Council.
- F. Structural General Notes on Structural Drawings.

1.02 SUBMITTALS

- A. Submit shop drawings under provisions of Section 01 33 00.
- B. Indicate standard designations, configuration, sizes, spacing, locations of joists, bridging, connections, attachments, and cambers.
- C. Shop drawings shall bear the stamp of a Structural Engineer licensed in the State of Washington.

1.03 QUALITY ASSURANCE

- A. Perform work in accordance with SJI Standard Specifications, Load Tables, and Weight Tables.
- B. Fabricator shall employ Structural Engineer licensed in State of Washington to design joists to accommodate loading criteria listed on Structural Drawings, including bridging, bracing, openings, connections, splices, bearing details, etc.

1.04 QUALIFICATIONS

- A. Fabricator: Company specializing in performing the work of this Section with minimum seven (7) years experience. Fabricator shall be an "approved fabricator" as defined by Section 306(f) of the IBC as required by local Building Department.
- B. Erector: Company specializing in performing the work of this Section with minimum five (5) years experience.
- C. Welder(s): Qualified within previous twelve (12) months for type of welding required for this project in accordance with AWS D1.1 and AWS D1.4.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site under provisions of Section 01 60 00 and SJI requirements.
- B. Store and protect products under provisions of Section 01 60 00 and SJI requirements.

- C. Protect joists from distortion or damage.

1.06 **ALTERNATES**

- A. See Section 01 23 00 for bidding alternates affecting work of this Section.

1.07 **COLORS**

- A. Colors are specified on Colors and Materials Schedule on drawings.

PART 2 - PRODUCTS

2.01 **MATERIALS**

- A. Steel Joists Institute Members: See SJI types called out on Structural Drawings.
- B. Anchor Bolts, Nuts, and Washers: See Structural Drawings.
- C. Shear Stud Connectors: See Structural Drawings.
- D. Primer: SSPC – Paint 15.
- E. Welding Materials: AWS D1.1; type required for materials being welded.

2.02 **FABRICATION**

- A. Field verify dimensions and conditions prior to fabrication.
- B. Fabricate joists in conformance with SJI Standard Specification.
- C. Provide bottom chord extensions as indicated.

2.03 **FINISH**

- A. Shop prime joists.

PART 3 - EXECUTION

3.01 **EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Beginning of installation means erector accepts existing conditions.

3.02 **ERECTION**

- A. Erect and bear joists on structural supports in accordance with Fabricator's erection instructions.
- B. Allow for erection loads. Provide sufficient temporary bracing to maintain framing safe, plumb, and in true alignment until completion of erection and installation of permanent bridging, bracing, and decking.
- C. Coordinate placement of anchors in supporting construction for securing bearing

plates/angles.

- D. Position and field weld joist chord extensions and wall attachments.
- E. Do not permit erection of decking until joists are braced, bridged, and secured.
- F. Do not field cut or alter structural members without written approval of joist fabricator, stamped by Fabricator's structural engineer licensed in State of Washington.
- G. After erection, prime welds, abrasions, and surfaces not shop primed.

3.03 ERECTION TOLERANCES

- A. Maximum Variation from Plumb: 1/4 in.
- B. Maximum Offset from True Alignment: 1/4 in.

END OF SECTION

**SECTION 05 31 00
STEEL DECKING**

PART 1 - GENERAL

1.01 REFERENCES

- A. AISI - Specification for the Design of Cold-Formed Steel Structural Members.
- B. ASTM A446 - Steel Sheet, Zinc-Coated, (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.
- C. ASTM A525 - Steel Sheet, Zinc-Coated, Galvanized by the Hot-Dip Process.
- D. AWS D1.1 - Structural Welding Code.
- E. SDI - Design Manual for Composite Decks, Form Decks, Roof Decks.

1.02 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01 33 00.
- B. Shop Drawings shall indicate decking type and gauge, decking plan, support locations, projections, openings, welding schedule, pertinent details, and accessories.
- C. Product data shall indicate deck profile characteristics and dimensions, structural properties, finishes, and acoustic noise reduction coefficient.

1.03 QUALIFICATIONS

- A. Installer: Company specializing in performing the work of this Section with minimum five (5) years experience.
- B. Welder(s): Qualified within previous twelve (12) months for type of welding required for this project in accordance with AWS D1.1 and AWS D1.4 and/or WABO (Washington Association of Building Officials) certified as required by local Building Department.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site under provisions of Section 01 60 00.
- B. Store and protect products under provisions of Section 01 60 00.
- C. Cut plastic wrap to encourage ventilation.
- D. Separate sheets and store decking on dry wood sleepers; slope for positive drainage.

1.05 ALTERNATES

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

1.06 COLORS

- A. Colors are specified on Colors and Materials Schedule on the drawings.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Sheet Steel: See Structural Drawings: Provide G60 galvanized coating conforming to ASTM A525.
- B. Sheet Steel: Building BI, Wash Bay and Structure E, Salt & Sand Bins: Building See Structural Drawings: Provide G90 galvanized coating conforming to ASTM A525.
- C. Welding Materials: AWS D1.1 is minimum requirement; see Structural Drawings for additional special requirements.
- D. Touch-Up Primer: Zinc chromate type.

2.02 ACCESSORIES

- A. Acoustical Insulation: Glass fiber type, minimum 1.1 lb/cu ft density; profiled to suit decking.

2.03 FABRICATION

- A. Steel Decking: See Structural Drawings for gauge, profile, and special requirements.
- B. Metal Closure Strips, Cover Plates, and Related Accessories: See Structural Drawings for gauge, configuration, and special requirements.

2.04 FINISH

- A. Passivation: Do not apply pre-treatments or passivation to deck surfaces that are indicated to be field primed and painted.
- B. Primer: Factory apply manufacturer's standard primer finish to the underside of steel decking to be installed in areas where it will be exposed to view and painted.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Beginning of installation means installer accepts existing conditions.

3.02 INSTALLATION

- A. Erect metal decking in conformance with SDI Design Manual for Composite Decks, Form Decks, Roof Decks.
- B. Bear ends and perimeter of decking on structural supports with 3 in. minimum overlap between sheets. Align and level.
- C. Fasten deck to steel support members at ends and intermediate supports with welds or fasteners per Structural Drawings.
- D. Weld in conformance with AWS D1.1.

- E. Connect decking side laps as shown on Structural Drawings.
- F. Cut openings for work of other trades.

END OF SECTION

**SECTION 05 40 00
COLD-FORMED METAL FRAMING**

PART 1 - GENERAL

1.02 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Refer to Structural Drawings..

1.04 SUBMITTALS

- A. Product Data: For each type of cold-formed metal framing product and accessory indicated.
- B. Welding certificates.
- C. Product Test Reports: From a qualified testing agency, unless otherwise stated, indicating that each of the following complies with requirements, based on evaluation of comprehensive tests for current products:
 - 1. Steel sheet.
 - 2. Expansion anchors.
 - 3. Power-actuated anchors.
 - 4. Mechanical fasteners.
 - 5. Vertical deflection clips.
 - 6. Horizontal drift deflection clips.
 - 7. Miscellaneous structural clips and accessories.
- D. Research/Evaluation Reports: For cold-formed metal framing.

1.05 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM E 329 to conduct the testing indicated.
- B. Product Tests: Mill certificates or data from a qualified independent testing agency indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, ductility, and metallic-coating thickness.
- C. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."
- D. Fire-Test-Response Characteristics: Where indicated, provide cold-formed metal framing identical to that of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.

1.06 **DELIVERY, STORAGE, AND HANDLING**

- A. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling in accordance with AISI's "Code of Standard Practice".
- B. Store cold-formed metal framing, protect with a waterproof covering, and ventilate to avoid condensation in accordance with AISI's "Code of Standard Practice".

PART 2 - PRODUCTS

2.01 **MANUFACTURERS**

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering cold-formed metal framing that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide cold-formed metal framing by one of the following:
 - 1. ClarkDietrich Building Systems.
 - 2. SCAFCO Corporation.
 - 3. Steeler, Inc.

2.02 **MATERIALS**

- A. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.
- B. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
 - 1. Grade: As required by structural performance.
 - 2. Coating: G60 (Z180) or equivalent.
 - 3. Heavy Duty Coating: G90 (Z275), or equivalent, in Building B - Wash Bay 121, Wash Bay Equipment Room 122, and Sprinkler Room 123, including all surrounding walls of these spaces.
- C. Steel Sheet for Clips: ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:
 - 1. Grade: As required by structural performance.
 - 2. Coating: G90 (Z275).
- D. Steel Sheet for Sub-Framing(Exterior Wall Cavity): ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:

1. Grade: As required by structural performance.
 2. Coating: G90 (Z275).
- E. Steel Sheet for Studs, Joists, Sub-Framing and Break Shape Framing (Exterior Soffit, Roof Eave, Roof Rake, Roof Fascia, Roof Ridge and Canopy Conditions): ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:
1. Grade: As required by structural performance.
 2. Coating: G90 (Z275).

2.03 EXTERIOR NON-LOAD-BEARING WALL FRAMING

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: 18 gauge minimum or as indicated on Architectural Drawings and Structural Drawings.
 2. Flange Width: As indicated on Architectural Drawings and Structural Drawings.
 3. Section Properties: As indicated on Architectural Drawings and Structural Drawings.
- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: Matching steel studs.
 2. Flange Width: As indicated on Architectural Drawings and Structural Drawings.
- C. Jamb Studs: Used at window and door jambs and other openings as indicated on the Drawings.
1. Minimum Base-Metal Thickness: 18 gauge minimum or as indicated on Architectural Drawings and Structural Drawings.
 2. Subject to compliance with requirements, provide ClarkDietrich™ Building Systems: Heavy Duty Studs – HDS and Header Bracket – HDSC.
- D. Vertical Deflection Clips: Manufacturer's standard bypass and head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web. Designed for screw attachment to stud using proprietary insert allowing frictionless vertical slide while maintaining lateral rigidity and attachment to structure with mechanical fasteners or welding.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Priceless Steel Products; Slide Clip, including insert.
 - a. Exterior Head-of-Wall Track: "SCAFCO Slotted Track SLT."
 - b. Exterior Head-of-Wall Clip: "Slide Clip ESC."
 - c. Bypass Structure at Pour-Stop Connection: "Slide Clip PLC1."

- d. Bypass Structure Below Slab Connection: "Slide Strut PLS1."
 2. Subject to compliance with requirements, provide ClarkDietrich™ Building Systems: Fast Strut™ / Fast Top™ Clips / FastClip™ Slide Clips / QuickClip™ / Slide Clip™ (SD).
- E. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal and lateral loads and transfer them to the primary structure, and as follows:
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ClarkDietrich™ Building Systems MaxTrak®.
 3. Minimum Base-Metal Thickness: 18 gauge minimum or as indicated on Architectural Drawings and Structural Drawings. 16 gauge minimum at Curtain Wall System.
 4. Flange Width: As indicated on Architectural Drawings and Structural Drawings.
- F. Double Deflection Tracks: Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with unstiffened flanges.
1. Outer Track: Of web depth to allow free vertical movement of inner track, with flanges designed to support horizontal and lateral loads and transfer them to the primary structure, and as follows:
 - a. Minimum Base-Metal Thickness: As indicated.
 - b. Flange Width: As indicated on Architectural Drawings and Structural Drawings.
 2. Inner Track: Of web depth indicated, and as follows:
 - a. Minimum Base-Metal Thickness: As indicated.
 - b. Flange Width: As indicated on Architectural Drawings and Structural Drawings.
- G. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure.

2.04 CEILING JOIST FRAMING AND SOFFIT JOIST FRAMING

- A. Steel Joists: Manufacturer's standard C-shaped steel sections, of web depths indicated, punched with enlarged service holes, with stiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: 18 gauge minimum or as indicated, as required to meet load and deflection criteria indicated.
 2. Flange Width: As indicated.

3. Section Properties: As indicated.

2.05 FRAMING ACCESSORIES

- A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.
- B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
 1. Supplementary framing.
 - a. Sub-Framing: Provide sub-framing members in Z-shaped, L-shaped, C-shaped and other profiles as required to form rake, ridge, fascia, soffit, parapet, boxed beam and other exterior roof, wall, soffit and eave conditions shown on drawings.
 - b. Sub-Framing (Soffits and Eaves): Provide sub-framing members in Z-shaped, L-shaped, C-shaped and other profiles as required to frame soffit and eave conditions shown on drawings.
 2. Bracing, bridging, backing and solid blocking.
 - a. Basis-of-Design Product: Priceless Steel Products; "Kwik-Bridge Punch System."
 3. Web stiffeners.
 4. Anchor clips.
 5. End clips.
 6. Foundation clips.
 7. Gusset plates.
 8. Stud kickers, knee braces, and girts.
 9. Joist hangers and end closures.
 10. Hole reinforcing plates.
 11. Backer plates.

2.06 ANCHORS, CLIPS AND FASTENERS

- A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.
- B. Anchor Bolts: As indicated on Structural Drawings.
- C. Expansion Anchors: As indicated on Structural Drawings.
- D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load

equal to 10 times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.

- E. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.
 - 1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.
- F. Welding Electrodes: Comply with AWS standards.

2.07 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: ASTM A 780.
- B. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
- C. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents, complying with ASTM C 1107, with fluid consistency and 30-minute working time.
- D. Shims: Load bearing, high-density multimonomer plastic, nonleaching.
- E. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

2.08 FABRICATION

- A. Fabricate cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.
 - 1. Fabricate framing assemblies using jigs or templates.
 - 2. Cut framing members by sawing or shearing; do not torch cut.
 - 3. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads.
 - 4. Fasten other materials to cold-formed metal framing by welding, bolting, or screw fastening, according to Shop Drawings.
- B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.

- C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:
 - 1. Spacing: Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
 - 2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch (3 mm).

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Install sealer gaskets to isolate the underside of wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations.

3.03 INSTALLATION, GENERAL

- A. Cold-formed metal framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed metal framing according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions" and to manufacturer's written instructions unless more stringent requirements are indicated.
- C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
 - 1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch (1.6 mm).
- D. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened.
 - 1. Cut framing members by sawing or shearing; do not torch cut.
 - 2. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.

- E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.
- F. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- G. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.
- H. Install insulation, specified in Division 7 Section "Building Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
- I. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.
- J. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:
 - 1. Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.04 EXTERIOR NON-LOAD-BEARING WALL INSTALLATION

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.
- B. Fasten both flanges of studs to bottom track, unless otherwise indicated. Space studs as follows:
 - 1. Stud Spacing: As indicated on Architectural Drawings and Structural Drawings.
- C. Set studs plumb, except as needed for diagonal bracing or required for non-plumb walls or warped surfaces and similar requirements.
- D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
 - 1. Connect vertical deflection clips to bypassing studs and anchor to building structure using mechanical fasteners.
- E. Install horizontal bridging in wall studs, spaced in rows indicated on Shop Drawings but not more than 48 inches (1220 mm) apart. Fasten at each stud intersection.
 - 1. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
 - 2. Bridging: Proprietary Kwik-Bridge Punch System installed according to manufacturer's written instructions.

- F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, fasteners, and stud girts, to provide a complete and stable wall-framing system.

3.05 JOIST INSTALLATION

- A. Install perimeter joist track sized to match joists. Align and securely anchor or fasten track to supporting structure at corners, ends, and spacings indicated on Shop Drawings.
- B. Install joists bearing on supporting frame, level, straight, and plumb; adjust to final position, brace, and reinforce. Fasten joists to both flanges of joist track.
 - 1. Install joists over supporting frame with a minimum end bearing of 1-1/2 inches (38 mm).
 - 2. Reinforce ends and bearing points of joists with web stiffeners, end clips, joist hangers, steel clip angles, or steel-stud sections as indicated on Shop Drawings.
- C. Space joists not more than 2 inches (51 mm) from abutting walls, and as follows:
 - 1. Joist Spacing: As indicated on Architectural Drawings and Structural Drawings.
- D. Frame openings with built-up joist headers consisting of joist and joist track, nesting joists, or another combination of connected joists if indicated.
- E. Install joist reinforcement at interior supports with single, short length of joist section located directly over interior support, with lapped joists of equal length to joist reinforcement, or as indicated on Shop Drawings.
 - 1. Install web stiffeners to transfer axial loads of walls above.
- F. Install bridging at intervals indicated on Shop Drawings. Fasten bridging at each joist intersection as follows:
 - 1. Bridging: Joist-track solid blocking of width and thickness indicated, secured to joist webs.
 - 2. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and joist-track solid blocking of width and thickness indicated. Fasten flat straps to bottom flange of joists and secure solid blocking to joist webs.
- G. Secure joists to load-bearing interior walls to prevent lateral movement of bottom flange.
- H. Install miscellaneous joist framing and connections, including web stiffeners, closure pieces, clip angles, continuous angles, hold-down angles, anchors, and fasteners, to provide a complete and stable joist-framing assembly.

3.06 FIELD QUALITY CONTROL

- A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field and shop welds will be subject to testing and inspecting.
- C. Testing agency will report test results promptly and in writing to Contractor and Architect.

- D. Remove and replace work where test results indicate that it does not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.07 **REPAIRS AND PROTECTION**

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer that ensure that cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION

**SECTION 05 50 00
METAL FABRICATIONS**

PART 1 - GENERAL

1.01 REFERENCES

- A. AAMA – American Architectural Manufacturers Association.
- B. AAMA 2605 – Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Architectural Extrusions and Panels.
- C. ANSI/AISC303 - Code of Standard Practice for Steel Buildings and Bridges – Section 10 Architecturally Exposed Structural Steel (AESS).
- D. ANSI/AISC 360 - Specification for Structural Steel Buildings.
- E. ASTM A36 - Structural Steel.
- F. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
- G. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- H. ASTM A240 - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
- I. ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- J. ASTM A153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- K. ASTM A276 - Standard Specification for Stainless Steel Bars and Shapes
- L. ASTM A283 - Carbon Steel Plates, Shapes, and Bars.
- M. ASTM A307 - Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
- N. ASTM A312 - Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless-Steel Pipes.
- O. ASTM A385 - Standard Practice for Providing High Quality Zinc Coatings (Hot Dip)
- P. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.
- Q. ASTM A501 - Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
- R. ASTM D2244 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films
- S. ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films

- T. AWS A2.0 - Standard Welding Symbols.
- U. AWS D1.1 - Structural Welding Code.
- V. PCI – Powder Coating Institute.
- W. SSPC (Steel Structures Painting Council) - Steel Structures Painting Manual.

1.02 SUBMITTALS

- A. Section 01 33 00 - Submittals: Procedures for submittals.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable. Shop drawings shall identify AESS components.
- C. Indicate welded connections using standard AWS welding symbols. Indicate net weld lengths.

1.03 QUALITY ASSURANCE

- A. Fabricate steel members in accordance with AISC Code of Standard Practice.
- B. Perform Work in accordance with Aluminum Association – Aluminum Design Manual.
- C. Fabricate steel members in accordance with AISC Code of Standard Practice, Section 10.
- D. Fabricator: Company specializing in performing the work of this Section with minimum five (5) years documented experience.
- E. Erector: Company specializing in performing the work of this Section with minimum five (5) years documented experience.
- F. Welder(s): Qualified within previous twelve (12) months for type of welding required for this project in accordance with AWS D1.1 and AWS D1.4 and/or WABO (Washington Association of Building Officials) certified as required by local Building Department.

1.04 DELIVERY, STORAGE AND PROTECTION

- A. Protect products and fabrications under provisions of Section 01 60 00.

1.05 ALTERNATES

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

1.06 EXPOSED STRUCTURAL STEEL MOCK-UP

- A. Mock-up: At least 3 weeks prior to fabricating components, the General Contractor shall construct individual mockups to demonstrate aesthetic effects as well as qualities of materials, fabrication, and execution. The mockups shall comply with the following requirements:
 - 1. Mockup shall be a section of full-size piece unless Architect approves smaller models.

2. Demonstrate the proposed range of aesthetic effects regarding each element.
3. Mockups will have finished surface (including surface preparation and paint system).
4. Mockups shall demonstrate element's finished edges, surface, shape, profile, dimensions of components.
5. Mockup of a welded element connection illustrating; continuous weld, grounded smooth weld, contouring and blending of weld.

1.07 COLORS

- A. Colors are specified on Colors and Materials Schedule on the drawings.

1.08 WARRANTY – POWDER COATED HIGH-PERFORMANCE (PVDF) FINISH

- A. Manufacturer's Warranty: Furnish twenty 20 year warranty providing coverage that coatings:
1. Will not chip, crack or peel (lose adhesion).
 2. Will not chalk in excess of ASTM D4214 number 8 rating, determined by procedure outlines in ASTM D4214.
 3. Will not change color more than five Delta-E Hunter units (square root of the sum of square Delta L, Delta a, and Delta b) as determined by ASTM D2244, Method 6.3. Fading or color changes may not be uniform if surfaces are not equally exposed to sun and elements. Mica and metallic coatings are exempt due to inability to accurately measure color, mica and metallic flakes reflect and scatter light in random patterns.

PART 2 - PRODUCTS

2.01 MATERIALS - STEEL

- A. Bolts, Nuts, Acorn Nuts, Threaded Rods, and Washers: Refer to structural notes on structural drawings and architectural notes on architectural drawings.
- B. Steel Sections: ASTM A36.
- C. Steel Tubing: ASTM A500, Grade B.
- D. Steel Plates: ASTM A283.
- E. Steel Pipe: ASTM A53, Grade B, Schedule 40.
- F. Steel Bolts, Nuts, Acorn Nuts, Threaded Rods and Washers: ASTM A307, galvanized to ASTM A153 for galvanized components.
- G. Steel Grating (Bar type): ASTM A36. Type: 19-SG-4, cross bars 4-inch C/C. Bar Size: 2 inch x 3/16 inch. 1-3/16-inch center to center bearing bars. Manufacturer: Ohio Grating, Inc.
- H. Welding Materials: AWS D1.1; type required for materials being welded.

2.02 **MATERIALS – STAINLESS STEEL**

- A. Stainless Steel Bolts, Nuts Acorn Nuts, Threaded Rods and Washers: Stainless steel, type 304 Field verify actual dimensions and conditions at site prior to shop fabrication.
- B. Stainless Steel Plate: ASTM A240, type 304.
- C. Stainless Steel Squares: ASTM A276, type 304.
- D. Stainless Steel Rounds: ASTM A276, type 304.
- E. Stainless Steel Angles: ASTM A276, type 304.
- F. Stainless Steel Tubing: Round, square and rectangular, ASTM A276, type 304.
- G. Stainless Steel Pipe: Seamless, schedule 40, ASTM A312, type 304.

2.03 **FABRICATION - MISCELLANEOUS ITEMS**

- A. Field verify actual dimensions and conditions at site prior to shop fabrication.
- B. Fit and shop assemble items in largest practical sections for delivery to site.
- C. Fabricate items with joints tightly fitted and secured.
- D. Continuously seal joined members by continuous welds. Grind exposed welds smooth.
- E. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- F. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- G. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- H. Eased edges to be smooth, straight and uniform in appearance.
- I. Welding shall conform to AWS D1.1.
- J. Fabricated Items include but not limited to the following:
 - 1. Stair and Ramp handrails: steel members, refer to drawings for profile, shapes and dimensions. Shop welded fabrication. Concealed field bolted assembly.
 - a) Galvanized steel members, refer to drawings for profile, shapes and dimensions. Exposed fasteners: Flush countersunk screws or bolts; consistent with design of handrails.
 - 2. Bollards: Galvanized steel pipe, refer to drawings for profile, shape and dimensions. Welded fabrication.
 - 3. Swinging Gates #1 (Dumpster Enclosure Structure: Pair of swinging gates. Galvanized steel material; frame, rail and components. Provide heavy-duty hinge hardware for swinging and locking operation; (4) hinges per gate, cane bolts and slide bolt..
 - 4. Roof Screen Posts and Anchor Brackets: Galvanized steel pipe, refer to drawings for

profile, shape and dimensions. Refer to structural drawings for detailing. Welded fabrication (fully welded) to form a single fabricated component. Posts and Brackets attached to structural steel members as shown on structural drawings.

2.04 EXPOSED STRUCTURAL STEEL FABRICATION

- A. Field verify actual dimensions and conditions on site prior to shop fabrication.
- B. Fabricate in accordance with AISC Code of Standard Practice.
- C. Fabricate and assemble in the shop to the greatest extent possible.
- D. No field welding of shop-applied powder coated finished components permitted. Field assembled components with bolted connections in accordance to Contract Documents.
- E. Locate field joints in assemblies at concealed locations or as approved by Architect.
- F. Detail assemblies to minimize field handling and expedite erection.
- G. Provide a continuous appearance to all welded joints including tack welds that are not incorporated in final welds. Provide joint filler at intermittent welds. Provide continuous welds, as indicated on the drawings, of uniform size and profile.
- H. Welding shall conform to AWS D1.1.
- I. Fabricate with exposed surfaces smooth, square and of surface quality consistent with the approved mock-up. Use special care in handling and shipping of both before and after shop painting.
- J. Fabrication straightness tolerance shall be that specified for standard structural steel. Fabrication straightness tolerance for built-up members shall be one-half of that specified in AWS D1.1. Matching of abutting cross sections shall be required.
- K. For butt and plug welds, the weld shall be made flush to the surface of each side to be within 1/16 inch of plate thickness. Butt and Plug welds shall be ground smooth. Fillet welds to be ground contoured, or blended, oversize welds as required and grind to provide smooth transition and to match profile on approved mock-up.
- L. Minimize weld show through at locations where welding on the far side of an exposed connection occurs, grind distortion and marking of the steel to a smooth profile with adjacent material.
- M. Joint gap tolerance; maintain a uniform gap of 1/8 inch.
- N. Fabricate such that piece marks are fully hidden in the final structure or made with such media to permit full removal after erection.
- O. Fabricator shall deliver steel with no mill marks (stenciled, stamped, raised, etc) in exposed locations. Mill marks shall be omitted by cutting of mill material to appropriate lengths where possible. Where not possible, the fabricator shall fill and/or grind to a surface finish consistent with the approved mock-up.
- P. Fabricator shall grind all edges of sheared, punched or flame-cut steel to match approved mock-up. Eased edges to be smooth, straight and uniform in appearance.

- Q. Members to be rolled to a final curved shape shall be fully shaped in the shop and tied during shipping to prevent stress relieving.
- R. Assemble and weld built-up sections by methods that will maintain alignment of members without warp exceeding specified tolerances.
- S. Seal weld open ends of round and rectangular hollow structural sections with 3/8-inch closure plates. Provide continuous, sealed welds at angle to gusset-plate connections and similar locations where exposed to weather.
- T. Special care in shipping, unloading, handling and erecting to protection shop applied paint finishes of steel surfaces shall be taken to avoid damage.
- U. Erect pre-painted finish pieces using padded slings or other methods such they are not damaged. Provide padding as required to protect while rigging and aligning member's frames.
- V. Remove blemishes or unsightly surfaces resulting from temporary braces or fixtures. Remove all backing and run out tabs. Remove all weld spatter, slivers, and similar surface discontinuities.
- W. Install all bolts on the same side of the connection, consistent from one connection to another.
- X. HSS seams shall be oriented consistently and away from view to the extent possible. HSS seams shall be treated so they are not apparent.
- Y. Open holes shall be filled with weld metal or body filler and smoothed by grinding. Surface imperfections shall be filled and sanded.

2.06 **FINISH - STEEL**

- A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- B. Clean surfaces to SSPC SP-6 prior to finishing.
- C. Do not prime surfaces in direct contact with concrete or where field welding is required.
- D. Protective Coatings:
 - 1. Shop and Touch-Up Primer: SSPC 15, Type 1, red oxide.
 - 2. Prime paint interior items with one (1) coat. Do not shop prime steel that is indicated or specified to be galvanized. For steel that is indicated or specified to be finish painted, coordinate shop primer with the paint system specified in Section 09 91 00.
 - 3. Galvanized Coating: All metal exposed to outdoor atmosphere or shown on drawings shall be hot-dipped galvanized coated to minimum 2.0 oz/sq. ft. zinc coating in accordance with ASTM A385 and ASTM A123.
- E. Section 09 91 00.
- F. Field-Applied Finish: As specified in Section 09 91 00.
- G. Shop-Applied Finish: as specified in Section 09 91 00.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Beginning of installation means erector accepts existing conditions.
- C. The erector shall check all members upon delivery for twist, kinks, gouges or other imperfections which might result in rejection of the appearance of the member. Coordinate remedial action with fabricator prior to erecting steel. Notify Architect of members with imperfections and proposed remedial action prior to erecting steel.

3.02 PREPARATION

- A. Obtain Architect/Engineer approval prior to site cutting or making adjustments not scheduled.
- B. Clean and strip primed steel items to bare metal where site welding is required.
- C. Supply steel items required to be cast into concrete or embedded in masonry with setting templates to appropriate sections.

3.03 INSTALLATION - MISCELLANEOUS ITEMS

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Field weld components indicated on drawings.
- D. Perform field welding in accordance with AWS D1.1.
- E. Minimize field welding of steel components. Field assembled components with bolted connections in accordance to Contract Documents.
- F. No field welding of shop-applied powder coated finished components permitted. Field assembled components with bolted connections in accordance to Contract Documents.
- G. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

3.04 ERECTION TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.
- D. Structural Steel Members: As specified in ANSI/AISC 303 - Code of Standard Practice for Steel Buildings and Bridges - Section 7 - Erection.

3.05 **SCHEDULE**

- A. Provide and install items listed or shown on drawings with anchorage and attachments necessary for installation.

END OF SECTION

**SECTION 05 51 33
FIXED ALUMINUM LADDERS**

PART 1 – GENERAL

1.01 REFERENCES

- A. OSHA 1910.23 – Occupational Safety and Health Standards – Fixed Ladders
- B. AA (Aluminum Association) – Designation System for Aluminum Finishes
- C. ANSI A14.3 - Ladders, Fixed, Safety Requirements.
- D. ASTM B209- Aluminum and Aluminum Alloy sheet and plate
- E. ASTM B221 – Aluminum –Alloy Extruded Bar, Rod, Wire, Shape and Tube.
- F. AAMA 607.1 –specifications and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum.
- G. ANSI A14.3 - Ladders, Fixed, Safety Requirements.
- H. ANSI / AWS D1.2 – Structural Welding Code – Aluminum
- I. AWS A2.0 - Standard Welding Symbols.
- J. AWS D1.1 - Structural Welding Code.

1.02 SUBMITTALS

- A. Submit shop drawings under provisions of Section 01 33 00.
- B. Product Data: Provide data describing standard framing member materials and finish, product criteria, load charts, limitations, and installation.
- C. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, welds, and accessories. Include erection drawings, elevations, and details where applicable.
- D. Indicate welded connections using standard AWS A2.0 welding symbols. Indicate net weld lengths.
- E. Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.
- F. Engineering: Provide sealed professional engineering drawings and calc's.

1.03 QUALITY ASSURANCE

- A. Fabricator: Company specializing in performing the work of this Section with minimum five (5) years' experience.

1.04 QUALIFICATIONS

- A. Installer: Company specializing in performing the work of this Section with minimum five (5) years documented experience.

1.05 FINISH

- A. Mill Finish.

1.06 DELIVERY, STORAGE AND PROTECTION

- A. Protect products and fabrications.

1.07 ALTERNATES

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

1.08 WARRANTY

- A. Five Years.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

- A. O’Keeffe’s, Inc.
- B. Alco Ladder Company.
- C. Precision Ladder, LLC
- D. Substitution: Under provisions of Section 01 60 00.

2.02 ALUMINUM FIXED VERTICAL LADDER AND SHIP LADDERS

- A. Unit shall be design to support minimum 1500lb loading without failure and treads shall withstand a minimum 3,000lb load.
- B. Aluminum Tubing and shapes: ASTM B221, 6005-T5 Aluminum Alloy.
- C. Stringers, Treads and landings: Aluminum 6005-T5, bar grating treads.
- D. Handrails: 1 ¼” Schedule 40 Aluminum Pipe, 6005-T5 providing a 1.6” O.D. with Internal aluminum fittings.
- E. Bolts, Nuts, and Washers: Stainless steel, type 316.
- F. Exposed Fasteners: Stainless steel, type 316, flush countersunk type; consistent with design of railing.
- G. Ladder extension safety posts at roof hatch.

2.03 FABRICATION

- A. Field verify actual dimensions and conditions at site prior to shop fabrication.

- B. Fabricate components with joints tightly fitted and welded full circumference. Align components accurately.
- C. If tubing has seams, locate in position concealed from view.
- D. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- E. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- F. Continuously seal joined pieces by continuous welds; grind welds flush and smooth.
- G. All components, connections, and parts shall be smooth, uniform and free from defects.
- H. Accurately form components to suit each other and structure.
- I. Fit and shop assemble items in largest practical sections for delivery to site.
- J. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- K. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions acceptable and are ready to receive work.
- B. Beginning of installation means installer and /or erector accepts existing conditions.

3.02 INSTALLATION

- A. Install per manufactures installation instructions.
- B. Install components plumb, level, and straight, accurately fitted, free from distortion or defects.
- C. Conceal bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings. Rigidly secure to structure.
- D. Perform field welding in accordance with AWS D1.2.
- E. Obtain approval prior to site cutting or making adjustments not scheduled.
- F. Coordinate with Roof Hatch Installation – Refer to Roof Accessories 07 72 00 for additional requirements.

3.03 ERECTION TOLERANCES

- A. Maximum Variation From Plumb: 1/8 inch.
- B. Maximum Offset From True Alignment: 1/4 inch.

3.04 **DISSIMILAR MATERIALS**

- A. Where dissimilar metals are in contact, protect surfaces with a coat conforming to MPI 79 to prevent galvanic or corrosive action. Where aluminum is in contact with concrete, plaster, mortar, masonry, wood, or absorptive materials subject to wetting, protect with ASTM D1187/D1187M, asphalt-base emulsion.

3.05 **PROTECTION**

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

END OF SECTION

**SECTION 06 16 43
EXTERIOR GYPSUM SHEATHING**

PART 1 - GENERAL

1.01 REFERENCES

- A. ASTM C473 Standard Test Methods for Physical Testing of Gypsum Panel Products.
- B. ASTM C518 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
- C. ASTM C1002 Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
- D. ASTM C1177 Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
- E. ASTM C1280 Standard Specification for Application of Gypsum Sheathing.
- F. ASTM D3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
- G. ASTM D6329 Standard Guide for Developing Methodology for Evaluating the Ability of Indoor Materials to Support Microbial Growth Using Static Environmental Chambers.
- H. ASTM E72 Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.
- I. ASTM E96 Standard Test Methods for Water Vapor Transmission of Materials.
- J. Gypsum Association (GA): GA-253 Application of Gypsum Sheathing ASTM C36 – Gypsum Wallboard.

1.02 SUBMITTALS

- A. Shop Drawings: Show locations, fabrication, and installation of control and expansion joints including plans, elevations, sections, details of components, and attachments to other units of work.
- B. Product Data: Manufacturer's specifications and installation instructions for each product specified.

1.03 QUALITY ASSURANCE

- A. Applicator: Company specializing in performing the work of this Section with minimum five (5) years experience.

1.04 REGULATORY REQUIREMENTS

- A. Conform to applicable code for fire rated assemblies.

1.05 **ALTERNATES**

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

1.06 **WARRANTY**

- A. Provide products that offer twelve months of coverage against in-place exposure damage (delimitation, deterioration and decay).
- B. Manufacturer's Warranty:
1. Five year against manufacturing defects.
 2. Ten years against manufacturing defects when used as a substrate in Architecturally specified Exterior Insulation and Finish System (EIFS).

PART 2 - PRODUCTS

2.01 **MANUFACTURERS**

- A. Georgia-Pacific Gypsum LLC.

2.02 **MATERIALS – EXTERIOR GYPSUM SHEATHING**

- A. Fiberglass-Mat Faced Gypsum Sheathing: ASTM C1177, Type X:
1. Thickness: 5/8 inch.
 2. Width: 4 feet.
 3. Length: 8 feet.
 4. Weight: 2.5 lb/sq. ft.
 5. Edges: Square.
 6. Surfacing: Fiberglass mat on face, back, and long edges.
 7. Racking Strength (Ultimate, not design value) (ASTM E72): Not less than 654 pounds per square foot, dry.
 8. Flexural Strength, Parallel (ASTM C1177): 100 lbf, parallel.
 9. Humidified Deflection (ASTM C1177): Not more than 1/8 inch.
 10. Permeance (ASTM E96): Not more than 17 perms.
 11. R-Value (ASTM C518): 0.67.
 12. Mold Resistance (ASTM D3273): 10, in a test as manufactured.
 13. Microbial Resistance (ASTM D6329, GREENGUARD 3-week protocol): Will not support microbial growth.
 14. Acceptable Products:

- a. 5/8 inch DensGlass Fireguard Sheathing, Georgia-Pacific Gypsum.

2.03 **ACCESSORIES**

- A. Fasteners: Screws: ASTM C1002, corrosion resistant treated.

PART 3 - EXECUTION

3.01 **EXAMINATION**

- A. Verify that site conditions are ready to receive work.

3.02 **INSTALLATION**

- A. Install gypsum sheathing in accordance with GA-253, ASTM C1280 and the manufacturer's recommendations.
- B. Single Layer Applications: Erect single layer board horizontal, perpendicular to framing with ends and edges occurring over firm bearing.
- C. .
- D. Use screws when fastening gypsum sheathing to metal framing.
- E. Control Joints: Install control joints per manufacturers recommendations.

3.03 **TOLERANCES**

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 ft in any direction.

END OF SECTION

**SECTION 06 20 23
INTERIOR FINISH CARPENTRY**

PART 1 - GENERAL

1.01 REFERENCES

- A. ANSI A135.4 - Basic Hardboard.
- B. ANSI A208.1 - Mat Formed Wood Particleboard.
- C. ANSI A208.2 - Medium Density Fiberboard (MDF) for Interior Applications
- D. AWS - Architectural Woodwork Standards. AWI - Architectural Woodwork Institute.
- E. FS MMM-A-130 - Adhesive, Contact.
- F. HPM (Hardwood Plywood Manufacturer's Association) HP - American Standard for Hardwood and Decorative Plywood.
- G. NEMA (National Electric Manufacturers Association) LD3 - High-Pressure Decorative Laminates.
- H. NHLA (National Hardwood Lumber Association).
- I. PS 1 - Construction and Industrial Plywood.
- J. PS 20 - American Softwood Lumber Standard.

1.02 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details and accessories. Submit Interior elevations.
- C. Samples: Submit two (2) samples of each material specified in this section, minimum 12-inch x 12-inch samples, illustrating specified color and finish.
- D. Manufacturer's installation instructions.

1.03 QUALITY ASSURANCE

- A. Perform work in accordance with AWS/AWI Premium Grade quality standards.
- B. Comply with "Quality Assurance" provisions, "References, Specifications and Manufacturer's Data".
 - 1. Conform to referenced AWS/AWI standards; Section 2 - Care and Storage, for "Premium Grade" quality product.
 - 2. Conform to referenced AWS/AWI standards; Section 3 - Lumber, for "Premium Grade" quality product.
 - 3. Conform to referenced AWS/AWI standards; Section 4 - Sheet Products, for

"Premium Grade" quality product.

4. Conform to referenced AWS/AWI standards; Section 5 - Finishing, for "Premium Grade" quality product.
5. Conform to referenced AWS/AWI standards; Section 6 - Millwork, for "Premium Grade" quality product.
6. Conform to referenced AWS/AWI standards; Section 8 - Wall / Ceiling Surfacing and Partitions, for "Premium Grade" quality product.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle products to site under provisions of Section 01 60 00.
- B. Protect work from moisture damage.

1.05 QUALIFICATIONS

- A. Fabricator and Installer: Company specializing in fabricating and installing the products specified in this Section with minimum three (3) years documented experience.

1.06 ALTERNATES

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

1.07 COLORS

- A. Colors are specified on Colors and Materials Schedule on the drawings.

1.08 ENVIRONMENTAL REQUIREMENTS

- A. Do not install materials when temperature or humidity conditions may have a detrimental affect on materials.

1.09 COORDINATION

- A. Coordinate work under provisions of Section 01 31 00.
- B. Coordinate the work with plumbing and electrical rough-in; installation of associated materials, finishes and adjacent components; including interior signage.

PART 2 - PRODUCTS

2.01 LUMBER MATERIALS

- A. Solid Lumber: Graded in accordance with AWS/AWI Premium Grade quality. Species; Cherry, American Black, maximum moisture content of 8 percent; Plain sawn lumber of AWS/AWI Premium Grade quality suitable for transparent finish.
 1. Shop Finish: Provide transparent factory finish conforming to AWS/AWI Section 5; System 13 - two coat Polyester finish and Stain, Premium Grade quality. Two coats of Stain. Refer to Colors and Materials Schedule for Stain color specified.
 2. Millwork: Refer to drawing for sizes and special shapes and dimensions. Shapes

include wall moulding, trim, window sills (stools), casing and wall caps. Fabricate to AWS/AWI Section 6, Premium Grade quality standard.

- B. Refer also to drawing for sizes and special shapes and/or dimensions.

2.03 MEDIUM DENSITY OVERLAY (MDO) PLYWOOD SHEATHING MATERIALS

- A. Medium Density Overlay (MDO) Plywood Sheathing: APA rated, Medium Density Overlay plywood; Grade A veneer face, paint grade; 3/4-inch thickness sheets. Opaque finish: ready to accept a paint finish.
 - 1. Field Finishing: As specified in Section 09 91 00.

2.04 FIBERGLASS REINFORCED PLASTIC PANELS (FRP) MATERIALS

- A. Fiberglass Reinforced Polyester Panels and Accessories.
- B. Manufacturer:
 - 1. Crane Composites.
 - 2. Or approved.
 - 3. Substitution: Under provisions of Section 01 60 00.
- C. Materials:
 - 1. Panels: Fiberglass Reinforced thermosetting polyester resin panel sheets complying with ASTM D 5319. Class A (I) fire rating. Thickness of 0.090 inch nominal. Nominal sheet dimensions of 4'-0" width x 10'-0" length. Sandstone texture surface.
 - 2. Moldings: Thin-wall semi-rigid extruded polypropylene material. Provide edge, outside corner, inside corner, division, and base cove as required for a complete installation. Color: to match panel.
 - 3. Adhesive and Sealant: As recommended by manufacturer.
 - 4. Color: as indicated on Colors and Materials Schedule.

2.05 HIGH-PRESSURE PLASTIC LAMINATE MATERIALS

- A. High-Pressure Plastic Laminate Materials (PLAM):
 - 1. Vertical Surfaces: High Pressure Plastic Laminate 0.028 inch thick and have textured surface.
 - 2. Horizontal Surfaces: High Pressure Plastic Laminate 0.050 inch thick and have textured surface.
 - 3. Neutral color melamine overlay shall be factory bonded with heat and pressure (thermo-fused).
 - 4. Edge banding shall be 0.018 inch PVC.

2.06 WINDOW SILL MATERIALS

- A. Building A - Window Sill Material: Solid Lumber exposed edges and trim. Solid Lumber as specified.
 - 1. Refer to drawing for sizes, shapes and dimensions. Window sill shapes include stool and apron. Fabricate to AWS/AWI Section 6, Premium Grade quality standard.
- B. Building B - Window Sill Material: Medium Density Fiberboard, painted finish.
 - 2. Refer to drawing for sizes, shapes and dimensions. Window sill shapes include stool and apron. Fabricate to AWS/AWI Section 6, Premium Grade quality standard.

2.07 WALL CAP MATERIALS

- A. Wall Cap Material: Solid Lumber] as specified.
- B. Install wall cap material at top of partial height walls. Extend wall cap material 1-inch beyond the finish face of vertical wall material.
- C. Refer to drawing for sizes, shapes, and dimensions. Wall cap shapes include cap and standing trim. Fabricate to AWS/AWI Section 6, Premium Grade quality standard.

2.08 WOOD CLADDING (WD-1) MATERIALS

- A. Manufacturer:
 - a. Windfall Lumber.
 - b. Substitution: Under provisions of Section 01 60 00.
- B. Materials:
 - a. Olympia Cladding: 1/2" thick x 3-1/2" wide x 2' - 8' random lengths, 1/16" microbevel. Red Alder (FSC Mix Credit), janka hardness scale 590, sanded smooth face, tongue and groove profile, open knots allowed up to 3/8" and not filled.
 - b. Finish: Standard top coat/sheen: Dead Flat 107 WB Finish.
 - c. Color: as indicated on Colors and Materials Schedule.

2.09 ACCESSORIES

- C. Building Paper: No: 15 asphalt saturated felt.
- D. Nails: Stainless Steel, size and finish type to suit application.
- E. Bolts, Nuts, Washers, Blind Fasteners, Lags, and Screws: Stainless Steel size and type to suit application; plain finish.
- F. Primer: Alkyd primer sealer type.
- G. Wood Filler: Solvent base, tinted to match surface finish color.

PART 3 - EXECUTION

CITY OF FEDERAL WAY
JOINT OPERATIONS & MAINTENANCE FACILITY

3.01 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify mechanical, electrical, and building items affecting work of this Section are placed and ready to receive this work.

3.02 INSTALLATION OF MILLWORK

- A. Install work in accordance with AWS/AWI Section 6, Premium Grade quality standard. Scarf and miter joints.
- B. Set and secure materials and components in place, plumb and level.
- C. Unless otherwise shown, 45 degrees miter-cut all end joints on long runs and miter or cope at angles and corners as approved; all joint tight.
- D. Install running trim and handrails in as long lengths as practical.
- E. All casings and trim to be backed out to allow firm tight fit over backing materials.
- F. Make joints tight, miter casings and trim.
- G. Set nail heads and screws ready for puttying.
- H. Install trim with blind nailing and concealed fastening in accordance to AWS/AWI Section 6.
- I. Clean up trim after installation by sandpapering and ease sharp external corners.
- J. Ensure that mechanical and electrical items affecting this Section of work are properly placed, complete and have been inspected by the Design Consultant prior to commencement of installation.
- K. Scribe work abutting other components to AWS/AWI tolerances; with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.

3.03 INSTALLATION OF INTERIOR FINISH CARPENTRY ITEMS

- A. Install work in accordance with AWS/AWI Premium Grade quality standard.
- B. Install wood cladding in accordance to manufacturer's installation instructions.
- C. Install FRP panels in accordance to manufacturer's installation instructions.
- D. Set and secure materials and components in place, plumb and level.
- E. Scribe work abutting other components to AWS/AWI tolerances; with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.

3.04 FINAL TREATMENT OF LUMBER MATERIALS SCHEDULED FOR SHOP APPLIED FINISHES

- A. Set exposed fasteners.
- B. Apply wood filler to match finished lumber at fastener indentations and lumber joints.
- C. Use wood filler which matches surrounding surfaces and of types recommended for applied

finishes.

3.05 FINAL TREATMENT OF LUMBER MATERIALS SCHEDULED FOR FIELD APPLIED FINISHES

- A. Sand work smooth and set exposed nails and screws to receive filler and leave ready to receive field applied finishes.
- B. Priming: Before installation, all work in this Section scheduled to be painted or stained is to be primed or stained, as applicable, in a heated place at jobsite. Priming paints of finish lumber specified under Section 09 91 00; painter subcontractor will make an adequate quantity of priming material, of applicable types, to carpenters for priming jobsite cut ends, edges, and concealed surfaces, as the installation work proceeds.
- C. Before installation, prime paint surfaces of items or assemblies to be in contact with cementitious materials.
- D. Field Finishing: As specified in Section 09 91 00.
- E. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes, and other fixtures and fittings. Verify locations of cutouts from site dimensions.

3.06 ERECTION TOLERANCES

- A. Maximum Variation from True Position: 1/16-inch.
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32-inch.

END OF SECTION

**SECTION 06 64 00
PVC WALL & CEILING PANELING**

PART 1 - GENERAL

1.01 REFERENCES

- A. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. ASTM D4226 – Standard Test Method for Impact Resistance.
- C. ASTM G21 – Standard Test Method Standard Practice for Determining Resistance of Synthetic Polymetric Materials to Fungi

1.02 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Shop Drawings: Indicate materials, component profiles, fastening methods and fastener layout, joint details, trim and accessories.
- C. Samples: Submit (2) samples for each piece of finished lumber, decking, siding, panel and trim material specified. Submit (2) samples for each fastener specified. Submit samples illustrating specified finish.
- D. Product data and manufacturer's installation instructions.

1.03 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum Five (5) years documented experience.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Store and protect products under provisions of Section 01 60 00.
- B. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- C. Storage:
 - 1. Store materials in clean, dry area indoors in accordance with manufacturer's instructions.
 - 2. Store wall and ceiling panels flat.
- D. Handling: Protect materials during handling and installation to prevent damage.

1.05 ENVIRONMENTAL REQUIREMENTS

- A. Installing Wall and Ceiling Panels:
 - 1. Cold Temperatures: When installing wall and ceiling panels in temperatures below 40 degrees F, warm to a minimum of 60 degrees F overnight and leave space between panels to allow for expansion in accordance with manufacturer's instructions.
 - 2. Warm Temperatures: When installing wall and ceiling panels in temperatures above

70 degrees F, warm panels to a minimum of 60 degrees F in accordance with manufacturer's instructions.

- B. Cutting Wall and Ceiling Panels:
 - 1. Cold Temperatures: Before field-cutting wall and ceiling panels in temperatures below 40 degrees F, warm panels to a minimum of 60 degrees F overnight.

1.06 **ALTERNATES**

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

1.07 **COLORS**

- A. Colors are specified on Colors and Materials Schedule on the drawings.

PART 2 – PRODUCTS

2.01 **ACCEPTABLE MANUFACTURERS**

- A. Basis of Design: DURAMAX Building Products, a division of US Polymers, Inc.,
- B. Trusscore Wall and Ceiling Board.
- C. Palram Americas
- D. Substitutions: Under provisions of Section 01 60 00.

2.02 **MATERIAL**

- A. Tongue-and-groove, rib-reinforced PVC wall and ceiling panels with nailing fins.
 - 1. Material: 100 percent virgin, exterior-grade PVC.
 - 2. Outside Surface: Flat.
 - 3. Width: 16 inches.
 - 4. Thickness: 1/2 inch.
 - 5. Weight: 0.95 pound per square foot.
 - 6. Surface Burning Characteristics, ASTM E 84:
 - a. Flame Spread Index: 10.
 - b. Smoke Developed Index: 400.
 - 7. Nonporous
 - 8. Waterproof
 - 9. Corrosion Proof
- E. Trim:

1. Material: 100 percent virgin, exterior-grade PVC.
2. Weight: 0.06 pound per linear foot.
3. Color: Same as wall and ceiling panels.

2.03 ACCESSORIES

- A. Nails, Screws and Fasteners: Use stainless steel, corrosion resistant, type 316; non-staining, of size, length and strength to securely and rigidly retain the work.
- B. construction Adhesive: Per manufacturers recommendation.
- C. Weather Resistive Barrier: As specified in Section 07 25 00.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces openings are ready to receive work.
- B. Beginning of installation means installer accepts existing surfaces.

3.02 PREPARATION

- A. Prepare wall and ceiling panels for installation in accordance with manufacturer's instructions.
- B. Ensure wall and ceiling panels are dry and clean.

3.03 INSTALLATION – WEATHER RESISTIVE BARRIER

- A. Install weather resistive barrier in accordance to manufacturer's installation instructions and details.
- B. Install membrane flashing at exterior wall openings and wall penetrations. Install in accordance with manufacturer's installation instructions and details.

3.04 INSTALLATION – PVC WALL & CEILING PANELS

- A. Install in accordance with manufacturer's installation instructions and details.

3.05 INSTALLATION TOLERANCES

- A. Maximum Variation From Plumb: 1/8 inch in 10 feet.
- B. Maximum Offset From Joint Alignment: 1/32 inch.

3.06 ADJUSTING AND CLEANING

- A. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.
- B. Remove and replace damaged wall and ceiling panels in accordance with manufacturer's instructions. et exposed nails.
- C. Clean wall and ceiling panels promptly after installation in accordance with manufacturer's instructions.

3.07 **PROTECTION**

- A. Protect installed wall and ceiling panels from damage during construction.

END OF SECTION

**SECTION 07 08 27
BUILDING AIR BARRIER SYSTEM TESTING FOR COMMISSIONING**

PART 1 GENERAL

1.01 SUMMARY

The air barrier shall be contiguous and connected across the six surfaces of the enclosed air barrier envelope indicated. Perform building thermography and air barrier leakage tests to demonstrate that the air barrier materials are properly installed and joined; that windows, doors, dampers, and ducts are sufficiently airtight; and that the overall air barrier envelope is sealed. The quality of the construction of the air barrier systems, including the joining and sealing of the air barrier materials and accessories must be sufficient to limit leakage under pressure to the maximum leakage functional requirements outlined in this specification.

Passing an air barrier leakage test to demonstrate that the building envelope is properly sealed and insulated will result in system acceptance. Report the results of the leakage tests. The testing and reporting shall be performed in accordance with the procedures outlined in this specification.

1.02 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referenced within the text by the basic designation only.

- A. ASNT CP-105 – ASNT Standard Topical Outlines for Qualification of Nondestructive Testing Personnel - Item No. 2821
- B. ASNT SNT-TC-1A – Recommended Practice for Personnel Qualification and Certification in Nondestructive Testing
- C. ASTM C1060 – Standard Practice for Thermographic Inspection of Insulation Installations in Envelope Cavities of Frame Buildings
- D. ASTM D4541 – Pull-Off Strength of Coatings Using Portable Adhesion Testers
- E. ASTM E1105 – Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference
- F. ASTM E1186 – Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems
- G. ASTM E1827 – Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door
- H. ASTM E779 – Standard Test Method for Determining Air Leakage Rate by Fan Pressurization
- I. ASTM E783 – Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors
- J. ISO 6781 – Thermal Insulation - Qualitative Detection of Thermal Irregularities in Building Envelopes - Infrared Method

1.03 DEFINITIONS

The following terms as they apply to this section:

A. Air Barrier Accessory:

Products designated to maintain air tightness between air barrier materials, air barrier assemblies and air barrier components, to fasten them to the structure of the building, or both (e.g., sealants, tapes, backer rods, transition membranes, fasteners, strapping, primers).

B. Air Barrier Assembly:

The combination of air barrier materials and air barrier accessories that are designated and designed within the environmental separator to act as a continuous barrier to the movement of air through the environmental separator.

C. Air Barrier Component:

Pre-manufactured elements such as windows, doors and service elements that are installed in the environmental separator.

D. Air Barrier Material:

A building material that is designed and constructed to provide the primary resistance to airflow through an air barrier assembly.

E. Air Barrier System:

The combination of air barrier assemblies and air barrier components, connected by air barrier accessories that are designed to provide a continuous barrier to the movement of air through an environmental separator. This includes the roof, wall, and floor assemblies, and the wall and roof components, and may include interior walls or partitions. There may be more than one air barrier system in a single building.

F. Air Leakage Rate:

The rate of airflow (CFM) driven through a unit surface area (sq.ft.) of an assembly or system by a unit static pressure difference (in.w.g or Pa) across the assembly. (examples: CFM/sq.ft. @ 0.30 in.w.g, or CFM/sq.ft. @ 75 Pa)

G. Air Permeance:

The rate of airflow (CFM) through a unit area (sq.ft.) of a material driven by unit static pressure difference (in.w.g. or Pa) across the material.

H. Environmental Separator:

The parts of a building that separate the controlled interior environment from the uncontrolled exterior environment, or that separate spaces within a building that have dissimilar environments.

I. Test Zone:

The portion of or volume within a building enclosed by an air barrier system which is to be tested for air leakage. The test zones are indicated.

1.04 PRECONSTRUCTION CONFERENCE

Organize pre-construction conferences between the air barrier inspector and the sub-contractors involved in the construction of or penetration of the air barrier system to discuss where each sub-contractor begins and ends, the sequence of installation, and each sub-contractor's responsibility to ensure airtight joints, junctures, penetrations and transitions between materials, products, and assemblies of products specified in the different sections to be installed by the different sub-contractors.

1.05 SUBMITTALS

1. Qualifications
 - a. Air Barrier Inspector.
 - b. Air Barrier Leakage Test Firm: two copies 60 days prior to leakage testing.
 - c. Air Barrier Leakage Test Technician: two copies 60 days prior to leakage testing.
2. Test Reports
 - a. Building Air Barrier Leakage Test Procedures: two copies of detailed test procedures indicating the test apparatus, the test methods and procedures, and the analysis methods to be employed for the Building Air Barrier Leakage Test 30 days prior to leakage testing.
 - b. Air Barrier Leakage Test Report: two copies of interim reports 10 days after completion. Four copies of the final report 14 days after completion.

1.06 AIR BARRIER SYSTEM SURFACE AREA AND FUNCTIONAL REQUIREMENTS

The building air barrier systems shall meet the following leakage functional requirements. The allowable leakage rate and the maximum leakage are at a pressure of 0.30 in.w.g.

1. Air Barrier System
 1. Surface Area: Building envelope area (square feet).
 2. Allowable leakage rate: 0.40 CFM/sq.ft

1.07 QUALITY CONTROL

- A. Qualifications
 1. Air Barrier Inspector:

Two years' experience in the installation of air barrier materials and assemblies including the experience in joining and sealing various components and sealing of penetrations of air barriers. Experience coordinating and instructing personnel involved in the installation, joining, and sealing of air barrier materials and components. The Air Barrier Inspector shall have training and certification as an Air Barrier Installer from the Air Barrier Association of America (ABAA).
 2. Air Barrier Leakage Test Firm:

Minimum 2 years' experience in air tightness testing and analysis, with a minimum of 3 successful projects of similar type and scope in the previous 3 years, using the specified testing standard, and employing qualified test technicians.

Acceptable Firms:

- a. Building Envelope Technology & Research
4000 Delridge Way SW, 1st Floor
Seattle, WA 98106
Tel: 206.405.3455
Fax: 206.405.3458
info@bet-r.com
- b. QEDLAB
2206-3 NW Birdsedale Ave.
Gresham, OR 97030
503.328.9549
chicago@construction.com
- c. Other firms meeting qualifications above.

3. Air Barrier Leakage Test Technician:

Two years' experience in air tightness testing using the specified testing standard and equipment.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 QUALITY CONTROL

- A. Documentation and Reporting:

Document the entire installation process on daily job site reports. These reports include information on the Installer, substrates, substrate preparation, products used, ambient and substrate temperature, the location of the air barrier installation, the results of the quality control procedures, and testing results.

- B. Construction Mock-Up:

1. Prepare a construction mock-up to demonstrate proper installation of the air barrier. The mock-up shall include air barrier connections between floor and wall, wall and window, wall and roof. The mock-up shall include the sealing method between membrane joints at transitions from one material or component to another, at pipe or conduit penetrations of the wall and roof, and at duct penetration of the wall and roof. Work will not begin until the mock-up is satisfactory to the Architect.
2. The mock-up shall be approximately 8 feet long by 8 feet high. The mock-up shall be representative of primary exterior wall assemblies and glazing components including backup wall and typical penetrations.

3. Mock-Up Tests for Air and Water Infiltration: Test the mock-up for air and water infiltration in accordance with ASTM E1186 or ASTM E783 and ASTM E1105. Use smoke tracer to locate sources of air leakage. If deficiencies are found, reconstruct the mock-up and retest until satisfactory results are obtained. Deficiencies include air leakage beyond the values specified, uncontrolled water leakage, and insecure materials. Perform the air leakage tests and water penetration test of the mock-up prior to installation of cladding and trim but after installation of all fasteners for cladding and trim and after installation of other penetrating elements.

C. Quality Control Testing and Inspection:

Conduct the following qualitative and quantitative tests and inspections in the presence of the code official as required by the Authority Having Jurisdiction, during installation of the air barrier system.

1. Inspection as Applicable:
 - a. Provide a Daily Report of Observations with a copy to the Architect.
 - b. Ensure continuity of the air barrier system throughout the building enclosure and that all gaps are covered, the covering is structurally sound, and all penetrations are sealed allowing for no infiltration or exfiltration through the air barrier system.
 - c. Ensure structural support of the air barrier system to withstand design air pressures.
 - d. Ensure masonry surfaces receiving air barrier materials are smooth, clean, and free of cavities, protrusions and mortar droppings, with mortar joints struck flush or as required by the manufacturer of the air barrier material.
 - e. Ensure site conditions for application temperature, and dryness of substrates are within guidelines.
 - f. Ensure substrate surfaces are properly primed.
 - g. Ensure laps in materials are at least a 2-inch minimum, shingled in the correct direction or mastic applied on exposed edges with no fishmouths.
 - h. Ensure that mastic is applied on cut edges.
 - i. Ensure that a roller has been used to enhance adhesion.
 - j. Measure application thickness of liquid applied materials to manufacturer's specifications for the specific substrate.
 - k. Ensure that the correct materials are installed for compatibility.
 - l. Ensure proper transitions for change in direction and structural support at gaps.
 - m. Ensure proper connection between assemblies (membrane and sealants) for cleaning, preparation and priming of surfaces, structural support, integrity and continuity of seal.
2. Tests:

- a. Provide written test reports of all tests performed with a copy to the Owner, Architect, and Authority Having Jurisdiction.

3.02 AIR BARRIER LEAKAGE TEST

Upon completion of construction, and quality control measures for the air barrier system, building air barrier leakage tests shall be conducted.

A. Building Air Barrier Leakage Test Procedures

Perform the air leakage test in accordance with ASTM E779 with the following additions and exceptions:

1. The test consists of measuring the flow rates required to establish a minimum of 12 positive and 12 negative building pressures. The lowest test pressure shall be 0.10 in.w.g or 25 Pa; the highest test pressure shall be 0.30 in.w.g or 75 Pa; and there must be at least 0.20 in.w.g or 50 Pa difference between the lowest and highest test pressures.
2. If the pressure exponent n is less than 0.45 or greater than 0.85 per section 9.6.4 of ASTM E 779, the test shall be rerun with additional readings over a longer time interval.
3. Measure the test pressure in a representative location such that pressures in the extremities of the enclosure can be shown to not exceed 10 percent of the measured test pressure. At least 12 bias pressure readings must be taken across the envelope and averaged over at least 20 seconds each before and after the flow rate measurements. None of the bias pressure readings must exceed 30 percent of the minimum test pressure when testing in both directions.
4. The mean value of the air leakage flow rate calculated from measured data at 0.3 in.w.g shall not exceed the air barrier functional requirements specified and the upper confidence limit as defined by ASTM E779. Reference measurements at standard conditions of 14.696 psi and 68 degrees F.
5. Conduct the test with ventilation fans and exhaust fans turned off and the outdoor air intake dampers and exhaust dampers closed. Provide a responsible HVAC technician with the authority to place the HVAC system in the correct mode for the pressure test. The test technician shall have unhindered access to mechanical rooms, air handlers, exhaust fans, and outdoor air and exhaust dampers.
6. Ensure that all windows in the test enclosure are kept closed. Prohibit entry and exit through doors in the test enclosure during the test. Discard data collected while the pressures and flows are affected by a door opening and closing. The openings of roll-up or roll-back type overhead doors shall be masked with plastic and sealed. Internal doors within the air barrier test enclosure shall be open; this includes access doors to attics enclosed by the air barrier system.
7. Perform a diagnostic evaluation in accordance with ASTM E1186, if the building fails to achieve the air barrier system functional requirement specified. Use the diagnostic evaluation to assist in identifying and eliminating air leakage so the system meets the functional requirement upon retesting.

B. Fan Pressurization Test

Conduct the fan pressurization test to determine final compliance with the air barrier system functional requirement when all components of the air barrier system have been installed and inspected, and have passed any intermediate testing procedures. The test may be conducted before finishes that are not part of the air barrier system have been installed. For example, if suspended ceiling tile, interior gypsum board, or cladding systems are not part of the air barrier system, the test may be conducted before they are installed.

C. Air Barrier Leakage Test Report

Submit a certified written report of each inspection, test, or similar service. Written reports of each inspection and test or similar service shall include all the Report items described in ASTM E1827. Building envelope air barrier leakage test report shall identify the tested surface area, floor area, air by volume, stories above grade and leakage rates. Additionally, the report shall also include the following information:

1. Date of Issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making the inspection or test.
6. Designation of the Work and test method.
7. Identification of product and Specification Section.
8. Complete inspection or test data.
9. Test results and an interpretation of test results for each test zone.
10. Name and signature of laboratory inspector.
11. Recommendations on retesting.
12. Comments or professional opinion on whether inspected or tested Work complies with Contract Document requirements.

3.03 REPAIR AND PROTECTION

Upon completion of inspection, testing, or sample taking and similar services, repair damaged construction and restore substrates and finishes, protect construction exposed by or for quality control service activities, and protect repaired construction.

End of Section

**SECTION 07 14 00
FLUID APPLIED WATERPROOFING**

PART 1 - GENERAL

1.01 REFERENCES

- A. ASTM C836/C836M-12 – Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course.

1.02 QUALITY ASSURANCE

- A. Installer: A firm that has at least three (3) years experience in work of the type required by this Section.
- B. Materials: Fluid applied waterproofing material shall be two-part synthetic rubber based system free of isocyanates, solvents, and bitumen. For each type of materials required for the work of this Section, provide primary materials that are the products of one (1) manufacturer.
- C. 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. Agenda for meeting shall include review of special details and flashing.
- D. Manufacturer's Representative: Make arrangements necessary to have a trained employee of the manufacturer on-site periodically during waterproofing work to review installation procedures.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials and products in labeled packages. Store and handle in strict compliance with manufacturer's instructions, recommendations, and material safety data sheets. 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. Do not double-stack pallets of waterproofing on the job site and dispose of in accordance with applicable regulations.
 - 2. Store drainage composite or protection board flat and off the ground. Provide cover on top and all sides.
 - 3. Protect waterproofing materials from freezing.
- B. Sequence deliveries to avoid delays, but minimize on site storage.

1.04 PROJECT CONDITIONS

- A. Perform work only when existing and forecasted weather conditions are within the limits established by the manufacturer of the materials and products used.

- B. Proceed with installation only when substrate construction and preparation work is complete and in condition to receive membrane waterproofing.

1.05 SUBMITTALS

- A. Product Data: Submit manufacturer's product data, installation instructions, use limitations and recommendations.
- B. Samples: Submit representative samples of the following for approval:
 - 1. Fluid applied membrane.
 - 2. Prefabricated drainage composite.

1.06 ALTERNATES

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

PART 2 - PRODUCTS

2.01 MATERIALS - WATERPROOFING SYSTEM

- A. Fluid Applied Waterproofing Membrane: Procor™ fluid applied waterproofing by GCP Applied Technologies (W.R. Grace); a two part, self-curing, solvent and bitumen free, synthetic rubber based material. Procor™ fluid applied waterproofing membranes meet or exceed the performance requirements of ASTM C836.
- B. Waterproofing Membrane Physical Properties: Meet or exceed Procor™ fluid applied membrane performance in ASTM tests for cured film thickness, solids content, flexibility, elongation, and peeled adhesion to concrete.
- C. Prefabricated Drainage Composite: Hydroduct® HZ-2 Drainage Composite by GCP Applied Technologies (W.R. Grace) for horizontal surfaces. Hydroduct 2 Drainage Composite by GCP Applied Technologies (W.R. Grace) for all vertical surfaces. Drainage composite shall be designed to promote positive drainage while serving as a protection course.
- D. Rigid Insulation: Dow Chemical Company; "Styrofoam Square Edge" rigid insulation R-5 per inch thickness.
- E. Substitutions: Under provisions of Section 01 60 00.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. The installer shall examine conditions of substrates and other conditions under which this work is to be performed and notify the Contractor, in writing, of circumstances detrimental to the proper completion of the work. Do not proceed with work until unsatisfactory conditions are corrected.

3.02 PREPARATION OF SUBSTRATES

- A. Refer to manufacturer's literature for requirements for preparation of substrates. Surfaces shall be structurally sound and free of voids, spalled areas, loose aggregate and sharp

protrusions. Remove contaminants such as grease, oil, and wax from exposed surfaces. Remove dust, dirt, loose stone, and debris. Use repair materials and methods which are acceptable to manufacturer of the fluid applied waterproofing.

- B. Cast-In-Place Concrete Substrates:
 - 1. Waterproofing application may commence as soon as the substrate can accept foot traffic. Surface shall be free of any visible water.
 - 2. Fill form tie rod holes with concrete and finish flush with surrounding surface.
 - 3. Repair bugholes over 13 mm (0.5 in.) in length and 6 mm (0.25 in.) deep and finish flush with surrounding surface.
 - 4. Remove scaling to sound, unaffected concrete and repair exposed area.
 - 5. Grind irregular construction joints to suitable flush surface.
- C. Related Materials: Treat joints and install flashing as recommended by waterproofing manufacturer.

3.03 INSTALLATION

- A. Refer to manufacturer's literature for recommendations on installation, including but not limited to, the following:
 - 1. If area to be waterproofed is in direct sunlight and temperature is rising, apply "scratch coat" (a thin application of fluid applied waterproofing) prior to the full application of the waterproofing membrane.
 - 2. In applications where a minimum slope of 11 mm/m (0.13 in./ft) cannot be achieved, a two-coat application of Procor™ membrane is recommended.
 - 3. Apply protection board and related materials in accordance with manufacturer's recommendations.

3.04 CLEANING AND PROTECTION

- A. Remove any masking materials after installation. Clean any stains on materials that would be exposed in the completed work.
- B. Protect completed membrane waterproofing from subsequent construction activities as recommended by manufacturer.

END OF SECTION

**SECTION 07 21 00
THERMAL INSULATION**

PART 1 - GENERAL

1.01 REFERENCES

- A. ASTM C612 – Mineral Fiber Block and Board Insulation.
- B. ASTM C665 - Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
- C. ASTM C1104 – Standard Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation.
- D. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.
- E. NFPA 255 - Test of Surface Burning Characteristics of Building Materials.
- F. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

1.02 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Product Data: Provide data on product characteristics, performance criteria, and limitations.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.03 ALTERNATES

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

1.04 COLORS

- A. Colors are specified on Color and Materials Schedule on drawings.

PART 2 - PRODUCTS

2.01 THERMAL BATT INSULATION MATERIALS

MINERAL WOOL

- A. Thermal Batt Insulation: Mineral wool batts; mineral fiber (inorganic material); rock and blast furnace slag); ASTM E136 noncombustible; moisture-resistant; ASTM C665 noncorrosive type I; non-deteriorating; mildew-proof; vermin-proof; available in 6" thickness, widths of 16" and 24", lengths of 48". R-4.0 per inch of thickness. Unfaced Flame Spread = 0. Smoke Development = 0.
 - 1. Product: Thermafiber UltraBatt (unfaced) or Roxul Comfortbatt SS Mineral Wool

Insulation or approved equal.

2. Provide blanket thickness to match stud cavity width.
3. Provide blanket widths to match standard stud spacing.
4. Installation: Friction fit securely between studs. Free of gaps or voids.

2.02 ACCESSORIES

- A. Insulation Hangers (Impaling Pins): 12 gauge, stainless steel pins and base plate of not less than 4 inches square for anchorage to substrate. Provide impaling pins of length to extend beyond insulation and retain cap washer when self-locking washer is placed on the pin.
- B. Adhesive: Spray type, suitable for adhering polyethylene film and foil faced vapor barriers permanently to metal studs.
- C. Head-of-Wall Insulation: Thermafiber TopStop. Mineral fiber (inorganic material; rock and blast furnace slag); ASTM E136 noncombustible; moisture-resistant; ASTM C665 noncorrosive type I; non-deteriorating; mildew-proof; vermin-proof; density of 6.0 PCF. Tested to ASTM C518. R-4.0 per inch of thickness. Unfaced Flame Spread = 0. Smoke Development = 0.
 1. Used at head-to-wall (below roof deck) conditions.
 2. Provide insulation profile and size to match installation condition and deck profile.
- I. Sealant: Suitable for sealing perimeters of vapor barrier membrane to adjacent materials, OSI SC-170.
- J. Support Wire: 25 gauge, annealed steel wire.
- K. Staples: Coated, non-rusting steel.

2.03 SOUND BATT INSULATION MATERIALS

- A. Sound Blanket Insulation: Mineral wool batts; mineral fiber (inorganic material; rock and blast furnace slag); ASTM E136 noncombustible; moisture-resistant; ASTM C665 noncorrosive type I; non-deteriorating; mildew-proof; vermin-proof; available in 1-1/2" to 7" thickness, widths of 17" and 25", lengths of 48"; density of 2.5 PCF. Tested to ASTM C518. R-4.0 per inch of thickness. Unfaced Flame Spread = 0. Smoke Development = 0.
- B. lag); ASTM E136 noncombustible; moisture-resistant; ASTM C665 noncorrosive type I; non-deteriorating; mildew-proof; vermin-proof; available in 1-1/2" to 7" thickness, widths of 17" and 25", lengths of 48"; density of 2.5 PCF. Tested to ASTM C518. R-4.0 per inch of thickness. Unfaced Flame Spread = 0. Smoke Development = 0.
 1. Product: Thermafiber SAFB (Sound Attenuation Fire Blankets) Insulation or approved equal.
 2. Used at all interior metal stud walls.
 3. Provide blanket thickness to match stud cavity width.
 4. Provide blanket widths in 1-inch wider than standard stud spacing to bow into metal stud cavity.
 5. Installation: Friction fit securely between studs. Free of gaps or voids.

2.04 PERIMETER FOUNDATION INSULATION MATERIALS

- A. Foundation Perimeter Insulation: Polystyrene (XPS) insulation, extruded cellular type, square edges, ASTM C578 Type IV, 25 psi minimum compressive strength, Dow Chemical Co. "Styrofoam," Owens Corning "Foamular," or approved.

2.05 STANDING SEAM SHEET METAL ROOFING INSULATION MATERIALS

- A. Standing Seam Sheet Metal Roofing Insulation: Polystyrene (XPS) insulation, extruded cellular type, square edges, ASTM C578 Type IV, 25 psi minimum compressive strength. Owens Corning "Foamular ThermaPink 25" or approved.

2.06 MINERAL WOOL INSULATION (MISCELLANEOUS PACKING)

- A. Mineral Wool Insulation and Safing; Mineral fiber (inorganic material; rock and blast furnace slag); ASTM C612 type IA, IB, II; ASTM E96 unfaced 50 perms as tested; ASTM E136 noncombustible; moisture-resistant; ASTM C665 noncorrosive type I, type III; non-deteriorating; mildew-proof; vermin-proof; 2" or greater thickness; 4.0 PCF safing. Tested to ASTM C518. R-4.0 per inch of thickness. Unfaced Flame Spread = 0. Smoke Development = 0. Thermafiber Inc. or approved equal.

2.07 SPRAY POLYURETHANE FOAM (SPF) IN-PLACE INSULATION MATERIALS

- A. Manufacturers of sprayed polyurethane foam insulation having Product considered acceptable for use: Johns Manville, Huntsman Building Solutions or Approved equal.
- B. Spray Polyurethane Foam (SPF): Two-component spray polyurethane cellular plastic foam, complying with the following methods and meeting the following physical properties:
1. Core Density (ASTM D1622): Minimum 2 pcf,
 2. Thermal Resistance (ASTM C518): 140 degree F/90day Aged R-Value, measured at 75F mean Temp: Minimum R-6.45/inch (LTTR).
 3. Flame Spread (ASTM E84, Class A): 25 or less. Smoke Developed (ASTM E84, Class A): 450 or less.
 4. Compressive Strength minimum (ASTM D1621, 10% parallel to rise): (20 psi) (182 kPa).
 5. Closed Cell Content (ASTM D2856): minimum 95 percent.
 6. Water Absorption by Volume maximum. (ASTM D2842): 2.5 percent.
 7. Water Vapor Permeability maximum. (ASTM E96): 2.5 perm-inches, 3.6 ng/(Pa.s.m).
- C. Acceptable Products: JM Corbond IV or HBS HeatLok HFO Pro.
- D. Primers: Follow manufacturer's recommendations for surfaces conditions.
- E. For oily steel surface like Z-bar, roof deck, curtain wall pan, aluminum tube or PVC pipes

cleaning, etching or a primer may be needed before spraying polyurethane foam.

- G. Equipment shall be maintained and in good operating conditions and approved by the foam manufacturer for type of application.

2.08 METAL BUILDING SYSTEMS INSULATION MATERIALS

A. Metal Building System Insulation Materials:

a. Roof Assembly: Simple Saver Insulation System.

- 1. Simple Saver Insulation System (Liner System): Acceptable systems shall be the Simple Saver insulation system (with OSHA compliant through fall protection) manufactured by Johns Manville Thermal Design with an installed total roof insulation, R-10.

- a. UVMAX® Steel Strap: 100 KSI minimum yield high tensile strength steel, galvanized, primed and then painted the specified color on the exposed side with a clear coat primer on the unexposed side. Minimum size shall be 0.02" x 1" x continuous length. The strap color shall be UVMAX 8 White.
- b. Vapor Barrier (Fabric Liner): As specified in Section 07 21 00.
- c. Accessories: Provide all accessories for complete installation including; brackets, clips, angles, tapes, sealants and fasteners.
- d. Install in accordance with manufacturer's installation instructions.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify site conditions under provisions of Section 01 31 00.
- B. Verify that substrate, adjacent materials, and insulation are dry and ready to receive insulation.

3.02 THERMAL BATT INSULATION INSTALLATION

- A. Install thermal batt insulation in accordance with insulation and impaling pin manufacturer's instructions.
- B. Install in exterior walls to close off gaps or voids. Do not compress insulation.
- C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- D. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within the plane of insulation.
- E. Metal Stud Framing: Friction fit kraft-faced and foil-faced thermal batt insulation between metal stud framing.
- F. Pack insulation around door frames and windows and in cracks, expansion joints, control joints, door soffits and other voids. Pack behind outlets, around pipes, ducts, and services encased in wall or partition. Hold insulation in place with pressure sensitive tape or adhesive.

- G. Fill all cavities formed within built-up or multiple framing members including, but not limited to: head, jamb and sill framing at openings, and other concealed voids.

3.03 SOUND BATT INSULATION INSTALLATION

- A. Install insulation in accordance with manufacturer's instructions.
- B. Install at all interior stud walls; fill cavity space without gaps or voids, trim to fit.
- C. Provide and install insulation in thickness to match stud cavity.
- D. Friction fit insulation securely between studs. Butt ends of blankets closely together and fill all voids.
- E. Install insulation for full height on interior stud walls; extending to underside of floor/roof deck.
- F. Install insulation for full height of interior partial height stud walls; extending to top side of intersecting framed horizontal soffits / ceilings.
- G. Extend insulation full length of interior walls.

3.04 MINERAL WOOL INSULATION AND SAFING INSTALLATION

- A. Install insulation in accordance with manufacturer's instructions.
- B. Pack mineral wool insulation between top of wall and roof metal deck/structure on non-load bearing walls full width of wall.
- C. Pack mineral wool insulation around all mechanical, plumbing and electrical penetrations through walls, floors, soffits, ceilings and roof assemblies / structures.
- D. Install mineral wool insulation at heads of interior full height walls abutting underside of metal deck (roof decks). Fill all voids between metal deck flutes and wall slip track.
- E. Pack mineral wool insulation around door frames and windows frames and in cracks, expansion joints, control joints, door soffits and other voids. Pack behind outlets, around pipes, ducts, and services encased in wall or partition. Hold insulation in place with pressure sensitive tape or adhesive.
- F. Pack mineral wool insulation within cavities of exterior hollow metal frames. Fill all voids.
- G. Install mineral wool insulation around all floor assembly and roof assembly penetrations.

3.05 SEMI-RIGID INSULATION (MINERAL WOOL) AT EXTERIOR WALLS

- A. Install insulation in accordance with manufacturer's recommendations and installation instructions.
- B. Install insulation continuous at exterior walls. Leave no gaps or voids.
- C. Mechanical attachment of insulation at exterior walls; install impaling pins at 16" o.c. maximum spacing horizontally and vertically, adhere impaling pins to substrate. Secure insulation flat to wall substrate.
- D. Fit insulation tight within spaces and tight to and behind mechanical and electrical services

within the plane of insulation. Leave no gaps or voids.

- E. Fit tight to ducts, electrical outlet boxes and ducts, and on outside of pipes in exterior walls.
- F. Coordinate with exterior door and window installer to install insulation in shim spaces.

3.07 PERIMETER FOUNDATION INSULATION INSTALLATION

- A. Install insulation in accordance with manufacturer's instructions.
- B. Run insulation board in continuous, unbroken line, butt joints tight, leave no voids or gaps.

3.08 MINERAL WOOL INSULATION (FOR MISCELLANEOUS PACKING)

- A. Pack insulation between top plate/runner and roof deck/structure on non-load bearing walls full width of plate/runner.
- B. Pack insulation around all mechanical and electrical penetrations through walls, floors, ceilings, and roof structure.
- C. Install mineral wool safing insulation at each floor level, full width of exterior metal stud cavity for depth of floor slab. Fill all voids between exterior metal studs and edge of floor slab.
- D. Install mineral wool safing insulation at heads of interior full height walls abutting underside of metal decking (floor and roof decks). Fill all voids between metal deck flutes and wall slip track.
- E. Pack mineral wool insulation within cavities of exterior hollow metal frames. Fill all voids.

3.09 SEMI-RIGID INSULATION BOARDS AT EXTERIOR WALLS

- A. Install insulation in accordance with manufacturer's recommendations. Install after mechanical and electrical services within walls have been installed.
- B. Fit insulation tight within spaces and tight to and behind mechanical and electrical services within the plane of insulation. Leave no gaps or voids.
- C. Install insulation with factory-applied membrane facing warm side of building spaces. Tape seal joints, butt ends, and sides around openings with vapor barrier tape. Do not tear or cut membrane.
- C. Fit tight to ducts, electrical outlet boxes and ducts, and on outside of pipes in exterior walls.
- D. Coordinate with exterior door and window installer to install insulation in shim spaces.

3.10 STANDING SEAM SHEET METAL ROOFING INSULATION

- A. Install vapor barrier in accordance with manufacturer's installation instructions.
- B. Install insulation in accordance with manufacturer's recommendations and installation instructions.
- C. Install roof insulation in R-value and thickness specified in the construction documents; roof insulation to be installed in multiple layers. Apply roof insulation in parallel rows with end

joints staggered.

- D. Run insulation board in continuous, unbroken line, butt joints tight, leave no voids or gaps.

3.12 EXTERIOR WALL INSULATION

- A. Install insulation in accordance with manufacturer's recommendations.
- B. Run insulation board in continuous, unbroken line, butt joints tight, leave no voids or gaps.

3.13 METAL BUILDING SYSTEMS INSULATION

- A. Install insulation in accordance with manufacturer's recommendations and installation instructions.
- B. Install insulation, fabric liner and accessories in accordance to Simple Saver Insulation System installation instructions.

END OF SECTION

**SECTION 07 25 00
WEATHER RESISTIVE BARRIER**

PART 1 – GENERAL

1.01 REFERENCES

- A. NWCB – Northwest Wall and Ceiling Bureau
- B. ASTM – American Society of Testing Materials
- C. UL – Underwriters’ Laboratories
- D. WH – Warnock Hersey
- E. GA – Gypsum Association
- F. BM&WT – Building Materials and Wood Technology

1.02 DELIVERY, STORAGE AND PROTECTION

- A. Section 01 60 00 – Product Requirements: Transport, Handle, Store and Protect Products.

1.03 COORDINATION

- A. Coordinate installation with flashing installation.
- B. Coordinate sequencing and installation of finish siding materials.
- C. Coordinate installation sequencing at “Rain-Screen” system.

1.04 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: For assemblies with fire-resistance ratings, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Fire-Resistance Ratings: Indicated by design designations from GA-600, Fire Resistance Design Manual.
- B. Manufacturer Qualifications: Minimum 2 years production of similar products.

1.05 PRE-INSTALLATION MEETING

- A. Convene two (2) weeks before starting work of this section.

1.06 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
- C. Preparation instructions and recommendations.
- D. Storage and handling requirements and recommendations.

- E. Installation methods.
- F. Manufacturer standard installation details.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.

1.08 MOCK-UP

- A. Exterior Wall Assembly Mock-Up: Provide full-scale, freestanding, 10' x 10' exterior wall mock-up illustrating all components including metal stud framing, weather resistive barrier, exterior sheathing, insulated metal panel systems, membrane flashings, metal flashings, sealants and window frame. Include 4'x4' window frame.

PRODUCTS

2.01 MATERIALS – MEMBRANE FLASHING (SELF-ADHERING)

- A. Membrane Flashing (Self-Adhering): GCP Applied Technologies (W.R. Grace) or approved equal.
 - 1. Vycor Plus: 25 mil thickness. Use: Sealing joints, seams, holes and unwanted openings in vertical surfaces. Window and door rough openings and other exterior wall rough openings. Not for use at roof areas.
 - 2. Vycor V40: 40 mil thickness. Use: Sealing critical non-roof detail areas, joints, seams, wall terminations and intersection details. Masonry Walls. Not for use at roof areas.
 - 3. VYCORners: Prefabricated corners for use at windows, doors, louvers and other exterior wall openings and penetrations.
 - 4. Perm-A-Barrier Wall Flashing: 40 mil thickness. Use: Base of wall detail areas, foundation detail areas, parapet wall detail areas, vertical leg of metal flashings.
 - 5. Perm-A-Barrier Detail Membrane: 3/64-inch thickness. Use: Detail areas, steel angles and steel framing, masonry wall details.

2.02 MATERIALS – MEMBRANE UNDERLAYMENT

- A. Acceptable manufacturer: GCP Applied Technologies (W.R. Grace).
- B. Membrane Underlayment (High-Temperature): Grace Ultra. Cold-applied, self-adhering membrane for high temperature applications; composed of a high strength polyethylene film coated on one side with a layer of butyl rubber adhesive. Color: Gray-Black. 30 mil thickness. 34" wide rolls. 300 deg F Temperature Resistance.
 - 1. Installation: One layer of membrane underlayment (high-temperature) on sloped surfaces at roof ridges, eaves, rakes edges, valleys, hips, dormers, sidewalls and roof penetrations. One layer of membrane underlayment (high-temperature) to the entire roof deck for wind-driven rain protection.
 - 2. Scheduled Use: Standing Seam Metal Roofing. Top of parapet walls.

2.03 MATERIALS – WEATHER RESISTIVE BARRIER

- A. Weather Resistive Barrier (Spray-Applied Membrane):
 - 1. Weather Resistive Barrier (Vapor Permeable Air Barrier): GCP Applied Technologies (W.R. Grace). Perm-A-Barrier VP (Vapor Permeable). Single-component, fluid-applied, acrylic, vapor-permeable air barrier cures to form a resilient, monolithic, fully bonded elastomeric membrane. Impermeable to liquid water. Minimum 90 mil wet thickness, 45 mil dry thickness. Provide related primers, tapes, membrane flashings, sealants and other accessory components for complete system.
 - A. Cold Weather Installation: GCP Applied Technologies (W.R. Grace). Perm-A-Barrier VP LT (Low Temp).

2.04 ACCESSORIES

- A. Provide Stainless Steel fasteners.
- B. Manufacturer's tape compatible with exterior plywood sheathing, exterior gypsum sheathing, weather resistive barrier and membrane flashing materials.
- C. Metal Flashing and Trim: As specified in Section 07 62 00.
- D. Joint Sealants: Silicone sealant as specified in Section 07 92 00.
- E. Adhesives: Manufacturer's recommended adhesives.
- F. Primers: Manufacturer's recommended primers.
- G. Tape compatible with exterior gypsum sheathing.

2.05 FIBERGLASS CLIPS (THERMAL SPACER)

- A. Fiberglass Clips (Thermal Spacer): Cascadia Clip, fiberglass thermal spacer. Clip depth: 3 inch. Screws: Master gripper screws (DT 2000 coating) #14 x 5 inch; by Leland Industries, available from Cascadia Windows Ltd or equal.
 - 1. Vertical clip spacing of 16-inch o.c. maximum.
 - 2. Horizontal clip spacing of 16-inch o.c. maximum.
 - 3. Install clips in accordance to Manufacturer's Installation Instructions and Details.
 - 4. Install clips at inside and outside wall corners per manufacturer standard Details.
 - 5. Install clips at wall openings and wall perimeter edges per manufacturer standard Details.
 - 6. Install (2) screws at each clip into metal studs.
- B. Substitutions: "Or Equal". Under provisions of Section 01 60 00.

EXECUTION

3.01 INSTALLATION WEATHER RESISTIVE BARRIER (SPRAY-APPLIED / SHEET-APPLIED MEMBRANE)

- A. Do not use materials with defects that impair quality of product.
- B. Tape exterior sheathing butt joints prior to installation of weather resistive barrier.
- C. Cover exterior sheathing with weather resistive barrier.
- D. Coordinate weather resistive barrier installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- E. Extend weather resistive barrier coverage to interior side of wall openings at stud framing (heads / jambs / sills) prior to installation of membrane flashings at rough openings.
- F. Install in accordance with manufacturer's application instructions.

3.02 INSTALLATION MEMBRANE FLASHING AND ACCESSORIES

- A. Rough openings in exterior walls shall have membrane flashing placed on wall surfaces as indicated on drawings and as listed below:
 - 1. Membrane flashing shall extend to interior side of wall opening (full depth of opening) at all sides of opening. Membrane flashing shall extend a minimum of 9 inches beyond face of opening at all sides, lapping over weather resistive barrier.
 - 2. Frames shall have membrane flashing adhesively attached to the frame.
 - 3. Openings shall have metal head and sill flashing installed in accordance to drawings.
- B. Install membrane underlayment (high-temperature) over tops of parapet walls, prior to installation of metal coping. Membrane underlayment to lap over weather resistive barrier, extend over top of wall and over wall vertical face a minimum of 6 inches.
 - 1. Install membrane underlayment at saddle flashing locations. Lap up vertical face of abutting walls a minimum of 6 inches.
- C. Install membrane flashing strips @ masonry veneer anchors. Strip shall extend 1/2 inch wider (all sides) than anchors contact face at wall surface. Coordinate spacing with anchor spacing specified in Section 03 45 00 and 04 20 00.
- D. Install membrane flashing at all wall penetrations. Comply with manufacturer's standard installation details and in accordance with drawings.

3.03 INSTALLATION MEMBRANE UNDERLAYMENT

- A. Install membrane underlayment in accordance with manufacturer's instructions.

3.04 INSTALLATION MEMBRANE UNDERLAYMENT (HIGH TEMPERATURE)

- A. Install membrane underlayment (High Temperature) in accordance with manufacturer's instructions.

END OF SECTION

**SECTION 07 42 13
INSULATED METAL WALL PANELS**

PART 1 - GENERAL

1.01 REFERENCES

- A. American Architectural Manufacturer's Association (AAMA):
1. AAMA 501.1: Standard Test Method for Metal Curtain Walls for water penetration using Dynamic Pressure.
 2. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems.
 3. AAMA 621 - Voluntary Specifications for High Performance Organic Coatings on Coil Coated Architectural Hot Dipped Galvanized (HDG) & Zinc-Aluminum Coated Steel Substrates.
- B. ASTM International (ASTM):
1. ASTM A 653 - Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 2. ASTM A 755 - Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.
 3. ASTM A 792 - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 4. ASTM C 518 - Standard Test Method for Steady State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
 5. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus
 6. ASTM D714: Standard Test Method for Evaluating Degree of Blistering of Paints
 7. ASTM D968: Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive
 8. ASTM D1308: Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes
 9. ASTM D 1621 - Compressive Properties of Rigid Cellular Plastics.
 10. ASTM D 1622 - Apparent Density of Rigid Cellular Plastics. ASTM D968: Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive
 11. ASTM D1654: Standard Test Method for Evaluation of Painted or Coated Specimens Subject to Corrosive Environments.
 12. ASTM D2126: Standard Testing Method for Response of Rigid Cellular Plastic to Thermal and Humid Aging.
 13. ASTM D 2244 - Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
 14. ASTM D2247: Standard Practices for Testing Water Resistance of Coating in 100 percent Relative Humidity.
 15. ASTM D 5894 - Standard Practices for Cycle Salt Fog/UV Exposure of Painted Metal.
 16. ASTM D 6226 - Standard Test Method for Open Cell Content of Rigid Cellular Plastics

17. ASTM E 72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.
 18. ASTM E 84 - Test Methods for Surface Burning Characteristics of Building Materials.
 19. ASTM E 283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 20. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
 21. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
 22. ASTM E 1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.
- C. National Fire Protection Association (NFPA)
1. NFPA 259 – Test Method for Potential Heat of Building Materials.
 2. NFPA 268: Standard Test Method for Determining Ignitability of Exterior Wall Assemblies Using a Radiant Heat Energy Source.
 3. NFPA 285 – Evaluation of Fire Propagation Characteristics of Exterior Non-Load Bearing Wall Assemblies.
 4. NFPA 286 – Fire Test of Evaluating Conditions of Wall and Ceiling Finish to Roof Fire Growth.

1.04 PRE-INSTALLATION CONFERENCE

- A. Convene one (1) week prior to commencing Work of this Section, under provisions of Section 01 31 00.
- B. Prior to erection of framing, conduct pre-installation meeting at site attended by Owner, Architect, metal panel installer, metal panel manufacturer's technical representative, inspection agency and related trade contractors.
 1. Coordinate building framing in relation to metal panel system.
 2. Coordinate openings and penetrations of metal panel system.

1.06 COORDINATION

- A. Coordinate work under provisions of Section 01 31 00.
- B. Coordinate with the work of Section 07 62 00 for installing flashing.

1.02 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Shop Drawings: Indicate panel layout, material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

- C. Product Data: Provide data on metal types, finishes, and characteristics.
- D. Submit specified trade association installation instructions.

1.04 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Product Data: Manufacturer's data sheets for specified products.
- C. Shop Drawings: Show layouts of metal panels. Include details of each condition of installation, panel profiles, and attachment to building. Provide details at a minimum scale 1-1/2-inch per foot of edge conditions, joints, fastener and sealant placement, flashings, openings, penetrations, and special details. Make distinctions between factory and field assembled work.
 - 1. Include data indicating compliance with performance requirements.
 - 2. Indicate points of supporting structure that must coordinate with metal panel system installation.
 - 3. Include structural data indicating compliance with performance requirements and requirements of local authorities having jurisdiction.
- C. Samples for Initial Selection: For each exposed product specified including sealants. Provide representative color charts of manufacturer's full range of colors. Submit two (2), 8"x10" samples illustrating metal finish color and panel profiles.
- E. Product Test Results: Indicating compliance of products with requirements.
- F. Qualification Information: For panel installer
- G. Accreditation Certificate: Indicating that manufacturer is accredited under an accredited third-party Quality Control Program, including IAS AC472 and based upon chapter 17 of the International Building Code (IBC).

1.06 MAINTENANCE DATA

- A. Submit under provisions of Section 01 77 00.

1.07 QUALITY ASSURANCE

- A. Manufacturer/Source: Provide metal panel assemblies and accessories from a single manufacturer approved under an accredited third-party quality control program.
- B. Manufacturer Qualifications: Approved manufacturer listed in this Section with minimum ten years' experience in the manufacturing of similar products and successful use in similar applications.
 - 1. Approval of Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for substitution review:
 - a. Product data, including certified independent test data indicating compliance with requirements.
 - b. Samples of each component.
 - c. Sample submittal from similar project.

- d. Project references: Minimum of five installations not less than five years old, with Owner and Architect contact information.
 - e. Sample warranty.
 - f. Certificate from an accredited third-party Quality Control Program.
2. Manufacturer to be registered with a Program Operator with a Certified, Environmental Product Declaration, in conformance with ISO 14025, for Insulated Metal Panels.
 3. Substitutions following award of contract are not allowed except as stipulated in Division 01 General Requirements
 4. Approved manufacturers must meet separate requirements of Submittals Article.
- C. Installer Qualifications: Experienced Installer certified by metal panel manufacturer with minimum of five years' experience with successfully completed projects of a similar nature and scope.
1. Installer's Field Supervisor: Experienced mechanic certified by metal panel manufacturer supervising work on site whenever work is underway.

1.08 **MOCK UP**

- A. Before construction of the exterior envelope, construct a mock-up to verify selections made under approved submittals and to demonstrate typical joints, surface finish, texture, tolerances, attachments to building structure, methods of installation, connections to adjacent building enclosure materials, and standard and quality of workmanship. Build mock-up to comply with the following requirements using materials indicated for completion of the Work:
1. Mock-up shall be a minimum of 64 square feet (8' x 8') and shall demonstrate substrate surface preparation, weather resistive barrier, membrane flashings, joint and crack treatment, solid phenolic rainscreen panel attachment, penetration sealing, connection to window and other adjacent building envelope materials, attachment method to wall substrate, and standard of workmanship.
 2. Demonstrate continuity, air, and water tightness of air and water barrier and installation and attachment of continuous exterior insulation.
 3. If Architect determines that the field constructed mock-up does not meet Project requirements, reconstruct mock-up until approved.
 4. Retain and maintain the approved field mockup during construction in an undisturbed condition as a standard for judging the completed exterior solid phenolic rainscreen panel system. The mock-up may not be part of the completed Work.

1.00 **DELIVERY, STORAGE, AND PROTECTION**

- A. Deliver, store, protect, and handle products to site under provisions of Section 01 60 00.
- B. Protect products of metal panel system during shipping, handling, and storage to prevent staining, denting, deterioration of components or other damage. Protect panels and trim bundles during shipping. Protect painted surfaces with a protective covering before shipping.
1. Deliver, unload, store, and erect metal panels and accessory items without deforming panels or exposing panels to surface damage from weather or construction operations.
 2. Store in accordance with Manufacturer's written instructions.

3. Shield foam insulated metal panels from direct sunlight until all components are installed.
- C. Prevent contact with materials that may cause discoloration or staining.

1.10 WARRANTY

- A. Provide manufacturer's warranties under provisions of Section 01 77 00.
- B. Limited Warranty: Standard form in which manufacturer agrees to repair or replace items that fail in materials or workmanship within specified warranty period. The items covered by the warranty include structural performance including bond integrity, deflection and buckling.
1. Warranty Period: Two (2) years from date of Substantial Completion, or 2 years and 6 months from the date of shipment from manufacturer's plant, whichever occurs first.
- C. Finish Warranty: Submit Manufacturer's limited warranty on the exterior paint finish for adhesion to the metal substrate and limited warranty on the exterior paint finish for chalk and fade.
- D. Thermal Warranty: Standard form in which manufacturer agrees to repair or replace panels that exhibit greater than 10% reduction from published material R-value at time of manufacture as measured in accordance with ASTM C518 within specified warranty period.
1. Warranty Period: Thirty (30) years from date of Substantial Completion or 30 years and 3 months from date of shipment from manufacturer's plant, whichever occurs first.
- E. The installation contractor shall issue a separate warranty against defects in installed materials and workmanship, beginning from the date of substantial completion of the installation.

1.11 COLORS

- A. Colors are specified on Colors and Materials Schedule on drawings.

1.12 ALTERNATES

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. Basis of Design: Kingspan Insulated Panels
- B. Substitutions: Under provisions of Section 01 60 00.

2.02 PERFORMANCE REQUIREMENTS

- A. General: Provide metal panel system meeting performance requirements as determined by application of specified tests by a qualified testing facility on manufacturer's standard assemblies.
- B. Structural Performance: Provide metal panel assemblies capable of withstanding the effects of indicated loads and stresses within limits and under conditions indicated, as determined by ASTM E 72 or ASTM E 1592 applied in accordance with ICC AC 04, Section 4, Panel Load Test

Option or Section 5, Panel Analysis Option:

1. Wind Loads: Determine loads based on applicable building code, wind speed, importance factor, exposure category, and internal pressure coefficient indicated on drawings.
 - a. Wind Negative Pressure: Certify capacity of metal panels by testing of proposed assembly.
 2. Deflection Limits: Withstand inward and outward wind-load design pressures in accordance with applicable building code with maximum deflection of 1/180 of the span with no evidence of failure.
- C. Fire Performance Characteristics: Provide metal panel systems with the following fire-test characteristics determined by indicated test standard as applied by testing and inspection agency acceptable to authorities having jurisdiction.
1. Surface-Burning Characteristics: The insulating core shall have been tested per ASTM E 84. The core shall have:
 - a. Flame spread index: 25 or less.
 - b. Smoke developed index: 450 or less.
 2. Fire Propagation: The fire assembly shall meet the requirements of the standard for NFPA 285
 3. Fire Growth: The fire assembly shall meet the requirements of the standard for NFPA 286
 4. Potential Heat: Determined in accordance with NFPA 259
 5. IBC Chapter 26: Panel Performance under the above test methods, shall meet the requirements of IBC, Chapter on foam plastics.
- E. Air Infiltration, ASTM E 283:
1. Maximum 0.0002 cfm/sq. ft. at static air pressure difference of 1.57 lbf/sq. ft.
 2. Maximum 0.0009 cfm/sq. ft. at static-air-pressure difference of 6.24 lbf/sq. ft..
 3. Maximum 0.01 cfm/sq. ft. at static-air-pressure difference of 20 lbf/sq. ft.
- F. Water Penetration Static Pressure:
1. ASTM E 331: No uncontrolled water penetration at a static pressure of 20 lbf/sq. ft.
 2. ASTM E 331 Modified (2 hour duration): No uncontrolled water penetration at a static pressure of 6.24 lbf/sq. ft.
- G. Thermal Movements: Allow for thermal movements from variations in both ambient and internal temperatures. Accommodate movement of support structure caused by thermal expansion and contraction. Allow for deflection and design for thermal stresses caused by temperature differences from one side of the panel to the other.
- H. Thermal Performance: When tested in accordance with ASTM C 518, Measurement of Steady State thermal Transmission, the panels shall provide a k factor of 0.14 btu/sf/hr/deg F at a 75° F mean temperature, or 0.126 btu/sf/hr/deg F at a 40° F mean temperature.

2.03 FABRICATION

- A. General: Provide factory fabricated and finished metal panels, trim, and accessories meeting performance requirements, indicated profiles, and structural requirements.
- B. Fabricate metal panel joints configured to accept sealant providing weathertight seal.

- C. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's written instructions, approved shop drawings, and project drawings.

2.04 **HORIZONTAL METAL WALL PANEL (IWP-1)**

- A. King Span, QuadCore® KS series, Insulated Wall Panel System, concealed fastener wall panel system.
1. Insulated Core: QuadCore Polyisocyanurate core, ASTM C591 Type IV, CFC and HCFC free, compliant with Montreal Protocol and Clean Air Act
- B. Panel Assembly:
1. Panel Thickness: 3 inches
 2. Panel Width: 24 inches and as indicated on drawings.
 3. Panel Length: Minimum 10 feet, maximum 33 feet.
 4. Panel Attachment: Shall consist of fasteners and stainless steel attachment clip completely concealed within the panel side joint.
 5. Horizontal Panel Joint Reveals: 3/8 inch.
 6. Vertical Panel Joints: Trimless ends with EPDM black Gasket Insert. Aluminum extrusions at corners
- C. Exterior Face of Panel:
1. Material: Steel coil material shall be in accordance with ASTM A755 Grade 33, G90 galvanized steel in accordance with ASTM A653 and A924.
 2. Gauge: 22 gauge
 3. Profile: Mini Micro Rib
 4. Finish: 2.4 mil. Fluoropolymer (PVDF) Three Coat system: 0.8 mil primer with 0.8 mil Kynar 500 (70 percent) SOLID color coat and 0.8 mil clear coat.
 5. Color: Custom Color as noted in Materials Schedule on drawings.
- D. Interior Face of Panel
1. Material: Steel coil material shall be in accordance with ASTM A755 AZ50 Galvalume®/ Zinalume®.
 2. Gauge: 26 gauge
 3. Profile: Shadowline.
 - a. Profile description: Linear striations nominal 0.0625 inch deep by 3/4 inches wide at 3 inches on center.
 4. Finish: PVDF finish, dry film thickness of 1.0 mil including primer.
 5. Color: White
- E. Location: Building A - Operations Building and Building B - Fleet Maintenance Building.,
- F. Substitutions: "Or Equal". Under provisions of Section 01 60 00.

2.05 **VERTICAL METAL WALL PANEL (IWP-2)**

- G. King Span, Vale Series, Insulated Wall Panel System, concealed fastener wall panel system.
 - 1. Insulated Core: Polyisocyanurate core, ASTM C591 Type IV, CFC and HCFC free, compliant with Montreal Protocol and Clean Air Act
- H. Panel Assembly:
 - 1. Panel Thickness: 4 inches
 - 2. Panel Width: 36 inches and as indicated on drawings.
 - 3. Panel Length: Full length (height) panels, no horizontal joints.
 - 4. Panel Attachment: Shall consist of fasteners and stainless steel attachment clip completely concealed within the panel side joint.
 - 5. Horizontal Panel Joint Reveals: None mid-span, Aluminum extrusions at top, bottom of wall and opening.
 - 6. Vertical Panel Joints: Trimless ends with EPDM black Gasket Insert. Aluminum extrusions at corners
- I. Exterior Face of Panel:
 - 1. Material: Steel coil material shall be in accordance with ASTM A755 Grade 33, G90 galvanized steel in accordance with ASTM A653 and A924.
 - 2. Gauge: 22 gauge
 - 3. Profile: Vale
 - 4. Finish: 2.4 mil. Fluoropolymer (PVDF) Three Coat system: 0.8 mil primer with 0.8 mil Kynar 500 (70 percent) SOLID color coat and 0.8 mil clear coat.
 - 5. Color: Custom Color as noted in Materials Schedule on drawings.
- J. Interior Face of Panel
 - 1. Material: Steel coil material shall be in accordance with ASTM A755 AZ50 Galvalume®/ Zinalume®.
 - 2. Gauge: 24 gauge
 - 3. Profile: Shadowline.
 - a. Profile description: Linear striations nominal 0.0625 inch deep by 3/4 inches wide at 3 inches on center.
 - 4. Finish: PVDF finish, dry film thickness of 1.0 mil including primer.
 - 5. Color: White
- K. Location: Building A - Operations Building and Building B – Fleet Maintenance Building.,
- L. Substitutions: “Or Equal”. Under provisions of Section 01 60 00.

2.06 **HORIZONTAL METAL WALL PANEL (IWP-3)**

- 1. King Span, QuadCore® KarrierPanel, Insulated Barrier Wall Panel System
- 2. Insulated Core: QuadCore Polyisocyanurate core, ASTM C591 Type IV, CFC and HCFC free, compliant with Montreal Protocol and Clean Air Act
- A. Panel Assembly:

1. Panel Thickness: 3 inches
 2. Panel Width: 24 inches and as indicated on drawings.
 3. Panel Length: Minimum 8 feet, maximum 33 feet.
 4. Panel Attachment: Shall consist of fasteners and stainless steel and 16 gauge galvanized strapping at panel side joints.
 5. Horizontal Panel Joint Reveals: 3/8 inch.
 6. Vertical Panel Joints Reveals: 3/8 inch.
- B. Exterior Face of Panel:
1. Material: Steel coil material shall be in accordance with ASTM A755 Grade 33, G90 galvanized steel in accordance with ASTM A653 and A924.
 2. Gauge: 26 gauge
 3. Profile: Shadowline.
 - a. Profile description: Linear striations nominal 0.0625 inch deep by 3/4 inches wide at 3 inches on center.
 4. Finish: Finish: PVDF finish, dry film thickness of 1.0 mil including primer.
 5. Color: White
- C. Interior Face of Panel
1. Material: Steel coil material shall be in accordance with ASTM A755 AZ50 Galvalume®/ Zinalume®.
 2. Gauge: 26 ga
 3. Profile: Shadowline.
 - a. Profile description: Linear striations nominal 0.0625 inch deep by 3/4 inches wide at 3 inches on center.
 4. Finish: PVDF finish, dry film thickness of 1.0 mil including primer.
 5. Color: White
- D. Location: Building A - Operations Building and Building B - Fleet Maintenance Building behind masonry wainscot.
- E. Substitutions: "Or Equal". Under provisions of Section 01 60 00.

2.07 METAL WALL PANEL ACCESSORIES

- A. General: Provide complete metal panel assemblies incorporating trim, copings, fasciae, gutters and downspouts, and miscellaneous flashings. Provide required fasteners, closure strips, and sealants as indicated in manufacturer's written instructions.
- B. Flashing and Trim:
1. Match material, thickness, and finish of metal panels.
 2. Extruded perimeter trim: Shall be extruded aluminum 6063-T5 alloy with spray applied PVF coating in same color as exterior face of insulated metal wall panel.
- C. Panel Clips: ASTM A 653/A 653M, G90 (Z180) hot-dip galvanized zinc coating, one-piece, configured for concealment in panel joints, and identical to clips utilized in tests demonstrating compliance with performance requirements.
- D. Panel Fasteners: Self-drilling or Self-tapping screws and other acceptable fasteners

recommended by metal panel manufacturer. Where exposed fasteners cannot be avoided, supply corrosion-resistant fasteners with heads matching color of metal panels by means of factory-applied coating, with weathertight resilient washers.

- E. Joint Sealers:
1. Sealants: Provide Tape Mastic Sealants, Non-skinning sealants, and Urethane Sealants in accordance with manufacturers standards
 2. Vertical Joint Gasket: Manufacturers standard EPDM gasket. Color: Black

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine metal panel system substrate with Installer present. Inspect for erection tolerances and other conditions that would adversely affect installation of metal panels.
1. Inspect framing that will support insulated metal panels to determine if support components are installed as indicated on approved shop drawings and are within tolerances acceptable to metal panel manufacturer and installer. Confirm presence of acceptable framing members at recommended spacing to match installation requirements of metal panels.
 2. Panel Support Tolerances: Confirm that metal panel supports are within tolerances acceptable to metal panel manufacturer but not greater than the following:
 - a. 1/4 inch in 20 foot in any direction.
 - b. 3/8 inch over any single wall plane.
 - c. Plumb or level within 1/8 inch at all changes of transverse for pre-formed corner panel applications.
 - d. Verify that bearing support has been provided behind vertical joints of horizontal panel systems and horizontal joints of vertical panel systems. Width of support shall be as recommended by manufacturer.
 - e. Correct out-of-tolerance work and other deficient conditions prior to proceeding with insulated metal panel installation.

3.02 METAL PANEL INSTALLATION

- A. Concealed-Fastener Insulated Metal Panels with foam core: Install metal panel system in accordance with manufacturer's written instructions, approved shop drawings, and project drawings. Install metal panels in orientation, sizes, and locations indicated. Anchor panels and other components securely in place. Provide for thermal and structural movement.
- B. Attach panels to metal framing using screws, fasteners, sealants, and adhesives recommended for application by metal panel manufacturer.
1. Fasten metal panels to supports with fasteners at each location indicated on approved shop drawings, at spacing and with fasteners recommended by manufacturer.
 2. Cut panels in field where required using manufacturer's recommended methods.
 3. Provide weatherproof jacks for pipe and conduit penetrating metal panels.
 4. Dissimilar Materials: Where elements of metal panel system will come into contact

with dissimilar materials, treat faces and edges in contact with dissimilar materials as recommended by metal panel manufacturer

- C. Attach panel flashing trim pieces to supports using recommended fasteners and joint sealers
- D. Joint Sealers: Install sealants where indicated and where required for weatherproof performance of metal panel assemblies
 - 1. Seal panel base assembly, openings, panel head joints, and perimeter joints using sealants indicated in manufacturer's instructions
 - 2. Seal wall panel joints; apply continuously without gaps in accordance with manufacturer's written instructions, approved shop drawings, and project drawings
 - 3. Prepare joints and apply sealants per requirements of Division 07 Section.

3.03 ACCESSORY INSTALLATION

- A. General: Install metal panel accessories with positive anchorage to building and weather tight mounting; provide for thermal expansion. Coordinate installation with flashings and other components.
 - 1. Install components required for a complete metal panel assembly, including trim, copings, flashings, sealants, closure strips, and similar items.
 - 2. Comply with details of assemblies utilized to establish compliance with performance requirements and manufacturer's written installation instructions.
 - 3. Set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently weather resistant.
 - 4. Field drill weep holes where appropriate in horizontal trim; minimum 1/4 inch diameter at 24 inches on center.

3.04 SEALANT INSTALLATION FOR EXPOSED JOINTS

- A. Clean and prime surfaces to receive exterior exposed sealants in accordance with sealant manufacturer's recommendations.
- B. Follow sealant manufacturer's recommendations for joint width-to-depth ratio, application temperature range, size and type of backer rod, and compatibility of materials for adhesion.
- C. Direct contact between butyl and silicone sealants shall not be permitted.

3.04 FIELD QUALITY CONTROL

- A. Inspection will be performed by firm appointed in accordance with Section 01 45 00 for compliance to the work of this Section.
- B. Testing Agency: Engage an independent testing and inspecting agency acceptable to Architect to perform field tests and inspections and to prepare test reports.
- C. Water-Spray Test: After completing portion of metal panel assembly including accessories and trim, test 2-bay area selected by Architect for water penetration, according to AAMA 501.2.

3.05 CLEANING AND PROTECTION

- A. Protect finished installation under provisions of Section 01 50 00.
- B. Remove temporary protective films immediately in accordance with metal panel

manufacturer's instructions. Clean finished surfaces as recommended by metal panel manufacturer.

- C. Replace damaged panels and accessories that cannot be repaired to the satisfaction of the Architect.

END OF SECTION

**SECTION 07 46 19
METAL SIDING AND SOFFIT PANELS**

PART 1 – GENERAL

1.01 REFERENCES

- A. AISI (American Iron and Steel Institute) - Stainless Steel - Uses in Architecture.
- B. ASTM A525 - Steel Sheet, Zinc Coated, (Galvanized) by the Hot-Dip Process.
- C. ASTM B32 - Solder Metal.
- D. ASTM B209 - Aluminum and Alloy Sheet and Plate.
- E. ASTM B370 - Copper Sheet and Strip for Building Construction.
- F. ASTM B486 - Paste Solder.
- G. ASTM D226 - Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
- H. ASTM D4586 - Asphalt Roof Cement, Asbestos-Free.
- I. CDA (Copper Development Association) - Contemporary Copper, A Handbook of Sheet Copper Fundamentals, Design, Details and Specifications.
- J. CDA - Copper Roofing - A Practical Handbook.
- K. FS O-F-506 - Flux, Soldering, Paste and Liquid.
- L. NRCA (National Roofing Contractors Association) - Roofing Manual.
- M. SMACNA - Architectural Sheet Metal Manual.
- N. AAMA – American Architectural Manufacturers Association.

1.02 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Shop Drawings: Indicate siding material and panel material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
- C. Samples: Submit two (2) siding material and panel material samples, illustrating typical material and finish.

1.03 QUALIFICATIONS

- A. Fabricator and Installer: Company specializing in sheet metal flashing work with three (3) years experience.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle products to site under provisions of Section 01 60 00.
- B. Stack preformed material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- C. Prevent contact with materials that may cause discoloration or staining.

1.05 ALTERNATES

- A. See Section 01 23 00 for bidding alternates affecting the Work of this Section.

1.06 COLORS

- A. Colors are specified on Colors and Materials Schedule on the drawings.

PART 2 – PRODUCTS

2.01 MANUFACTURERS:

- A. AEP SPAN
- B. Morin Corporation
- C. MBCI
- D. McElroy Metal
- E. Nu-ray Metals
- D. Substitutions: Under provisions of Section 01 60 00.

2.02 VERTICAL METAL SIDING MATERIAL (VMS)

- A. Basis of Design: Morin Corporation, VB-36 Profile. 20 gauge. Exposed fastener wall panel system.
- B. Finish: Fluropon Coastal PVDF, factory paint coating
- C. Substitutions: Under provisions of Section 01 60 00.

2.03 METAL SOFFIT PANEL MATERIAL (MSP)

- A. Basis of Design: McElroy Metals, Marquee-lock, 22 gauge.
- B. Finish: Fluropon Coastal PVDF, factory paint coating.
- C. Substitutions: Under provisions of Section 01 60 00.

2.08 ACCESSORIES

- A. Exposed Fasteners: Stainless steel self-tapping screws with soft neoprene washers. Factory finished Color Coated; color to match metal siding material and metal panel material.

- B. Concealed Fasteners: Stainless steel self-tapping screws with soft neoprene washers. Stainless steel rivets.
- C. Metal Flashings and Trim: Fabricated of same material, gauge and finish as metal siding material and metal panel material, unless noted otherwise on drawings.
- D. Profiles and Closures: Provide manufacturers standard profiles and closure strips.
- E. Isolation Tape (Dissimilar Metal Tape): Provide manufacturers standard separation tape.
- F. Accessories: Provide manufacturer's standard outside closure, inside closure, retention clips, metal flashings, metal trim profiles and other accessories as required for complete installation.
- G. Membrane Flashings: Type as specified in Section 07 25 00.
- H. Weather Resistive Barrier: Type as specified in Section 07 25 00.
- I. Metal Subgirt (Sub-framing): As specified in Section 05 40 00.
- J. Joint Sealant: Silicone sealant. Type as specified in Section 07 92 00.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are ready to receive work.
- B. Beginning of installation means acceptance of substrate.

3.02 INSTALLATION

- A. General: Comply with metal siding and metal panel manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply. Center fasteners in elongated slots without binding metal siding and metal panel to allow for thermal movement. Overlap joints to shed water away from direction of prevailing wind.
- B. Install vertical metal siding, trim, flashing and accessories according to manufacturer's installation instructions.
- C. Install metal wall panels, trim, flashing and accessories according to manufacturer's installation instructions.
- D. Install metal soffit panels, trim, flashing and accessories according to manufacturer's installation instructions.
- E. Install metal flashings and accessories according to SMACNA - Architectural Sheet Metal Manual.
- F. Install isolation tape between vertical metal siding and metal subgirt (metal sub-framing).
- G. Install metal siding] and [metal panels plumb and true and in proper alignment.

- H. Install metal siding systems and metal panel systems without waves, warps, buckles or distortion, allow for thermal movement.
- I. Secure metal siding and metal panels without warp or deflection.
- J. Install metal profiles and trim pieces at end conditions of vertical metal siding; including wall openings, outside corners, inside corners and base of wall conditions.
- K. Refer to Section 07 62 00 for exterior wall assembly metal flashing installation requirements prior to installation of vertical metal siding.
- L. Isolate dissimilar metals by separating with rubber gaskets or elastomeric sealant. Use rubber washers where fasteners made from dissimilar metal penetrate panels. Isolate dissimilar metals behind panels by covering with polyethylene film.

3.03 ADJUSTING AND CLEANING

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

END OF SECTION

**SECTION 07 54 23
TPO ROOFING**

PART 1 – GENERAL

1.01 REFERENCES

- A. ANSI/ASTM D412 – Rubber Properties in Tension.
- B. ANSI/ASTM D746 – Brittleness Temperature of Plastics and Elastomers by Impact.
- C. ASTM D624 – Rubber Property – Tear Resistance.
- D. ASTM D822 – Practice for Operating Light and Water-exposure Apparatus (Carbon-Arc Type) for Testing Paint, Varnish, Lacquer, and Related Products.
- E. ASTM D1004 – Initial Tear Resistance of Plastic Film and Sheeting.
- F. ASTM D2240 – Rubber Property – Durometer Hardness.
- G. ASTM E96 – Water Vapor Transmission of Materials.
- H. FS HH-I-526 – Insulation Board, Thermal (Mineral Fiber).
- I. FS HH-I-529 – Insulation Board, Thermal (Mineral Aggregate).
- J. FS HH-I-530 – Insulation Board, Thermal (Urethane).
- K. FS HH-I-551 – Insulation Block and Board, Thermal (Cellular Glass).
- L. FS LLL-I-535 – Insulation Board, Thermal (Cellulosic Fiber).

1.02 SYSTEM DESCRIPTION

- A. 60 mil thick Reinforced Thermoplastic Polyolefin (TPO) membrane roof assembly to conform to UL requirements for a Class A rated assembly and UL requirements for uplift resistance. Manufacturer / installer shall provide all components required to meet UL Class A rated assembly.

1.03 QUALITY ASSURANCE

- A. Membrane Manufacturer: Company specializing in sheet roof membranes with five (5) years experience.
- B. Applicator: Company specializing in installation of sheet roof membranes with three (3) years documented experience approved by membrane manufacturer.
- C. All materials used in or in conjunction with the roofing system shall be manufactured by or approved by one manufacturer.
- D. Each Bidder shall be prepared to provide documentation for Class-A assembly provided by their product.

1.04 REGULATORY REQUIREMENTS

- A. Underwriters Laboratories, Inc. (UL): Class - A Fire Hazard Classification.

1.05 SUBMITTALS

- A. Product Data: Submit specifications, installation instructions, and general recommendations from manufacturers of sheet roofing system materials, for types of roofing required. Include data substantiating that materials comply with requirements.
- B. Shop Drawings: Submit complete shop drawings showing roof configuration and sheet layout, details at perimeter, and special conditions:
 - 1. Indicate layout of tapered insulation materials and thicknesses.
 - 2. Indicate layout of all mechanical fasteners.
 - 3. Submit manufacturer's standard details, modified standard details or special details. Submit letter (prior to roofing installation) from manufacturer stating that all materials and details used by the installer meet the manufacturer's requirements to be warranted by the manufacturer for twenty (20) years.
- C. Samples: Submit samples of all roofing materials and accessories.
- D. Pre-Roofing Conference: Submit copies of pre-roofing conference records.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site under provisions of Section 01 60 00.
- B. Under provisions of Section 01 60 00, store materials in weather protected environment clear of ground and moisture. Protect foam insulation from direct sunlight exposure.

1.07 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply membrane during inclement weather or when air temperature is below 40 degrees F.

1.08 PRE-INSTALLATION CONFERENCE

- A. Convene a pre-installation conference one (1) week prior to commencing work of this Section.
- B. Require attendance of parties directly affecting work of this Section.
- C. Review conditions of installation, installation procedures, and coordination required with related work.

1.09 WARRANTY

- A. Provide minimum twenty (20) year manufacturer's warranty under provisions of Section 01 77 00. Warranty shall be provided by the manufacturer of the system, not the marketer.
- B. Warranty: Include coverage of materials (entire system, including fasteners) and installation and resultant damage resulting from failure to resist penetration of moisture; defective materials and workmanship.
 - 1. Warranty Period: Minimum twenty (20) years after date of Final Acceptance. Warranty shall not exclude damage from improper application or environmental contaminants.

1.10 PRECAUTIONS

- A. Adhesives, primer, and caulks as indicated are extremely flammable and/or toxic. Use precautions indicated on can and carton labels.
- B. Surfaces to be bonded shall be dry and clean. Suitable surfaces are usually considered to be smooth, solid masonry, wood, and metal plus well-fastened insulation board that is considered water resistant and accepted for adhered applications by roofing manufacturer.
- C. After exposure to sunlight for 24 hours or longer, membranes may have achieved a "surface curing". Prior to hot air welding an application of primer is required to achieve a proper weld. The need for primer is determined by a test weld.
- D. All fasteners should be installed with a depth-sensing screw gun to prevent overdriving.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS – MEMBRANE

- A. Basis of Design: Carlisle SynTec, Sure-Weld, Reinforced Thermoplastic Polyolefin (TPO) membrane, mechanically fastened system.
- B. Substitution: Under provisions of Section 01 60 00.

2.02 MEMBRANE MATERIALS

- A. Membrane: White, 60 mils thick, Sure-Weld Reinforced Thermoplastic Polyolefin (TPO) membrane and scrim reinforcement, minimum 8 feet wide roll conforming to the following criteria.

PROPERTIES	TEST	RESULTS
Breaking strength, minimum (Grab method)	ASTM D751	250 lbf
Tear strength, minimum (Tongue tear)	ASTM D751	55 lbf
Brittleness	ASTM D2137	-40 deg C Pass
Heat aging, 32 days at 240 degrees F,	ASTM D573	90% breaking strength, 90% elongation (reinforced)
Water absorption psi minimum (Method A) 158 degrees F, 7 days	ASTM D471	Plus 3% weight change
Ozone resistance 100 deg F – 70 hours	ASTM D1149	Pass
Dimensional stability 24 hours at 54 deg C	ASTM D1204	+/- 0.3%
Puncture resistance,	FTM 101C	300 lbf

minimum Method 2031

- B. Seaming and Adhesive Materials: As recommended by membrane manufacturer.
- C. Flexible Flashing: 60 mil thick unreinforced TPO membrane; white color; manufactured by membrane manufacturer.
- D. Prefabricated Perimeter Flashing: TPO coated metal flashing flanges.

2.03 INSULATION MATERIALS

- A. Rigid Insulation: Rigid insulation shall be compatible with single-ply membrane and be provided by membrane manufacturer. Polyisocyanurate (ISO) rigid insulation. (LTTR) of R-5.7 per inch thickness. Refer to Building Thermal Envelope Legend for insulation Washington State Energy Code requirements.
- B. Rigid Insulation: Provided by membrane manufacturer for mechanically fastened application in a Class-A assembly.
- C. Fasteners: Metal plates and screws as recommended by insulation manufacturer for deck type and complying with fire rating assembly requirements. Fasteners approved by primary sheet roofing manufacturers.

2.04 CANTS

- A. Fiber Cant and Tapered Edge Strips: Perlite or wood fiberboard, approved by membrane manufacturer, preformed to 45 degree angle; or as required by details.

2.05 TAPERED INSULATION CRICKETS

- A. Tapered Insulation System: Factory tapered perlite with a minimum slope of 1/4 in./ft unless otherwise noted; ASTM C728; approved for use with single-ply mechanically attached membrane roofing. Compression resistance: 35 psi, water absorption 1.2%; ASTM C209; weight: 0.9lbs/SF.
 - 1. Provide tapered cricket insulation over rigid foam insulation cover board earlier specified.
 - 2. Provide roofing membrane manufacturer's written approval of system layout and fastening.

2.06 ACCESSORIES

- A. Sealants: As recommended by membrane manufacturer.
- B. Cover Board: Georgia-Pacific, DensDeck cover board, minimum 1/4 inch thickness, ASTM C1177 as recommended and provided by membrane manufacturer. 4 ft x 8 ft boards.
- C. Reglet and Counter Flashing: As specified in Section 07 62 00.
- D. Coping Flashing: Pre-coated galvanized steel, ASTM A525, G-90 hot dipped galvanized 24-gauge core steel, shop pre-coated with standard pretreatment and primer coating. As specified in Section 07 62 00.

- E. Exposed Scuppers: Aluminum; ASTM B209, alloy 3003, temper H14, AA-C22A41 dark bronze anodized finish; 0.063 in. thick except as otherwise indicated. As specified in Section 07 62 00.
- F. Insulation Joint Tape: Manufacturer's standard glass fiber reinforced; 4 to 6 inch wide; self-adhering.
- G. Traffic Surfacing Walkway: Sure-weld heat weldable walkway rolls heat welded to the membrane surface provided by membrane manufacturer.
- H. Mechanical Fasteners for Insulation: Appropriate to purpose intended and approved by UL; length required for thickness of material; with metal washers; manufactured by membrane manufacturer.
- I. Disc Washers and Screws: Membrane manufacturer's standard.
- J. Flashing Materials: Manufacturer's standard system compatible with sheet membrane. Including premolded inside and outside corners, pipe flashing and square tube wraps.
- K. Roof Vents: One-way 2-inch-diameter vapor pressure relief vents at a rate of one per 1000 sq ft of roof area.
- L. All roof accessories to be installed per sheet roofing membrane manufacturer's approved details.

PART 3 – EXECUTION

3.01 INSPECTION

- A. Membrane manufacturer's technical advisor shall field inspect prepared roof surface prior to membrane application and compile a written report to the Architect prior to roofing membrane application.
- B. Contractor shall verify that insulation and other systems have been installed complying with membrane manufacturer's recommended practices.
- C. Verify deck is clean and smooth, free of depressions, waves, or projections, properly sloped to drains.
- D. Verify roof openings and penetrating elements through roof are solidly set, Fiber cant strips, nailing strips, and reglets are in place. Verify deck is supported and secured.
- E. Do not apply roofing materials to damp, frozen, dirty, dusty, or deck surfaces unacceptable to manufacturer.
- F. Verify deck surfaces are dry and free of snow or ice. Confirm dry deck by moisture meter with 12 percent moisture maximum.
- G. Beginning installation means acceptance of substrate.

3.02 PREPARATION

- A. Install metal reglets flashing and mechanically fasten rigid. Apply sealant to top edge continuous.

3.03 INSULATION APPLICATION

- A. Verify sheathing paper is clean and dry.
- B. Place layers of insulation and cover board in accordance with insulation manufacturer's instructions.
- C. Insulation shall be installed in compliance with the flamespread and smoke density requirements of Section 2603 of the IBC.
- D. Lay insulation boards to moderate contact without forcing joints. Cut insulation to fit neatly to perimeter blocking and around protrusions through roof.
- E. Lay tapered boards back from roof drains for positive drainage.
- F. Lay tapered boards to establish pitch to drains. Provide positive slope (minimum 1/8 in./ft; unless otherwise noted; from horizontal).
- G. Mechanically or adhesively fasten insulation boards per roofing manufacturer's recommendations.
- H. Tape joints of insulation in accordance with insulation manufacturer's instructions.
- I. Install cant strips to internal corners by mechanical fasteners.
- J. Apply separation sheet in accordance with manufacturer's instructions.

3.04 MEMBRANE INSTALLATION

- A. Install membrane roofing in accordance with membrane manufacturer's instructions.
- B. Roll out membrane. Minimize wrinkles and bubbles.
- C. Overlap edges and ends minimum 4-1/2 inch and heat seal. Apply uniform bead of sealant to cut edges.
- D. Install mechanical fasteners in accordance with manufacturer's recommendations.
- E. Shingle joints on sloped substrate in direction of drainage.
- F. Seal adjoining surfaces.
- G. Continue membrane up vertical surfaces minimum 8 in. unless otherwise noted.
- H. Seal items penetrating membrane with counterflashing membrane material.
- I. Install flashings. Seal watertight to membrane.
- J. Reinforce membrane with multiple thickness of membrane material over joints, whether joints are static or moving.
- K. Apply roof control and expansion joint materials to isolate roof into areas as shown.

- L. Place traffic surfacing (walkway roll) at locations noted on roof plan. As a minimum, install continuous walkway extending from roof hatch to each roof drain and each HVAC mechanical unit. Install walkway along all sides of HVAC mechanical units.
- M. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.

3.05 PROTECTION

- A. Protect finished installation under provisions of Section 01 50 00.
- B. After installation, close off area to prevent unauthorized traffic.

3.06 FIELD QUALITY CONTROL

- A. Inspection will be performed by firm appointed in accordance with Section 01 45 00 for compliance to the work of this Section.
- B. Manufacturer's technical representative shall provide final inspection report to Architect. This inspection will verify acceptance of installation by manufacturer for issuance of manufacturer's warranty. If any deficiencies are found to effect final acceptance by manufacturer, then the Contractor shall make any repairs; changes required for final acceptance by manufacturer; at his own expense with no cost to Owner/Architect.

3.07 CLEANING

- A. Remove trash, debris, equipment, and parts from job site.
- B. Repair damage and remove stains caused by work of this Section.

3.08 MAINTENANCE/EXTRA STOCK

- A. Instruct Owner's Representative in periodic maintenance of roof membrane. Provide maintenance manuals, warranties and information required for future maintenance.
- B. Maintenance Material: Provide complete set of materials to Owner for maintenance of roof membrane. Include 10 sf of material, all adhesives, caulk, and miscellaneous items required to repair minor leaks. Obtain receipt from Owner upon delivery and submit to Architect.

END OF SECTION

**SECTION 07 61 13
STANDING SEAM SHEET METAL ROOFING**

PART 1 - GENERAL

1.01 REFERENCES

- A. ASCE 7: Minimum Design Loads for Buildings and Other Structures.
- B. ASTM A361 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process for Roofing and Siding.
- C. ASTM A653: Steel Sheet, Zinc Coated (Galvanized) or Zinc Iron Alloy Coated (Galvannealed) by the Hot Dip Process.
- D. ASTM A792 - Steel Sheet, 55% Aluminum - Zinc Alloy - Coated by the Hot-Dip Process.
- E. ASTM D226 - Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
- F. ASTM D2178 - Asphalt Impregnated Glass Mat for Roofing and Waterproofing.
- G. ASTM D4586 - Asphalt Roof Cement, Asbestos-Free. ASTM C1549: Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer.
- H. ASTM D523: Specular Gloss.
- I. ASTM E1592: Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.
- J. ASTM E1646: Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference.
- K. ASTM E1680: Rate of Air Leakage Through Exterior Metal Roof Panel Systems
- L. ASTM E1918: Measuring Solar Reflectance of Horizontal and Low Sloped Surfaces in the Field.
- M. ASTM E1980: Calculating Solar Reflectance Index of Horizontal and Low Sloped Opaque Surfaces.
- N. ASTM E2140:
- O. NRCA (National Roofing Contractors Association) - Roofing Manual.
- P. SMACNA - Architectural Sheet Metal Manual

1.02 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Shop Drawings: Indicate panel layout, material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
- C. Product Data: Provide data on metal types, finishes, and characteristics.
- D. Submit specified trade association installation instructions.
- E. Submit two (2) samples illustrating metal finish color.

1.03 QUALIFICATIONS

- A. Manufacturer Qualifications: Ten (10) years' experience, minimum, in factory fabrication of metal panels.
- B. Fabricator and Installer: Company specializing in sheet metal roof installations with minimum five (5) years' experience.

1.04 PRE-INSTALLATION CONFERENCE

- A. Convene one (1) week prior to commencing Work of this Section, under provisions of Section 01 31 00.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle products to site under provisions of Section 01 60 00.
- B. Stack preformed material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage. Keep panels and accessory items dry.
- C. Prevent contact with materials that may cause discoloration or staining.

1.06 COORDINATION

- A. Coordinate work under provisions of Section 01 31 00.
- B. Coordinate with the work of Section 07 62 00 for installing flashing.

1.07 WARRANTY

- A. Contractor's Warranty: Include coverage for degradation of metal, roofing system materials, water tightness and integrity of seals. Provide two (2) year warranty under provisions of Section 01 77 00.
- B. Manufacturer's Warranty: Provide manufacturer's standard twenty (20) year full system weathertightness and coating performance warranties under provisions of Section 01 77 00.

1.08 ALTERNATES

- A. See Section 01 23 00 for bidding alternates affecting the Work of this Section.

1.09 COLORS

- A. Colors are specified on Colors and Materials Schedule on the drawings.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. Basis of Design: AEP Span, division of ASC Profiles, Inc., panel system Design Span HP.
- B. Morin Corporation
- C. MBCI, division of NCI Building Systems.
- D. Substitutions: Under provisions of Section 01 60 00.

2.02 **PANEL TYPE**

- A. Design Span HP. 16 inch panel coverage with striations. Concealed fastener panel.

2.03 **MATERIALS**

- A. Sheet Material: Steel conforming to ASTM A792 AZ50, minimum yield 50,000 psi, 22 gauge
- B. Finish: Zinalume plus finish. DuraTech 5000, premium fluoropolymer (PVDF) coating system.

2.04 **ACCESSORIES**

- A. Fasteners: Galvanized steel, size and length as specified by manufacturer.
- B. Flashing and Trim: Material, Color and Finish to match panels.
- C. Membrane Underlayment (High-Temp): AEP Span Underlayment HT. 40 mil thickness. 36" wide roll. Install per manufacturers requirements.
- D. Coverboard: DensDeck Roof Board by G-P Gypsum Corp. 1/2" thick, 4'x8' boards, square edges. Nonstructural, glass mat faced gypsum panel with water-resistant core.
- E. Rigid Insulation: As specified in Section 07 21 00.
- F. Protective Backing Paint: Bituminous.
- G. Sealant: As recommended by manufacturer.
- H. Downspouts, Gutters, Reglet and Counter Flashing: As specified in Section 07 62 00.

PART 3 - EXECUTION

3.01 **EXAMINATION**

- A. Inspect roof deck to verify deck is clean and smooth, free of depressions, waves, or projections, properly sloped.
- B. Verify deck is dry and free of snow or ice. Verify joints in wood deck are solidly supported and fastened.
- C. Verify correct placement of nailers and insulation positioning between nailers.
- D. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, reglets are in place, and nailing strips located.
- E. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 **PREPARATION**

- A. Field Measurements:
 - 1. Verify prior to fabrication.
 - 2. If field measurements differ from drawing dimensions, notify Architect prior to fabrication.

- B. Protection:
 - 1. Treat or isolate with protective material, any contact surfaces of dissimilar materials to prevent electrolytic corrosion.
 - 2. Require workmen who will be walking on roofing panels to wear clean, soft-soled work shoes that will not pick up stones or other abrasive material that could cause damage and discoloration.
 - 3. Protect work of other trades against damage and discoloration.
- C. Surface Preparation:
 - 1. Clean and dry surfaces prior to applying sealant.

3.04 INSTALLATION OF MEMBRANE UNDERLAYMENT (HIGH-TEMP)

- A. Install over clean, dry roof coverboard.
- B. Install over entire roof deck.

3.05 COVERBOARD

- A. Install coverboard in accordance with roof assembly requirements and manufacturer's instructions.

3.07 FLASHING INSTALLATION

- A. Weather lap joints minimum 2 in. and seal weathertight with plastic cement. Secure in place with screws at 24 in. o.c. max. Conceal fastenings.
- B. Flash and seal intersection walls and items projecting through or mounted on roofing with plastic cement. Provide weathertight installation.

3.08 INSTALLATION OF PANELS

- A. Panels:
 - 1. Follow roof panel manufacturer's directions.
 - 2. Install panel seams vertically.
 - 3. Lap panels away from prevailing wind direction.
 - 4. Do not stretch or compress panel side-lap interlocks.
 - 5. Secure panels without warp or deflection.
 - 6. Fully engage interlocking seams.
 - 7. Extended roof panels to overlap gutter openings 2 in., but do not restrict opportunity to clean gutters.
 - 8. Remove strippable protective film, if used, immediately preceding panel installation.
- B. Allowable Erection Tolerance:

1. Maximum Alignment Variation: 1/4 in. in 40 ft.
- C. Flashing:
1. Follow manufacturer's directions and Architect approved shop drawings.
 2. Overlap roof panels at least 6 in.
 3. Install flashings to allow for thermal movement.
- D. Cutting and Fitting:
1. Neat, square, and true. Torch cutting is prohibited.
 2. Openings 6 in. and larger in any direction: Shop fabricate and reinforce to maintain original load capacity.
 3. Where necessary to saw cut panels, debur and treat with galvanic paint.

3.09 CLEAN UP AND CLOSE OUT

- A. Touch-Up:
1. Touch-up damaged paint surfaces with air-dry touch-up paint provided by manufacturer. Follow directions carefully to minimize color irregularities. Small brush application only - do not spray touch-up paint.
- B. Cleaning and Repairing:
1. At completion of each day's work and at work completion, sweep panels, flashing, and gutters clean. Do not allow fasteners, cuttings, fillings, or scraps to accumulate.
 2. Remove debris from project site upon work completion or sooner, if directed.

3.10 PROTECTION OF FINISHED WORK

- A. Protect finished Work under provisions of Section 01 50 00.
- B. Do not permit traffic over unprotected roof surface.

END OF SECTION

**SECTION 07 62 00
SHEET METAL FLASHING AND TRIM**

PART 1 - GENERAL

1.01 REFERENCES

- A. AISI (American Iron and Steel Institute) - Stainless Steel - Uses in Architecture.
- B. ASTM A653 – Steel sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- C. ASTM A792 – Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
- D. ASTM B32 - Solder Metal.
- E. ASTM B209 - Aluminum and Alloy Sheet and Plate.
- F. ASTM B370 - Copper Sheet and Strip for Building Construction.
- G. ASTM B486 - Paste Solder.
- H. ASTM D226 - Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
- I. ASTM D4586 - Asphalt Roof Cement, Asbestos-Free.
- J. FS O-F-506 - Flux, Soldering, Paste and Liquid.
- K. NRCA (National Roofing Contractors Association) - Roofing Manual.
- L. SMACNA - Architectural Sheet Metal Manual.
- M. AAMA – American Architectural Manufacturers Association.
- N. AAMA 611 – Specification for Anodized Architectural Aluminum.
- O. AAMA 2605 – Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Architectural Extrusions and Panels.
- P. AA - Aluminum Association. Aluminum Design Manual.
- Q. PCI – Powder Coating Institute.

1.02 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
- C. Samples: Submit two (2) samples, illustrating typical material, color and finish.

1.03 **QUALIFICATIONS**

- A. Fabricator and Installer: Company specializing in sheet metal flashing work with three (3) years experience.

1.04 **DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, store, protect, and handle products to site under provisions of Section 01 60 00.
- B. Stack preformed material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- C. Prevent contact with materials that may cause discoloration or staining.

1.05 **ALTERNATES**

- A. See Section 01 23 00 for bidding alternates affecting the Work of this Section.

1.06 **COLORS**

- A. Colors are specified on Colors and Materials Schedule on the drawings.

PART 2 - PRODUCTS

2.01 **MATERIALS – SHEET METAL**

- A. Steel Sheet: ASTM A792, AZ-60 Zincalume / Galvalume (Aluminum-Zinc hot dip coating) steel sheet, minimum yield 50,000 psi, minimum 20 gauge thickness if not specified under components. Factory Finish.
- A. Aluminum Sheet: ASTM B209, alloy 5005 aluminum sheet, minimum 0.0403-inch (18 gauge) thickness if not specified under components. Factory Finish.
- B. Stainless Steel Sheet: ASTM A167, alloy 316 stainless steel sheet, minimum 20 gauge thickness if not specified under components. Factory Finish.

2.02 **COMPONENTS**

- A. Coping: As shown in SMACNA figure 3-6A. Including continuous cleat. Exterior fascia style E1 as shown in SMACNA page 3.4. Coping seam as shown in SMACNA figure 3-3 #22 Single lock standing seam. Steel sheet material. Minimum thickness of 20 gauge
- B. Flashing, Trim and Break Shapes: Steel sheet material. Minimum thickness of 20 gauge.
- C. Masonry Flashing (Through-Wall): Stainless steel sheet material. Minimum 20 gauge thickness.
- D. Masonry Flashing (Base of Wall): Stainless steel sheet material. Minimum 20 gauge thickness.
- E. Exterior Wall Flashing (Base of Wall): Stainless steel sheet material. Minimum 20 gauge thickness.
- F. Saddle Flashing (Concealed): Stainless steel sheet material. Minimum 24 gauge thickness.

Soldered fabrication.

- G. Gutters (Exposed): Fabricate gutter profile with dimensions of 8" width x 8" depth. Shape similar to SMACNA figure 1-2 Style A. Profile as indicated on drawings. Steel sheet material. Minimum thickness of 20 gauge Form gutters in sections as long as possible, but not less than 10 feet in length complete with end pieces, outlet tubes and special pieces as required.
1. Gutters (Installation): Install gutter with continuous cleat, hanger straps and spacers. Straps and spacers installed at 36" o.c. maximum, fabricated from 1/8 inch x 1 inch flat stock. Material, color and finish same as gutters. Gutter installation similar to that shown in SMACNA figure 1-13A. Fabricate strap profile and coordinate strap installation to allow for removable gutter screen.
 2. Gutter Screen: Removable 1/4 inch stainless steel hardware cloth panels with C-shaped metal closures on all edges. Attach screen to gutter spacers. Provide screen panels of 6 ft maximum length; align butt ends of screen panels with gutter spacers.
 3. Gutter Outlet Tubes: Shape and sized to fit into downspouts. Material, gauge, color and finish same as gutters. Downspout to gutter connection similar as shown in SMACNA figure 1-33B, detail 2.
 4. Eave Drip Flashing Over Gutter: Material, gauge, color and finish same as gutters.
 5. Gutter Expansion Joint: Butt type with cover plate similar to SMACNA figure 1-5.
- H. Gutters (Steel Canopy): Fabricate rectangular gutter profiles with dimensions of as indicated on architectural drawings. A. Profile as indicated on drawings. Steel sheet material. Minimum thickness of 20 gauge. Form gutters in sections as long as possible, but not less than 10 feet in length complete with end pieces, outlet tubes and special pieces as required.
1. Gutters (Installation): Install gutter with continuous cleat, hanger straps and spacers. Straps and spacers installed at 36" o.c. maximum, fabricated from 1/8 inch x 1 inch flat stock. Material, color and finish same as gutters. Fabricate strap profile and coordinate strap installation to allow for removable gutter screen.
 2. Gutter Screen: Removable 1/4 inch stainless steel hardware cloth panels with C-shaped metal closures on all edges. Attach screen to gutter spacers. Provide screen panels of 6 ft maximum length; align butt ends of screen panels with gutter spacers.
 3. Gutter Outlet Tubes: Shape and sized to fit into downspouts. Material, gauge, color and finish same as gutters. Downspout to gutter connection similar as shown in SMACNA figure 1-33B, detail 2.
 4. Eave Drip Flashing Over Gutter: Material, gauge, color and finish same as gutters.
 5. Gutter Expansion Joint: Butt type with cover plate similar to SMACNA figure 1-5.
- I. Downspouts: Rectangular Round 4-inch diameter, smooth, non-corrugated. Steel sheet material. Minimum thickness of 18 gauge Mitered and welded or soldered for watertight fabrication. Form downspouts in sections as long as possible, but not less than 10 feet in length complete with special pieces as required. Factory Finish.
1. Downspout Hangers: 3" wide flat stock. Material, color and finish same as downspouts. Minimum thickness of 18 gauge. Hanger profile as shown in SMACNA Figure 1-35E for round profiles.

- J. Conductor Head: Dimensions of 20" width x 10" depth x 15" height. Fabricate shape similar to SMACNA figure 1-25F, with overflow spout. Mitered and welded or soldered for watertight fabrication. Steel sheet material. Minimum thickness of 18 gauge . Color and finish as specified under Materials. Factory Finish.
- K. Through-Wall Scuppers: Fabricate similar to SMACNA figure 1-27A. Mitered and welded or soldered for watertight fabrication. Stainless Steel sheet material. Minimum thickness of 20 gauge.
- L. Exterior Wall Opening Flashing (Metal Door, Rolling Service doors and Louvers). at vertical and horizontal Insulated Metal Wall Panels, Minimum thickness of 18 gauge. Color and finish to match IMWP wall panel.
- M. Exterior Wall Opening Flashing (Aluminum Storefront openings) at vertical and horizontal Insulated Metal Wall Panels, Minimum thickness of 18 gauge. Color and finish to match IMWP wall panel.
- N. Exterior Wall Opening Flashing within Aluminum Storefront system: Minimum 0.0403-inch aluminum sheet material. Color and finish to match storefront frame.
- O. Exterior Wall Opening Flashing (Metal Door, Rolling Service doors and Louvers) in pre-engineered Metal Buildings., Minimum thickness of 18 gauge. Color and finish to match Metal Wall Panels.

2.03 ACCESSORIES

- A. Fasteners: Stainless steel screws with soft neoprene washers. Stainless steel rivets.
- B. Felt Underlayment: ASTM D226, No. 15 asphalt saturated roofing felt.
- C. Slip Sheet: Red Rosin building paper. W.R. Meadows Sealtight.
- D. Protective Backing Paint: Bituminous coating.
- E. Sealant: As specified in Section 07 92 00.
- F. Plastic Cement: ASTM D4586, Type I.
- G. Membrane Flashing: As specified in Section 07 25 00.
- H. Membrane Underlayment (High-Temp): As specified in Section 07 25 00.
- I. Isolation Tape (Dissimilar Metal Tape): Kelcom Inc or equal. Separation tape.
- J. Neoprene Tape (Weather Stripping): Kelcom Inc or equal. Neoprene tape. Compressible closed cell used for sealing and weather stripping.
- K. Butyl Tape (Sealing): Kelcom Inc or equal. Butyl tape. Used for watertight seal between two substrates.

2.04 FABRICATION

- A. Shop-fabricate work to greatest extent possible and comply with details shown and with

applicable requirements of SMACNA Architectural Sheet Metal Manual.

- B. Form gutters of profiles and size required. Fabricate gutter screen to fit gutter profile and hanger.
- C. Field measure site conditions prior to fabricating work.
- D. Form the work to fit substrates. Comply with material manufacturer instructions and recommendations for forming material.
- E. Fabricate with required connection pieces.
- F. Form sections square, true, and accurate in size and shape, in maximum possible lengths but not less than 10 feet in length and free of distortion or defects detrimental to appearance or performance. Allow for expansion at joints where required by SMACNA recommendations. Keep joints to minimum, but any joint that is required, shall be provided with butt seam with concealed backup plate at joints unless specified otherwise. Coordinate joint layout with Architect prior to installation of sections.
- G. Hem exposed edges of metal.
- H. Mitered and soldered or welded fabricated components.
- I. Seam and install sealant at metal joints watertight.
- J. Fabricate gutters, downspouts and related components; seal watertight.
- K. Fabricate through-wall scuppers, conductor heads and related components; seal watertight.
- L. Fabricate copings in minimum of 10 ft sections and jointed to allow for longitudinal expansion. Corners on copings shall be mitered, lap-seamed and sealed. Install copings with continuous concealed cleat at the side of exterior walls opposite of the roof.
- M. Fabricate corners from one piece with minimum 18 to 24 inch long legs; seal corner watertight.
- N. Form exposed sheet metal work without excessive oil-canning, buckling and tool marks, true to line and levels indicated with exposed edges folded back to form hems.
- O. Fabricate sheet metal flashing, trim and components of specified profiles and shapes such that all visible exposed surfaces shall be of color and finish as specified. Conditions where both sides of the sheet metal material surface is visibly exposed to view; Contractor has option to provide single-piece of sheet metal material with specified color and finish on both visibly exposed surfaces or provide 2-pieces of sheet metal material with specified color and finish on one surface, fabricate the item with the two sheet metal material pieces back-to-back such that all visible exposed surfaces are of color and finish specified.

2.05 FINISH - STEEL

- A. Prepare surfaces in accordance with Section 09 91 00.
- B. All visible exposed surfaces shall be of color and finish as specified.
- C. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mils.
- D. Factory Finish: Kynar 500 / Hylar 5000 High-Performance (PVDF) Fluoropolymer Resin Finish

(minimum 70% Polyvinylidene Fluoride (PVDF) resins) complying with AAMA 2605 specification requirements. Color as specified in Colors and Materials Schedule. Provide custom color when specified.

2.06 FINISH – ALUMINUM

- A. Prepare surfaces in accordance with Section 09 91 00.
- B. All visible exposed surfaces shall be of color and finish as specified.
- C. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mils.
- D. Factory Finish: Kynar 500 / Hylar 5000 High-Performance (PVDF) Fluoropolymer Resin Finish (minimum 70% Polyvinylidene Fluoride (PVDF) resins) complying with AAMA 2605 specification requirements. Color as specified in Colors and Materials Schedule. Provide custom color when specified.
- E. Factory Finish: Anodized Finish, AAMA 611, Architectural Class I, minimum of 0.0007-inch thickness. Color as indicated in Colors and Materials Schedule.

2.07 FINISH – STAINLESS STEEL

- A. Prepare surfaces in accordance with Section 09 91 00.
- B. All visible exposed surfaces shall be of color and finish as specified.
- C. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mils.
- D. Factory Finish: Kynar 500 / Hylar 5000 High-Performance (PVDF) Fluoropolymer Resin Finish (minimum 70% Polyvinylidene Fluoride (PVDF) resins) complying with AAMA 2605 specification requirements. Color as specified in Colors and Materials Schedule. Provide custom color when specified.
- E. Factory Finish: (Exposed to view) Directional Brushed Satin #4 finish.
- F. Factory Finish: (Concealed from public view) 2B mill finish.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are ready to receive work.
- B. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, reglets in place, and nailing strips located.
- C. Verify roofing termination and base flashings are in place, sealed, and secure.
- D. Beginning of installation means acceptance of substrate.

3.02 PREPARATION

- A. Install starter and edge strips, and cleats before starting installation.
- B. Install surface-mounted reglets true to lines and levels. Seal top of reglets with sealant.

3.03 INSTALLATION

- A. Except as otherwise indicated, comply with manufacturer's installation instructions and recommendations and with SMACNA Architectural Sheet Metal Manual.
- B. Install conductor heads, through-wall scuppers, flashing, trim and break shapes, reglets and counter flashing system, copings, saddles, gutters, downspouts, eave and rake flashings, and accessories in accordance with manufacturer's instructions and SMACNA manual. Coordinate installation of flashings with other sections.
- C. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.
- D. Apply plastic cement compound between metal flashings and felt flashings.
- E. Install isolation tape between dissimilar metals.
- F. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- G. Install work with laps, joints and seams that will be permanently watertight and weatherproof.
- H. Drip edge flashing shall be provided with butt seam with concealed backup plate at joints; form drip edge flashing in sections as long as possible, but not less than 10 feet in length. Coordinate joint layout with Architect prior to installation of drip edge flashing.
- I. Trim, flashing and break shapes shall be provided with butt seam with concealed backup plate at joints; form trim, flashing and break shapes in sections as long as possible, but not less than 10 feet in length. Coordinate joint layout with Architect prior to installation of trim, flashing and break shapes.
- J. Join lengths with seams of joint type allowing flush alignment of adjacent lengths, sealed watertight and allowing for thermal movement. Flash and seal gutters to downspouts and accessories.
- K. Install L-shaped metal flashing at base of exterior framed walls. Minimum 4 inch vertical leg. Install metal base flashing after weather resistive barrier installed over exterior gypsum sheathing. Seal vertical leg of metal base flashing to weather resistive barrier with membrane flashing. Set bottom leg of metal base flashing in beads of sealant.
- L. Install concealed L-shaped vertical metal flashing at inside corners of exterior framed walls and ends of exterior framed walls abutting brick masonry or concrete. Minimum 3 inch legs. Install metal flashing after weather resistive barrier installed over exterior gypsum sheathing. Seal leg of metal flashing to weather resistive barrier with membrane flashing. Set leg of metal flashing in beads of sealant at face of brick masonry wall.
- M. Slope gutters 1/16 inch per foot towards downspouts for positive drainage.
- N. Locate gutter expansion joints and unrestrained gutter terminations indicated to allow for thermal movement. Fix gutter at inside corners and outlet tubes.
- O. Seam and seal metal joints watertight. Coordinate with Section 07 92 00 for sealants.

- P. Install downspout hangers at 12 inch maximum distance from each end of downspout in contact with exterior wall and maximum 10 feet o.c. vertical spacing. Install a minimum of (4) hangers for each downspout.
- Q. Secure flashings in place using concealed fasteners and cleats.
- R. Secure gutters in place using concealed fasteners.
- S. Connect downspouts to storm sewer system. Seal connection watertight. Provide downspout connections and cleanouts as indicated per Civil drawings.

END OF SECTION

**SECTION 07 72 00
ROOF ACCESSORIES**

PART 1 - GENERAL

1.01 REFERENCES

- A. ANSI 125 - American National Standard For Conformity Assessment For Safety And PPE
- B. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
- C. OSHA 1910 - Occupational Safety and Health Standards - Fixed Ladders
- D. OSHA 1926.502 - Fall protection systems criteria and practices
- E. OSHA 1940.27 - Fixed Ladders
- F. ANSI Z359.1 - The Fall Protection Code
- G. ANSI Z359.2 - Minimum Requirements For A Comprehensive Managed Fall Protection Program
- H. ANSI A10.32 - Personal Fall Protection Systems Used In Construction And Demolition Operations,

1.01 SUBMITTALS

- A. Submit per Section 01 33 00.
- B. Product Data and Samples:
 - 1. Mechanical Equipment Screen:
 - a. Panel and color sample
- C. Shop Drawings:
 - 1. Mechanical Equipment Screen:
 - a. Shop Drawings: Indicate layout heights, component connection details, and details of interface with adjacent construction.
 - b. Roof top mechanical equipment to be screened from view.
- D. Certification:
 - 1. Mechanical Equipment Screen:
 - a. Manufacturer's Certificate of Compliance certifying that panels supplied meet or exceed requirements specified.
 - b. Professional Engineer stamped drawings.

1.02 DELIVERY, STORAGE, AND HANDLING

- A. In accordance with Section 01 60 00 and the following:
 - 1. Acceptance at site:

- a. Verify undamaged condition.
2. Protection (prior to installation):
 - a. Store out of harm's way.
3. Handle to prevent marring finishes.

1.03 SEQUENCING/SCHEDULING

- A. Phase in properly with Construction Schedule per Section 01 32 16.

1.04 QUALITY CONTROL

- A. Manufacturer Qualifications: Manufacturer to specialize in production of products of the type specified with a minimum of 10 years documented experience.
- B. Installer Qualifications: Installer shall specialize in installation of products with a minimum of five years documented experience.

1.05 COLORS

- A. Colors are specified on the Colors and Materials Schedule on drawings.

1.06 ALTERNATES

- A. See Section 01030 for bidding alternates affecting the work of this Section.

PART 2 - PRODUCTS

2.01 ROOF HATCH

- A. Bilco "Type F-50-TB", 48-inch x 48-inch (inside frame opening), thermally broke aluminum construction roof hatch. R-value of R-20, with 3" polyisocyanurate insulation. Stainless steel hinges. Extruded EPDM rubber gaskets. 12-inch height curb with integral metal flashing. Factory-applied powder coat paint finish. Color: White.
 1. Insulated Metal Roof Curb: Include manufacturers curb option-modification for installation at with single ply roofing.
- B. Safety Post: Provide Bilco LadderUP safety post at each roof hatch. Model LU-1, powder coated steel. Color: Yellow. Install to roof access ladder. Provide one (1) per ladder.
- C. Substitutions: "Or Equal". Under provisions of Section 01 60 00.

2.02 RIDGE ANCHORS (RA-1) Standing Seam Roofs.

- A. Roof Anchors (RA-1): Guardian Ridge, Fall Restraint, Stainless Steel anchors. Compliant with all OSHA 1910.140, OSHA 1926.502, ANSI 125.
 1. Roof Anchor (RA): Ridge-it Anchor Series. Stainless Steel Straps with (2) two D-Rings. Worker Capacity Range: 130-420 lbs. Minimum Breaking Strength: 1,000 lbs. 18-inch strap length. Models: 00510.
 - a) Installation: Sheet metal screws per Manufacturers requirements, mounted

under ridge cap flashing with an exposed D-ring on each side of cap.

- B. Substitutions: "Or Equal". Under provisions of Section 01 60 00.

2.03 ROOF ANCHORS (RA-2) Single Ply Roofs

- C. Roof Anchors (RA): Guardian Fall Protection. Galvanized steel anchors. Compliant with all OSHA 1910, OSHA 1926 Subpart M, ANSI Z359.1 and ANSI A10.32 regulations.
1. Roof Anchor (RA): Anchor Series. Galvanized steel post with premium swivel top for installation at sloped roof surfaces; field welded to structural steel framing members. Worker Capacity Range: 130-420 lbs. Minimum Breaking Strength: 5,000 lbs. 18-inch height. Models: CB-18 #00654, Metal deck installation. Field Galvanized finish.
 - a) Installation: install per manufacturer's instructions.
 2. EPDM Pipe Boot Flashing Assembly: Install EPDM pipe boot flashing assembly at roofing surface of each roof anchor.
- D. Substitutions: "Or Equal". Under provisions of Section 01 60 00.

2.04 MECHANICAL EQUIPMENT SCREEN

- A. Manufactureer: CityScapes International Inc., Envisor, Perimeter Wall System. Vertical Height per drawings but must screen height of each roof top Mechanical unit above Parapet height of each building.
- B. Post and Panel Design: Metal Series, Pan Perforated, with Lineal Band trim style. Manufacturer: CityScapes International Inc.
1. Perimeter Wall Screen system attached to metal deck, with Pipe Boot Flashing at roofing surface.
 2. Framing: Aluminum plates, shapes and bars, ASTM B 221, alloy 6063-T5.
 3. Panels: Perforated metal panel, Sherwin Williams 4000 Series Powder-Coated
 4. Fasteners: Stainless steel type.
 5. Provide all components and accessories for complete installation.
 6. Installation shall comply with manufacturer's standard specifications and installation instructions.
 7. Shop drawings to be Stamped by Professional Engineer.

2.05 PIPE BOOT FLASHING ASSEMBLY

- A. Pipe Boot Flashing Assembly: Molded pipe boot flashing assembly specifically designed for round penetrations; conically shaped steps of the boot create a secure seal around the pipe and allow for expansion, contraction and pipe vibration and movement; square base. Color: to match single ply roofing. Minimum 20 year warranty.
1. Install in accordance with roofing manufacturer's installation instructions. Provide all

components for complete installation.

2. Product: Carlisle Syntec or approved. Provide in sizes to fit pipes and roof anchors.
- B. Substitutions: "Or Equal". Under provisions of Section 01 60 00.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify installation conditions as satisfactory to receive work of this Section. Do not install until any unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.02 PREPARATION

- A. Protect surrounding surfaces to preclude damage from work of this Section.

3.03 INSTALLATION

- A. Install in accordance with specifications and manufacturer's directions. Where these may be in conflict, the more stringent requirements apply.
- B. Coordinate all work with roofing installer and roofing manufacturers requirements.

END OF SECTION

**SECTION 07 84 00
FIRESTOPPING**

PART 1 – GENERAL

1.01 SUMMARY

- A. Section Includes: Provide firestopping and smoke seals as indicated on drawings as well as the following areas, including:
 - 1. All openings in fire-rated floors and wall assemblies, both empty and those accommodating penetrating items such as cables, conduits, pipes, ducts, etc.
 - 2. Openings at each floor level in shafts or stairwells.
- B. Responsibility: This Section contains requirements for firestopping and smoke barrier penetration seals around pipes, ducts, conduits, etc., in walls, partitions, ceilings, and floors. The trades for Work under Divisions 21 through 28 of this Contract shall be responsible for providing required sleeves and for sealing said penetrations in accordance with requirements of this Section.
- C. Substitutions: Substitute products will be considered only under terms and conditions specified in Section 01 60 00.

1.02 REFERENCES

- A. ASTM E84 (American Society for Testing & Materials) - Test Method for Surface Burning Characteristics of Building Materials.
- B. ASTM E136 (American Society for Testing & Materials) - Test Method for Behavior of Materials in a Vertical Tube Furnace at 750° C.
- C. ASTM E 814 (American Society for Testing & Materials) – Test Method for Fire Tests of Through –Penetration Fire Stops
- D. UL 1479 (Underwriters Laboratories) - Fire Tests of Through-Penetration Firestops.
- E. NFPA 101 Life Safety Code.
- F. IBC International Building Code

1.03 DEFINITIONS

- A. Firestopping and Smoke seals: Material or combination of materials and installation of them to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and gases. Included would be openings, gaps, and joints through walls, floors, and the wall/floor interface.

1.04 SUBMITTALS

- A. General: Make submittals in accordance with Section 01 33 00.
- B. Certificates of Compliance: Submit manufacturer's certificates of compliance stating that the

firestopping and smoke seal material, or combination of materials meet the requirements specified and is recommended for the applications indicated. If requested, furnish complete test reports from Independent Laboratory.

- C. Product Data: Submit manufacturer's product data, including material composition, performance and limitation criteria, and installation procedures for each type of firestopping and smoke seal material required.
- D. Shop Drawings: Submit shop drawings showing each condition requiring penetration seals indicating proposed UL systems materials, installation details, including reinforcement, anchorage, and fastenings as required. Include a schedule showing each firestop and smoke seal material.

1.05 QUALITY ASSURANCE

- A. Material Qualifications: Provide only materials tested and certified to conform with specified requirements. Flame spread rating must be a minimum of one (1) hour, but not less than the fire resistance rating of the assembly being penetrated.
- B. Codes and Standards: Firestop tests and Smoke seal tests shall conform to UL 1479 or ASTM E814.
- C. Un-Tested Penetrations: For mechanical and electrical penetrations that have characteristics (e.g., pipe material and diameter, pipe insulation type and thickness, type of wall that is penetrated) that have not been tested in accordance with ASTM E814 or UL 1479 by any firestop manufacturer, provide a written certification from the proposed firestop manufacturer stating that the manufacturer's firestop material will meet the requirements for successfully passing the tests ASTM E814 or UL 1479.
 - 1. The certification shall also contain firestop installation procedures (e.g., sleeve material and size, space requirements, quantity of firestop material required).
 - 2. If required, submit certification to the local fire authority and obtain their approval before submitting to Architect for his review.
- D. Installer's Qualifications: Engage an experienced Installer who has been trained in installation of "Through-Penetration Firestop Systems" based on published UL tested assemblies.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. General: Comply with requirements specified in Section 01 60 00.
- B. Deliver materials undamaged in manufacturer's unopened containers or packages identified with brand, type, grade, and UL label. Coordinate delivery with scheduled installation dated to minimize storage time at site. Leave seals unbroken and labels intact until time of use. Remove from job site rejected or damaged packages found unsuitable for use.
- C. Store materials in clean, dry, ventilated location. Protect from soiling, abuse, and moisture. Follow manufacturer's instructions.

1.07 PROJECT CONDITIONS

- A. General: Conform to manufacturer's printed instructions for installation and, when applicable, curing recommendations regarding temperature and humidity. Provide adequate ventilation if using solvent. Provide forced air ventilation during installation, if required by manufacturer. Keep flammable materials away from sparks or flame.

- B. Coordination with Other Trades: Coordinate annular space, sleeve and insulation requirements with work of Divisions 21 through 28. Firestopping or smoke seal material at penetrations of insulated pipes shall be applied after the insulation is installed. The material selected for use with insulated pipes shall have been tested in accordance with UL 1479 for that particular insulated pipe assembly.

1.08 SEQUENCING AND SCHEDULING

- A. General: It is the responsibility of the Contractor to identify all locations requiring firestopping and coordinate installation of the firestopping.

1.09 ALTERNATES

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

1.10 COLORS

- A. Colors are specified on Colors and Materials Schedule on the drawings.

PART 2 - PRODUCTS

2.01 SLEEVES

- A. Sleeves for Metal Pipe, Conduit, Cable, and Ducts: Form continuous sleeves from 24-gauge galvanized steel; length of sleeve to extend through full thickness of partition.
- B. Sleeves for Plastic Pipe: ASTM E514, asbestos-free, prefabricated sleeves, compatible with firestopping system for plastic pipe.
- C. Sizes: Size sleeves to provide the annular space between sleeves and pipe (or duct, or conduit, etc.) as recommended by the firestopping material manufacturer, as required to comply with the Quality Assurance portion of this Section. Size sleeves based on outside diameter of insulation when it is to be continuous through the opening.

2.02 FIRESTOPPING AND SMOKESEALS

- A. Firestopping Materials: Asbestos free and capable of maintaining an effective barrier against flame and hot gases in compliance with the following:
 - 1. Flame Spread: Fire hazard rating 25 or less, ASTM E84.
 - 2. Smoke Development: Fire hazard rating 50 or less, ASTM E84.
 - 3. "F" and "T" Ratings: Firestopping materials shall be rated "F" and "T" in accordance with UL 1479 or ASTM E814. "F" or "T" rating shall match the hour rating of assembly in which the firestopping material is installed or use the next highest full hourly rating if the assembly has a fractional hourly rating.
 - 4. Combustibility: Non-combustible, ASTM E136.
- B. Smokestop Material: Asbestos free and capable of maintaining the smoke resistance of the smoke barrier in compliance with NFPA 101 and complying with the following requirements:
 - 1. Flame Spread: Fire hazard rating 25 or less, ASTM E84.
 - 2. Smoke Development: Fire hazard rating 50 or less, ASTM E84.

3. Leakage Tests: Smokestop materials shall be rated "F" and "T" in accordance with UL 1479.
4. Combustibility: Non-combustible, ASTM E136.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. General: Examine the conditions and substrates upon which firestopping or smoke seal material is to be applied. Do not proceed with work until all unsatisfactory conditions have been corrected. Installation of firestopping shall constitute the Contractor's acceptance of surfaces and conditions of substrates. Proceed with installation only after penetrations of the substrate and supporting brackets have been installed.

3.02 SLEEVES

- A. General: Install sleeves through full thickness of walls and partitions. Where sleeves are installed prior to pouring of concrete, install through floors and extend 1 in. above finished floor level. Seal sleeves watertight to floor slabs.

3.03 PREPARATION

- A. General: Prior to application of firestopping or smoke seal material, clean the substrate of loose material, including dust, rust, grease other material which would preclude the successful application and retention of bond to the substrate. Do not apply firestops or smoke seals to surfaces previously painted or treated with a sealer, curing compound, water repellent or other coating unless tests have been performed to ensure compatibility of materials. Remove coatings as required in compliance with firestopping and smoke seal manufacturer's instructions.
- B. Provide primers as required that conform to firestopping and smoke seal manufacturer's recommendations for various substrates and conditions.
- C. Mask where necessary to protect adjoining surfaces. Remove excess material and stains on surfaces as required.

3.04 INSTALLATION

- A. General: Provide firestopping and smoke seal material in the following locations:
 1. Mechanical and electrical penetrations (e.g., insulated and non-insulated pipe, tubing, wiring, raceways, cable, and conduit penetrations, cable trays, busways, and ductwork without fire or smoke-fire dampers) through floor slabs and through time rated partitions, ceilings, fire walls, and smoke walls.
 2. Unused openings in floor slabs and time rated partitions and walls.
 3. Other locations indicated, specified, or required by codes or local authorities.
- B. Installation: Install firestopping and smoke seal materials in accordance with the manufacturer's instructions and UL approval requirements. Ensure that anchoring devices, back-up materials, clips, sleeves, supports, and other materials used in the actual fire test are installed.

1. Dam bottom of vertical openings and one side of horizontal openings with temporary containment forms or, where required to achieve fire resistance ratings, provide permanent forms.
2. Do not allow materials to overflow or spill onto adjoining surfaces, or to migrate into voids of adjoining surfaces.
3. Firestopping or smoke sealing materials for filling voids in floors having openings of 4 in. or greater shall be installed to support the same load as the floor system, unless the area is protected by a permanent barrier preventing loading or traffic on the firestopped or smoke sealed area.
4. Tool or trowel exposed surfaces.

3.05 CLEAN-UP

- A. After completion of application of firestopping or smoke seal materials, remove debris, excess materials, broom clean exposed wall and floor areas. Neatly cut and trim materials as required.
- B. When finished work will be visible, remove temporary dams and clean adjacent surfaces in accordance with manufacturer's printed instructions. Remedy staining and discoloration in adjacent surfaces caused by work under this Section.

3.06 FIELD QUALITY CONTROL

- A. General: Examine firestopped and smoke sealed areas to ensure proper installation and full compliance with this Section. Correct deficiencies prior to concealing or enclosing the areas.
- B. Maintain accessibility to all areas of work until completion of inspection by the Building Official. Correct unacceptable firestops and smoke seals and provide additional inspection to verify compliance with this specification at no additional cost.

END OF SECTION

**SECTION 07 92 00
JOINT SEALANTS**

PART 1 - GENERAL

1.01 REFERENCES

- A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric Type Sealants by Means of a Durometer.
- B. ASTM C834 - Latex Sealants.
- C. ASTM C920 - Elastomeric Joint Sealants.
- D. ASTM C1248 - Test Method for Staining of Porous Substrate by Joint Sealants.
- E. ASTM C1311 - Standard Specification for Solvent Release Sealants.
- F. ASTM C1330 - Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.
- G. ASTM D2240 - Standard Test Method for Rubber Property - Durometer Hardness.
- H. FDA (U.S. Food and Drug Administration) - 21 CFR 177.2600: Title 21 Part 177 Indirect Food Additives: Polymers
- I. NSF (NSF International) - Standard 51: Food Equipment Materials.
- J. SWRI (Sealant, Waterproofing and Restoration Institute) - Sealant and Caulking Guide Specification.
- K. SWRI (Sealant, Waterproofing and Restoration Institute) - Validation Program.

1.02 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability. Colors will be selected by Architect from manufacturer's full line of available colors.
- C. Samples for Color Selection: For each joint sealant type.
- D. Mockups: Provide joint sealant application within mockups required in other sections identical to specified joint sealants and installation methods.

1.03 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum five (5) years documented experience.
- B. Applicator: Company specializing in performing the work of this Section with minimum five (5) years' experience approved by manufacturer.

1.04 **ENVIRONMENTAL REQUIREMENTS**

- A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.05 **COORDINATION**

- A. Coordinate work under provisions of Section 01 31 00.

1.06 **WARRANTY**

- A. Provide one (1) year warranty under provisions of Section 01 77 00.
- B. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal and exhibit loss of adhesion or cohesion, or do not cure.
- C. Special Manufacturer's Warranty: Manufacturer's standard form in which joint sealant manufacturer agrees to furnish joint sealants to repair or replace those that demonstrate deterioration or failure under normal use within warranty period specified.
 - 1. Warranty Period for Silicone Sealants: Twenty (20) years from date of Substantial Completion.

1.07 **ALTERNATES**

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

1.08 **COLORS**

- A. Colors are specified on Colors and Materials Schedule on the drawings.

PART 2 - PRODUCTS

2.01 **MATERIALS**

- A. General:
 - 1. VOC Content for Interior Applications: Provide sealants and sealant primers complying with the following VOC content limits per 40 CFR 59, Subpart D (EPA Method 24):
 - a. Architectural Sealants: 250 g/L.
 - b. Sealant Primers for Nonporous Substrates: 250 g/L.
 - c. Sealant Primers for Porous Substrates: 775 g/L.
 - 2. Compatibility: Provide joint sealants and accessory materials that are compatible with one another and with materials in close proximity under use conditions, as demonstrated by sealant manufacturer using ASTM C1087 testing and related experience.
 - 3. Stain Test Characteristics: Where sealants are required to be nonstaining, provide sealants tested per ASTM C 1248 as non-staining on porous joint substrates indicated for Project.

4. Food Contact Suitability: Where sealants are required to be suitable for contact with food provide sealants complying with 21 CFR 177.2600.

B. Liquid Joint Sealants:

1. Single-Component, Nonsag, Neutral-Curing Sealant:
ASTM C 920, Type S, Grade NS, Class 50, for Use NT, G, M, A, and O; SWRI validation.
Hardness, ASTM D 2240: 35 durometer Shore A, minimum.

The Dow Chemical Company, DOWSIL 756 SMS Building Sealant.

Use in the following locations:

- a. Exterior joints in metal panel cladding systems.

2. Acrylic Latex Sealant:
Siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

Pecora AC20 + Silicone.
Sonneborn Sonolac.
Tremco Tremflex 834.

Use in the following locations:

- a. Interior perimeter joints of interior frames.
- b. Interior non-moving joints between interior painted surfaces and adjacent materials.

3. Butyl-Rubber-Based Sealant:
ASTM C 1311.

Tremco Butyl Sealant.

Use in the following locations:

- a. Interior concealed sealants at thresholds and sills.

4. Single-Component, Nonsag, Neutral-Curing Sealant:
ASTM C 920, Type S, Grade NS, Class 50, for Use NT, G, M, and A; SWRI validation.
Hardness, ASTM D 2240: 34 durometer Shore A, minimum.

The Dow Chemical Company, DOWSIL 791 Silicone Weatherproofing Sealant.

Use in the following locations:

- a. Interior perimeter joints of exterior frames.

5. Self-Leveling Urethane Sealant:
ASTM C920, Type S or M, Grade P, Class 25, Use T.

Sonolastic SL2.
Pecora Urexpan NR-200.
Tremco THC 900.

Use in the following locations:

- a. Exterior horizontal traffic and traffic isolation joints.
 - b. Interior traffic joints in floor and between floor and wall construction.
6. Single-Component, Nonsag, Non-Staining, Neutral-Curing Silicone Sealant:
ASTM C920, Type S, Grade NS, Class 100/50, for Use NT, G, M, A, and O; SWRI
validation. Hardness, ASTM D2240: 15 durometer Shore A.
Staining, ASTM C1248: None on concrete, granite, limestone, and brick.

The Dow Chemical Company, DOWSIL 790 Silicone Building Sealant.
Tremco Spectrem 3.

Use in the following locations:

- a. Exterior construction joints in cast-in-place concrete. Above-grade.
 - b. Exterior movement joints in concrete unit masonry. Above-grade.
 - c. Exterior movement joints in brick masonry. Above-grade.
 - d. Exterior movement joints in stone masonry. Above-grade.
 - e. Exterior joints within exterior insulation finish systems (EIFS).
 - f. Exterior joints between different materials listed above. Above-grade.
 - g. Exterior perimeter joints at frames of doors, windows, storefront frames, curtain wall frames, and louvers.
 - h. All other exterior non-traffic joints. Above-grade.
 - i. Interior movement joints in exterior concrete and unit masonry.
7. Mildew-Resistant, Single-Component, Nonsag, Acid-Curing Sealant:
ASTM C 920, Type S, Grade NS, Class 25, for Use NT.
NSF Standard 51 and FDA Regulation No. 21 CFR 177.2600 compliant.
Hardness, ASTM D 2240: 25 durometer Shore A, minimum.

The Dow Chemical Company, DOWSIL 786 Silicone Sealant.
Sonneborn OmniPlus.
Tremco Tremsil 200.

Use in the following locations:

- a. Interior sanitary joints between plumbing fixtures and food preparation fixtures and casework and adjacent walls, floors, and counters.
8. Single-Component, Nonsag, Neutral-Curing Silicone Sealant:
ASTM C 920, Type S, Grade NS, Class 25, for Use NT; SWRI validation.
Hardness, ASTM D 2240: 45 durometer Shore A, minimum.

The Dow Chemical Company, DOWSIL 758 Silicone Building Sealant.

Use in the following locations:

- a. Exterior concealed watertight joints in cladding systems.
9. Non-hardening Acoustical Sealant:

Tremco Acoustical Sealant.
OSI SC-175.
USG sheetrock Acoustical Sealant.

Use in the following locations:

- a. Interior exposed and non-exposed acoustical applications.

10. Single Component Urethane Sealant:

Pecora Dynatrol 1-XL
Sonneborn Sonolastic NP-1
Tremco Dymonic

Use in the following locations:

- a. Expansion joints in ceramic tile floors.

11. Single Component Silicone Sealant:

The Dow Chemical Company, DOWSIL 799 Silicone Glass and Metal Building Sealant.

Use in the following locations:

- a. Clear sealant at exposed bolt and fastener connections in exterior exposed metal fabrications.

12. Single Component High Performance Neutral Cure Silicone Sealant:

The Dow Chemical Company, DOWSIL Glass and Metal Silicone Sealant.

Use in the following above-grade locations:

- b. Sealant for sheet metal and aluminum roofing, flashing, gutters and rainwater accessories.

C. Sealant Color: As selected by Architect.

2.03 **ACCESSORIES**

- A. Joint Substrate Primers: Substrate primer recommended by sealant manufacturer for application.
- B. Cylindrical Sealant Backing: ASTM C 1330, Type B non-absorbent, bi-cellular material with surface skin, Type C closed cell polyethylene or Type O open-cell polyurethane, as recommended by sealant manufacturer for application. Diameter 1/3 to 1/2 greater than width of joint where it is to be installed.
 1. Polystyrene foam not acceptable.
- C. Bond Breaker Tape: Polymer tape compatible with joint sealant materials and recommended by sealant manufacturer.
- D. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- E. Bond Breaker: Pressure sensitive polyethylene tape/plastic tape recommended by sealant manufacturer, applied to sealant contact surfaces where bond to substrate or backer rod must be avoided for proper performance of sealant.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces and joint openings are ready to receive work.
- B. Verify that joint backing and release tapes are compatible with sealant.

3.02 PREPARATION

- A. Remove loose materials and foreign matter that might impair adhesion of sealant.
- B. Clean joints in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with ASTM C804 for solvent release and ASTM C790 for latex base sealants.
- D. Verify that joint backing and release tapes are compatible with sealant.
- E. Protect elements surrounding the work of this Section from damage or disfiguration.

3.04 PRIMER APPLICATION

- A. General: Install primer wherever recommended by sealant manufacturer for conditions/materials being sealed to achieve manufacturer's published joint performance criteria including applicable federal specifications.
- B. Prime all exterior joints, using primer recommended by sealant manufacturer for substrate/conditions.

3.05 INSTALLATION

- A. Install sealant in accordance with manufacturer's instructions.
- B. Measure joint dimensions and size materials to achieve required width/depth ratios. Minimum joint width for exterior joints not indicated otherwise shall be 1/2-in.
- C. Install joint backing to achieve a neck dimension no greater than 1/3 of the joint width.
- D. Install bond breaker where joint backing is not used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- F. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- G. Tool joints concave, unless noted otherwise.
- H. Remove improperly applied sealant and replace with new.

3.07 FIELD QUALITY CONTROL

- A. Perform adhesion tests for replacement silicone sealant joints and preformed silicone seal in accordance with manufacturer's instructions and ASTM C1193, Method A, Field-Applied Sealant Joint Hand-Pull Tab.
 - 1. Perform 5 tests for first 1,000 linear feet of applied silicone sealant and 1 test for

each 1,000 feet sealant thereafter or perform 1 test per floor per building elevation minimum.

2. For sealants applied between dissimilar materials, test both sides of joint.
- B. Sealants failing adhesion test shall be removed, substrates cleaned, seals re-installed, and re-testing performed.
 - C. Maintain test log and submit report to Architect indicating tests, locations, dates, results, and remedial actions.

3.08 CLEANING

- A. Clean work under provisions of Section 01 77 00.
- B. Clean adjacent soiled surfaces.

3.09 PROTECTION OF FINISHED WORK

- A. Protect sealants until cured.
- B. Repair or replace defaced or disfigured finishes caused by work of this Section.

END OF SECTION

**SECTION 08 11 13
HOLLOW METAL DOORS AND FRAMES**

PART 1 - GENERAL

1.01 REFERENCES

- A. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- B. ASTM A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- C. ASTM A924 - Standard Specification for General Requirements for Steel Sheet Metallic-Coated by the Hot-Dip Process.
- D. ASTM C236 - Test Method for Steady-State Thermal Performance of Building Assemblies by Means of a Guarded Hot-Box.
- E. ASTM E152 - Methods of Fire Tests of Door Assemblies.
- F. ASTM E413 - Classification for Determination of Sound Transmission Class.
- G. DHI (Door Hardware Institute) - The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames and Builder's Hardware.
- H. NFPA 80 - Fire Doors and Windows.
- I. NFPA 252 - Fire Tests for Door Assemblies.
- J. ANSI A250.8- SDI-100 - Recommended Specifications for Standard Steel Doors and Frames.
- K. SDI - Steel Door Institute.
- L. SDI-105 - Recommended Erection Instructions for Steel Frames.
- M. SDI-111 - Standard Steel Doors, Frames, Accessories and Related Components.
- N. SDI-112 - Zinc-Coated (Galvanized / Galvannealed) Steel Doors and Frames.
- O. UL 10B - Fire Tests of Door Assemblies.

1.02 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01 33 00 - Submittals.
- B. Indicate frame configuration, anchor types and spacings, location of cutouts for hardware, reinforcement and finish.

1.03 QUALITY ASSURANCE

- A. Conform to requirements of ANSI A250.8.
- B. Conform to Steel Door Institute (SDI) published standards and performance requirements.

- C. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum three (3) years documented experience.

1.04 REGULATORY REQUIREMENTS

- A. Fire Rated Door and Panel Construction: Conform to UL 10B.
- B. Installed Door and Frame Assembly: Conform to NFPA 80 for fire rated class as indicated on drawings.
- C. Thermal Performance of Exterior Doors: The maximum U-value for opaque doors, having less than 50% glass area, shall be 0.34. The maximum U-value for glazed swinging doors, having 50% or more glass area, shall be 0.60 when tested in accordance with NFRC 100, and the maximum SHGC value shall be 0.40 when tested in accordance with NFRC 200, and assemblies shall carry NFRC labels
- D. Air Leakage: Maximum air infiltration rates for exterior door assemblies shall be 0.30 cfm/sq. ft. when tested in accordance with AAMA/WDMA/CSA101/I.S.2/A440 at 6.24 psf, or 0.20 cfm/sq. ft. when tested in accordance with AAMA/WDMA/CSA101/I.S.2/A440 or NFRC 400 at 1.57 psf. Assemblies shall be labeled.

1.05 DELIVERY, STORAGE, AND PROTECTION

- A. Section 01 60 00 – Product Requirements: Transport, handle, store, and protect products.
- B. Protect doors and frames as recommended by manufacturer.
- C. Break seal on site to permit ventilation, store doors and frames in protected area. Stack doors and frames minimum of 6 inch off floor and provide space between each.

1.06 ALTERNATES

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

1.07 COLORS

- A. Colors are specified on Colors and Materials schedule on drawings.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Basis of Design for Exterior Doors: Assa Abloy, Ceco Door” Trio-E Efficient Steel Stiffened Doors with Mercury 3 Thermal Break Frames.
- B. Assa Abloy, Curries.
- C. Allegion, Steelcraft.
- D. Allegion, Republic.
- E. Stiles Custom Metal, Inc.

- F. SDI or NAAMM members that conform to the specific requirements of this Specification.
- G. Substitutions: Under provisions of Section 01 60 00.

2.02 DOORS

- A. General: Provide 1-3/4 inch thick hollow metal doors of the best commercial quality meeting Steel Door Institute (SDI) recommended specifications / standards and these Specifications. Flush panel design.
- B. Exterior Doors: SDI-100 Level 3, Model 2, 16 gauge, G90 Galvannealed (hot-dip process), seamless design. See special requirements under "Fabrication".
- C. Interior Doors: SDI-100 Level 3, Model 2, 16 gauge, seamless design. See special requirements under "Fabrication".
- D. Provide frames with minimum of three (3) anchors per jamb plus floor anchors. Anchors minimum 18-gauge steel or minimum 3/16-inch diameter wire, adjustable.

2.03 FRAMES

- A. General: Provide hollow metal frames of the best commercial quality, meeting Steel Door Institute (SDI) recommended specifications / standards and these Specifications.
- B. Exterior Frames: SDI-100 Level 3, 16 gauge, G90 Galvannealed (hot-dip process), mitered corners and fully-welded frames. Provide double rabbet profile frame. Provide Level 4, 14 gauge for frames wider than 8-3/4 inch. See special requirements under "Fabrication".
- C. Interior Frames: SDI-100 Level 3, 16 gauge, mitered corners and fully-welded frames. Provide double rabbet profile frame. Provide Level 4, 14 gauge for frames wider than 8-3/4 inch. See special requirements under "Fabrication".

2.04 RELITES

- A. General: Provide hollow metal frames of the best commercial quality, meeting Steel Door Institute (SDI) recommended specifications / standards and these Specifications.
- B. Relite Frames: SDI-100 Level 3, 16 gauge, mitered corners and fully-welded frames. Provide double rabbet profile frame. Provide Level 4, 14 gauge for frames wider than 8-3/4 inch. See special requirements under "Fabrication".
- C. Glazing Stops:
 - 1. Glazing Stops: Rolled steel channel shape, minimum 18 gauge, mitered corners; prepared for oval head, countersunk tamper-proof screws; size as shown on Drawings. Prime paint for field finish selected by Architect.
 - 2. Glazing: As specified in Section 08 81 00 Glass Glazing.

2.06 DOOR CORE

- A. Exterior Doors: Steel Stiffened, foamed in place Polyurethane insulation.

2.07 **ACCESSORIES**

- A. Rubber Silencers: Resilient rubber.
- B. Glazing Stops:
 - 1. Painted Steel: Rolled steel channel shape, minimum 18 gauge, mitered corners; prepared for oval head, countersunk tamper-proof screws; size as shown on Drawings. Prime paint for field finish selected by Architect.

2.08 **PROTECTIVE COATINGS**

- A. Galvanized Finish: Hot-dip process, G90 galvanized coating; minimum 0.6 oz/sq. ft.
- B. Galvannealed Finish: Hot-dip process, A60 galvanized coating; heat treatment converting zinc coating layer to a zinc-iron alloy (90% zinc / 10% iron); minimum 0.6 oz/sq. ft.
- C. Primer: Baked on rust inhibiting shop primer.
- D. Field Finish: Field paint as specified in Section 09 91 00.
- E. Bituminous Back Coating: Waterproof, fibrated asphalt emulsion, thickness of 1/16 inch, Assa Abloy Curries water-based bituminous back coating, Assa Abloy Ceco Door water-based asphaltic frame undercoating or equal.

2.09 **MINERAL WOOL INSULATION**

- A. Mineral Wool Insulation: As specified in Section 07 21 00.

2.10 **FABRICATION**

- A. Construction: Fabricate frames as mitered corners and fully-welded unit type, exposed welds shall be ground smooth and flush. Conform with SDI-100.
- B. Hardware Provisions: Mortise and reinforce doors and frames to accommodate hardware specified in Section 08 71 00.
- C. Hinge Reinforcement: Hinge reinforcement in doors shall be minimum 7 gauge. Hinge reinforcement in frames shall be minimum 7 gauge. Fabricate frames and doors with hardware reinforcement plates securely welded in place. At exterior frames, provide hinge reinforcement full width of doorframe. In addition to manufacturer's standard weld attachment, provide full fillet weld at top and bottom of frame hinge reinforcement. Provide mortar guard boxes. Coordinate with Section 08 71 00.
- D. Security Electronics Provisions: Mortise and reinforce door and frames to accommodate security electronics specified in Division 28.
- E. Hardware Reinforcement: All reinforcement shall be securely welded to door/ frame (spot welding not acceptable). Provide closer reinforcement "sleeve" the full width of doorframes. Reinforcement minimum 14 gauge, except minimum 7 gauge for hinges.
- F. Wide Frames: Reinforce frames wider than 48 inch with roll formed steel channels fitted tightly into frame head, flush with top.
- G. Door Edges: Square edge. Edge seams shall be continuously welded full length and ground

flush and smooth.

- H. Door Silencers: Prepare frame for silencers. Provide three (3) single rubber silencers for single doors and mullions of double doors on strike side, and two (2) single silencers on frame head at double doors without mullions where continuous smoke/weather seals are not specified.
- I. Fire Door Labels: Attach metal fire rating label to each fire-rated frame and door unit.
- J. Door Tops (End Closure): Close top edge of doors with 16 gauge flush steel channel; Flush End Closure with Offset Channel as illustrated in SDI-127A.
 - 1. Door Closers, Overhead Stops and Holders Hardware: If required for door hardware installation provide close top edge of doors with inverted steel channel; Inverted End Closure with Reinforcement Channel as illustrated in SDI-127A. Seal joints watertight.
- K. Door Bottoms (End Closure): Close bottom edge of doors with 16 gauge flush steel channel; Flush End Closure with Offset Channel as illustrated in SDI-127A.
 - 1. Door Bottom Seal Hardware: If required for door hardware installation provide close bottom edge of doors with inverted steel channel; Inverted End Closure with Reinforcement Channel as illustrated in SDI-127A.
- L. Floor Anchors: Provide 16 gauge (minimum) steel angle floor anchors securely welded to frame with two (2) holes for anchoring frame to floor. Provide 12-gauge stirrup floor anchor at mullions.
- M. Jamb Anchors: Provide jamb anchors to suit wall condition and meet fire-rating requirements of frame. Jamb anchors shall be concealed type except punch and dimpled frame with countersunk anchor bolt attachment to concrete wall on painted metal frames is acceptable; patching head is specified in Part 3.
- N. Relite Stops: Mount stops for relites on interior side of room or building.
- O. Door Clearance: Provide clearance to accommodate door hardware clearance requirements and code requirements. The clearance under the bottom of a door shall be a maximum of 3/4-inch. Coordinate with Section 08 71 00.
- P. Glazing Provisions: Glazing in exterior doors shall be insulating glass units with minimum 1/2-inch airspace.

2.11 FINISH

- A. Interior Field Painted Units: Factory protective coating of prime paint. Field paint as specified in Section 09 91 00.
- B. Exterior Field Painted Units: Factory protective coating of hot-dip galvanized coating as specified with prime paint. Factory or shop applied bituminous coating to interior surfaces of all exterior frames and frames mounted in masonry and concrete. Field paint as specified in Section 09 91 00.
- C. Primer Adhesion: Must pass the ASTM D3359 Cross Hatch Test, Method A, X-Cut.
- D. Stainless Steel: Factory Finish. Finish as specified under "Specialty Doors and Frames".

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Section 01 31 00 – Project Management and Coordination: Verification of existing conditions before starting work.
 - 1. Verify that opening sizes and tolerances are acceptable.

3.02 INSTALLATION

- A. Install frames in accordance with SDI-105; installed tolerances for squareness, alignment, twist, and plumbness shall not exceed 1/16-inch total. Maintain proper door perimeter clearances.
- B. Install doors in accordance with SDI-100 and DHI.
- C. Coordinate installation of glass and glazing.
- D. Coordinate installation of doors with installation of hardware specified in Section 08 71 00.
- E. Coordinate with wall construction for anchor placement and throat widths.
- F. Secure all doorframe floor anchors to floor with steel concrete anchors, two (2) concrete anchors per jamb or mullion.
- G. Fasten concealed jamb anchors to 16 gauge jamb stud wall framing with minimum four (4) case-hardened, self-drilling steel screws at each anchor. Weld to steel angle anchors where shown on drawings.
- H. Grind head of exposed anchor bolt fasteners flush with face of frame and fill with polyester metal patching compound; sand flush and smooth to hide bolt head from view.
- I. Exterior Hollow Metal Frames: Solidly pack mineral wool insulation within cavities of exterior hollow metal frames. Fill all voids.
- J. Relite Frames: Solidly pack mineral wool insulation within cavities of relite hollow metal frames. Fill all voids. Coordinate installation of frames to allow for solidly filling cavities.

3.03 ERECTION TOLERANCES

- A. Maximum Diagonal Distortion: 1/16-inch measured with straight edge, corner to corner.

3.04 ADJUSTING

- A. Adjust door and hardware for smooth and balanced door movement.

END OF SECTION

**SECTION 08 14 16
FLUSH WOOD DOORS**

PART 1 - GENERAL

1.01 REFERENCES

- A. ANSI A135.4 - Basic Hardboard.
- B. ASTM E152 - Methods of Fire Tests of Door Assemblies.
- C. ASTM E413 - Classification for Determination of Sound Transmission Class.
- D. AWS - Architectural Woodwork Standards. AWI - Architectural Woodwork Institute.
- E. HPMa HP - Hardwood and Decorative Plywood.
- F. NEMA (National Electric Manufacturers Association) LD3 - High Pressure Decorative Laminates.
- G. NFPA 80 - Fire Doors and Windows.
- H. NFPA 252 - Standard Method of Fire Tests for Door Assemblies.
- I. UL 10B - Fire Tests of Door Assemblies.
- J. Warnock Hersey - Certification Listings for Fire Doors.

1.02 SUBMITTALS

- A. Submit product data under provisions of Section 01 33 00.
- B. Indicate door elevations, stile and rail reinforcement, internal blocking for hardware attachment, and cutouts for glazing.

1.03 QUALITY ASSURANCE

- A. Perform work in accordance with AWS/AWI Premium Grade quality standards.
- B. Conform to referenced AWS/AWI standards; Section 2 – Care and Storage, for "Premium Grade" quality product.
- C. Factory Finish doors and frames in accordance with AWS/AWI Quality Standard Section 5 - Finishing; Premium Grade quality standards.
- D. Fabricate and install door frames in accordance with AWS/AWI Quality Standard Section 6 - Millwork; Premium Grade quality standards.
- E. Fabricate and install doors in accordance with AWS/AWI Quality Standard Section 9 - Doors; Premium Grade quality standards.
- F. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum three (3) years documented experience.

1.04 REGULATORY REQUIREMENTS

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- A. Conform to applicable code for fire rated doors.

1.05 DELIVERY, STORAGE, AND PROTECTION

- A. Section 01 60 00 – Product Requirements: Transport, handle, store, and protect products.
- B. Package, deliver, and store doors in accordance with AWS/AWI Section 2 requirements.

1.06 WARRANTY

- A. Provide five (5) year manufacturer's warranty against material defects and warpage under provisions of Section 01 77 00.

1.07 ALTERNATES

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

1.08 COLORS

- A. Colors are specified on Color and Materials Schedule on drawings.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. VT Industries, Inc.
- B. Vancouver Door Company. Puyallup, Washington.
- C. Marshfield Door System, Inc.
- D. Lynden Door. Lynden, Washington.
- E. Eggers Industries.
- F. Substitutions: Under provisions of Section 01 60 00.

2.02 DOOR TYPES

- A. Flush Interior Doors: 1-3/4 inch thick; solid core and hollow core construction; wood veneer facing; fire rated as indicated on drawings.

2.03 DOOR CONSTRUCTION (INTERIOR DOORS)

- A. Solid Core, Non-Rated: AWS/AWI Section 9, Type PC-7 (Particleboard, MDF or Agrifiber core; core with 3 layers on each side). AWS/AWI figure 9-012

2.04 FLUSH DOOR FACING (INTERIOR DOORS) FACTORY FINISH (TRANSPARENT FINISH)

- A. Facing Quality: AWS/AWI Section 9; Premium Grade. Plain sliced, AA veneer face; book matched leaves for transparent finish. Provide balance and center match. Provide pair match for double doors.
- B. Facing Veneer Material: Cherry select veneer to receive transparent finish.

- C. Provide Factory Finish conforming to AWS/AWI Section 5, System 11 - two-coat Catalyzed Polyurethane finish and Stain, Premium Grade. two-coats of Stain.

2.058 ACCESSORIES

- A. Glazing Vision Panels:
 - 1. Glazing Option: Flush solid wood mouldings, AWS/AWI Section 9, figure 9-024. Solid lumber to match wood door veneer.
 - 2. Glazing: As specified in Section 08 81 00.

2.06 FABRICATION

- A. Fabricate non-rated doors in accordance with AWS/AWI Premium Grade quality standards.
- B. Doors in Pairs: Pair Match as per the AWS/AWI Grade specified. AWS/AWI figure 9-001.
- C. Sound Rating For Single Door Leaf and Frame Assembly: ASTM E413, minimum STC 35.
- D. Door Blocking Construction: Provide internal blocking for hardware reinforcement in accordance with AWS/AWI Premium Grade quality standards. Provide full-width; 5-inch wide top rail block and bottom rail block; Type HB-3 as illustrated in AWS/AWI figure 9-028 and figure 9-029. Provide full-width; center block and 5-inch x 18-inch lock blocks; Type HB-6 as illustrated in AWS/AWI figure 9-028 and figure 9-030.
- E. Door Edge Construction: AWS/AWI Type A (Solid wood edgeband, face, and cross band edges show); AWS/AWI figure 9-006.
- F. Factory machine doors for finish hardware in accordance with hardware requirements and dimensions. Do not machine for surface hardware. Provide solid blocking for through bolted hardware.
- G. Glazed Panels: Refer to Door Schedule and Door Types Legend included in the Construction Documents.
- H. Door Meeting Edge Construction: Bevel edge condition as illustrated in AWS/AWI figure 9-022.
- I. Cased Opening Frame Construction: Cased opening style. Type 5 as illustrated in AWS/AWI figure 6-030.
- J. Factory fit doors for frame opening dimensions identified on shop drawings.
- K. Provide edge clearances in accordance with AWS/AWI Section 9.
- L. Coordinate with Section 08 71 00. Undercut doors as scheduled. Undercuts are measured from top of finish floor covering or threshold.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions.
- B. Install fire rated doors in accordance with AWS/AWI quality standards and NFPA 80.

- C. Trim non-rated door width by cutting equally on both jamb edges.
- D. Trim door height by cutting bottom edges to a maximum of 3/4 inch. Trim fire door height at bottom edge only, in accordance with fire rating requirements.
- E. Machine cut for hardware.
- F. Coordinate installation of doors with installation of hardware specified in Section 08 71 00.
- G. Coordinate installation of glass and glazing.
- H. Install door louvers plumb and level.

3.02 INSTALLATION TOLERANCES

- A. Conform to AWS/AWI quality standard requirements for fit and clearance tolerances.

3.03 ADJUSTING

- A. Adjust door for smooth and balanced door movement.

END OF SECTION

**SECTION 08 31 00
ACCESS DOORS AND PANELS**

PART 1 - GENERAL

1.01 QUALITY ASSURANCE

- A. Manufacture fire rated access doors and frames to conform to UL requirements.
- B. Provide labels indicating rating.

1.02 SUBMITTALS

- A. Submit product data under provisions of Section 01 33 00.
- B. Include sizes, types, finishes, scheduled locations, and details of adjoining work.

1.03 ALTERNATES

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

1.04 COLORS

- A. Colors are specified on Color and Materials Schedule on drawings.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Access Panel:
 - 1. J.L. Industries Type FDWB, Fire Rated Panel.
 - 2. J.L. Industries Type WB, Non-Rated Panel.
 - 3. Substitutions: Under provisions of Section 01 60 00.
- B. Locks:
 - 1. Corbin Russwin Cylinder Lock.

2.02 ACCESS PANEL

- A. Construction: Hinged lockable steel access door with 16-gauge frame and 14-gauge door, concealed hinge, lock, and adjustable anchor straps. Provide of steel construction with prime coated finish in other areas.
- B. Sizes: 12" x 12", 10" x 10", 8" x 8" and other sizes as indicated in the documents. Refer to mechanical drawings and specifications.
- C. Fire Rating: Door shall maintain fire rating of system installed in.

- D. Access door shall be keyed to the building key system.

2.03 MECHANICAL ACCESS DOORS

- A. Meet requirements of this Section. Provide by Division 22 and Division 23.

2.04 FINISH

- A. Prime coat with baked on primer.
- B. Field paint per Section 09 91 00.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify rough openings for door and frame are correctly sized and located for coordination with access to concealed work and adjoining systems at access points.
- B. Beginning of installation means acceptance of existing conditions.
- C. Coordinate with Section 09 29 00 for gypsum wallboard.
- D. Coordinate with Section 06 10 00 for opening requirements.

3.02 INSTALLATION

- A. Install frame plumb and level in openings.
- B. Coordinate position to provide convenient access to concealed work requiring access.
- C. Secure rigidly in place in accordance with manufacturer's instructions.

END OF SECTION

**SECTION 08 33 23
ROLLING SERVICE DOORS**

PART 1 - GENERAL

1.01 REFERENCES

- A. ANSI/DASMA 105 – Thermal Transmittance and Air Infiltration of Garage Doors
- B. ASTM A480/A480M - Flat Rolled Stainless Heat Resisting Steel Plate, Sheet, and Strip.
- C. ASTM A658/A924 - Steel Sheet, Zinc-coated (Galvanized) by the Hot-Dip Process.
- D. ASTM A526/A526M - Steel Sheet, Zinc-coated (Galvanized) by the Hot-dip Process, Commercial Quality.
- E. ASTM B221/A221M - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
- F. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- G. NEMA ICS 2 - Standards for Industrial Control Devices, Controllers and Assemblies.
- H. NEMA MG1 - Motors and Generators.
- I. UL - Fire Resistance Directory.
- J. UL 325 - Door, Drapery, Gate, Louver, and Window Operators and Systems.

1.02 SUBMITTALS

- A. Section 01 33 00 - Submittals: Procedures for submittals.
- B. Product Data: Provide general construction, component connections and details, and hardware.
- C. Shop Drawings: Indicate pertinent dimensioning, anchorage methods, hardware locations, and installation details.
- D. Samples: Submit exterior finish samples illustrating shape, color and finish texture.

1.03 OPERATION AND MAINTENANCE DATA

- A. Submit under provisions of Section 01 77 00.
- B. Operation Data: Include electrical and control adjustments.
- C. Maintenance Data: Include data for motor and transmission, shaft and gearing, lubrication frequency, spare part sources.

1.04 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section

with minimum five (5) years documented experience.

- B. Installer: Company specializing in performing the work of this Section approved by manufacturer.

1.05 REGULATORY REQUIREMENTS

- A. Products Requiring Electrical Connection: Listed and classified by *Underwriters Laboratories Inc.*, as suitable for the purpose specified and indicated.
- B. Provide certificate of compliance from [authority having jurisdiction indicating approval of door and operating hardware assembly.
- C. Thermal Performance of Exterior Doors: The minimum R-value for opaque doors is R-7.7.

1.06 WARRANTY

- A. Provide five (5) year warranty under provisions of Section 01 77 00.

1.07 ALTERNATES

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

1.08 COLORS

- A. Colors are specified on Color and Materials Schedule on drawings.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Overhead Door Company.
- B. Wayne-Dalton Corporation.
- C. Raynor.
- D. Substitutions: Under provisions of Section 01 60 00.

2.02 INSULATED ROLLING SERVICE DOORS – HEAVY DUTY

- A. Specification Standard: Overhead Door Company; Series 625, Stormtite Insulated.
- B. Components:
 - 1. Curtain: Interlocking flat profile slats (Type F-265I), foamed in place with CFC-free foamed-in-place polyurethane insulation. Front slat shall be fabricated of 20 gauge galvanized steel. The back slat shall be of same material as front slat.
 - 2. Guides: Structural galvanized steel sections. Face of wall mounted; angle guides.
 - 3. Lock: Inside side mounted, adjustable keeper, spring activated latch bar with feature to keep in locked or retracted position; interior handle.
 - 4. Door Panel Weatherstripping: At bottom and head of door panel, full width; contact

resilient.

5. Jam Weatherstripping: Roll formed steel fitted full height of jamb with integral resilient weatherstripping in moderate contact with door panels.
6. Hood: The hood shall be minimum 20 gauge galvanized. The hood shall be supplied with integral hood baffle weatherseal.
7. Operation: Adjustable helical wound torsion springs (designed **100,000** cycles) on crossheader shaft, motorized operation – wall mounted above shaft. Enclosed counterbalance assembly. The counterbalance shall be adjustable by means of an adjusting tension wheel.
8. Options: Provide the following manufacturer's options; Bottom Sensing EdgeHigh-Use Package, High-Windload Package.
9. Provide the following operator control option: combination stations, surface mounted next to door, interior Vehicle detectors
10. Finish: Curtain slats and hood shall be galvanized per ASTM A653 and shall receive a rust-inhibitive, roll-coating process, including baked-on prime paint to be .2 mils thick, and a baked-on polyester top coat to be .6 mils thick. All non-galvanized exposed ferrous surfaces shall receive one coat of rust-inhibitive primer.
 - a) Galvanized steel slats and hood shall include powder coat factory finish; color matched to specification. Powder Coat: PowerGuard Premium.
 - b) Color: As specified in Colors and Materials Schedule.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that wall openings are ready to receive work and opening dimensions and tolerances are within specified limits.
- B. Beginning of installation means acceptance of existing surfaces.

3.02 PREPARATION

- A. Prepare opening to permit correct installation of door unit to perimeter air and vapor barrier seal.

3.03 INSTALLATION

- A. Install door unit assembly in accordance with manufacturer's instructions.
- B. Anchor assembly to wall construction and building framing without distortion or stress.
- C. Securely brace door tracks suspended from structure. Secure tracks to structural members only.
- D. Fit and align door assembly including hardware, level and plumb, to provide smooth operation.
- E. Coordinate installation of electrical service. Complete power and control wiring from disconnect to unit components.

- F. Coordinate installation of sealants and backing materials at frame perimeter as specified in Section 07 92 00.
- G. Install perimeter trim and closures.

3.04 TOLERANCES

- A. Maintain dimensional tolerances and alignment with adjacent work.
- B. Maximum Variation from Plumb: 1/16-inch.
- C. Maximum Variation from Level: 1/16-inch.
- D. Longitudinal or Diagonal Warp: Plus or minus 1/8-inch from 10 ft straight edge.

3.05 ADJUSTING

- A. Adjust door assembly to smooth operation.

3.06 CLEANING

- A. Clean doors and frames.
- B. Remove labels and visible markings.

3.07 PROTECTION OF FINISHED WORK

- A. Protect finished Work under provisions of Section 01 50 00.

END OF SECTION

SECTION 08 41 13
ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.01 REFERENCES

- A. AA - Aluminum Association. Designation System for Aluminum Finishes.
- B. AAMA - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.
- C. AAMA 501.2 - Methods of Test for Metal Curtain Walls.
- D. AAMA 603.8 - Performance Requirements and Test Procedures for Pigmented Organic Coatings on Extruded Aluminum.
- E. AAMA 605.2 - Specification for High Performance Organic Coatings on Architectural Extrusions and Panels.
- F. AAMA 606.1 - Specifications and Inspection Methods for Integral Color Anodic Finishes for Architectural Aluminum.
- G. AAMA 607.1 - Specifications and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum.
- H. AAMA SFM-1 - Aluminum Storefront and Entrance Manual.
- I. ASTM A36/A36M - Structural Steel.
- J. ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.
- K. ASTM B221 - Aluminum-Alloy Extruded Bar, Rod, Wire, Shape, and Tube.
- L. ASTM E283 - Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors.
- M. ASTM E330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- N. AAMA – American Architectural Manufacturers Association.
- O. AAMA 611 – Specification for Anodized Architectural Aluminum.
- P. AAMA 2605 – Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Architectural Extrusions and Panels.
- Q. AA - Aluminum Association. Aluminum Design Manual.
- R. PCI – Powder Coating Institute.

1.02 PERFORMANCE REQUIREMENTS

- A. Window components to provide for expansion and contraction caused by a cycling temperature range of 170 degrees F without causing detrimental effects to components.

- B. Design and size members to withstand dead loads and live loads caused by pressure and suction of wind as calculated in accordance with structural notes and applicable codes.
- C. Limit deflection to $1/175$ of the span, or flexure limit of glass with full recovery of glazing materials, whichever is less.
- D. Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to exterior.
- E. Water infiltration shall be tested in accordance with ASTM E331. No water penetration at a test pressure of 6.24 psf.
- F. Thermal Performance of Exterior Assemblies: The maximum U-value for storefront, non operable, shall be $U=0.38$, and the maximum SHGC value shall be $SHGC=0.40$. The maximum U-value for storefront windows, operable, shall be $U=0.40$, and the maximum SHGC value shall be $SHGC=0.40$. The maximum U-value for glazed swinging doors, having 50% or more glass area, shall be $U=0.42$, and the maximum SHGC value shall be $SHGC=0.40$. U-values shall be tested in accordance with NFRC 100. SHGC values shall be tested in accordance with NFRC 200. Assemblies shall be labeled in accordance with NFRC standards.
- F. Air Leakage: Assemblies shall be labeled. Maximum air infiltration rates for exterior assemblies shall be as follows:
 - 1. Windows: 0.30 cfm/sq. ft. when tested in accordance with AAMA/WDMA/CSA101/I.S.2/A440 at 6.24 psf, or 0.20 cfm/sq. ft. when tested in accordance with AAMA/WDMA/CSA101/I.S.2/A440 or NFRC 400 at 1.57 psf.
 - 2. Storefront Glazing: 0.06 cfm/sq. ft. when tested in accordance with NFRC 400 or ASTM E283 at 1.57 psf.
 - 3. Swinging Entrance Doors: 1.00 cfm/sq. ft. when tested in accordance with NFRC 400 or ASTM E283 at 1.57 psf.

1.03 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01 33 00.
- B. Include wall opening and component dimensions; wall opening tolerances required; anchorage and fasteners; affected related work; installation requirements.
- C. Submit manufacturer's installation instructions under provisions of Section 01 33 00.
- D. Submit samples under provisions of Section 01 33 00. Submit samples for each exposed finish Material required, in same thickness and material indicated for the work, in 5-inch-long sections.

1.04 QUALITY ASSURANCE

- A. Perform work in accordance with AAMA - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.
- B. Manufacturer: Company specializing in manufacturing aluminum glazing systems with minimum three (3) years documented experience.

1.05 DELIVERY, STORAGE, AND PROTECTION

- A. Section 01 60 00 – Product Requirements: Transport, handle, store, and protect products.
- B. Protect finished aluminum surfaces. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

1.06 WARRANTY

- A. Provide five (5) year manufacturer warranty for glazed units, under provisions of Section 01 77 00.
- B. Warranty: Include coverage for complete system for failure to meet specified requirements.

1.07 COLORS

- A. Colors are specified on Colors and Materials Schedule on drawings.

1.08 ALTERNATES

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. General: The following manufacturers are acceptable provided they supply products meeting the requirements of this specification and specification standard:
 - 1. Kawneer
 - 2. C.R. Laurence Company (CRL) / U.S. Aluminum.
 - 3. EFCO Corporation
 - 4. Arcadia, Inc.
- B. Substitutions: Under provisions of Section 01 60 00.

2.02 MATERIALS

- A. Extruded Aluminum: ANSI/ASTM B221; 6063-T5 alloy and temper.
- B. Steel Sections: ANSI/ASTM A36; shapes to suit mullion sections.
- C. Primer: FS TT-P-31; red; for shop application and field touch-up.
- D. Touch-Up Primer for Galvanized Surfaces: FS TT-P-641.

2.03 ALUMINUM STOREFRONT SYSTEM (EXTERIOR)

- A. Storefront System: Basis of Design: Kawneer 451T.
- B. Thermal Framing System, Center Glazing. The assembly shall have National Fenestration

Rating Council (NFRC) certification in accordance with Washington State Energy Code requirements.

- C. Framing System: 2-inch x 4-1/2-inch, thermally broken aluminum framing system to accept 1-inch thick insulated glazing unit. Exterior glazing method.
- D. Schedule: Use at the following exterior conditions: Storefronts, Entrances, and Windows.
- E. Utilize manufacturer's 90 degree outside corner, 90 degree inside corner at corners.
- F. Provide doorjamb and head frame section similar to 451T with continuous vinyl thermal break. Provide all accessories necessary to accept aluminum entrance doors with butt hinges into aluminum storefront system. Provide steel reinforcement for door hinge attachment.
- G. Glazing Gaskets: Elastomeric extrusions of manufacturer's standard. Square glass stops.
- H. Fasteners: Stainless steel type.
- I. Sealant: As specified in Section 07 92 00.
- J. Internal Sealants: Type recommended by manufacturer.
- K. Reinforcement: As recommended by manufacturer to achieve deflection limits specified herein.
- L. Factory Finish: Color and finish as specified in Colors and Materials Schedule.
- M. Sheet Metal Flashing and Trim: Minimum 0.0403-inch aluminum sheet material, shapes as shown on drawings. Minimum 0.0508 inch aluminum sheet material where exposed faces or legs of material exceed 5 inch widths. Materials color and finish to match storefront system framing.
- N. Filler: Provide manufacturer's standard filler pieces for open backs of jamb, sill, and head framing.
- O. Subsill: Provide manufacturer's standard extruded aluminum subsill and subsill end closures to form a continuous flashing pan at the bottom of exterior storefront framing.
- P. Accessories: Provide all clips, fasteners, connectors, anchors and accessories required for a complete installation and as recommended by manufacturer.

2.04 ALUMINUM ENTRANCE DOORS (EXTERIOR)

- A. Aluminum Entrance Doors: Kawneer 500T Insulpour Thermal Entrance Aluminum, Heavy duty doors, wide stile center hung, single acting, to accept 1-inch thick insulated glazing unit. Square glass stops. 9-1/2 inch height ADA bottom rail.
 - 1. Provide all hardware for complete functional and operational doors. Hardware color and finish to match aluminum entrance doors. Coordinate hardware with access control system.
 - a. Hinges: Single Acting. Stainless steel butts as specified in Section 08 71 00.
 - b. Deadlock: As specified in Section 08 71 00.
 - c. Closer: Exposed overhead closer as specified in Section 08 71 00.

- d. Cylinder Guard.
 - e. Thumb Turn Lock Cylinders.
 - f. Threshold: Aluminum, ADA compliant, commercial saddle threshold. Threshold width to match door frame width.
 - g. Flush Bolt: Manufacturer's standard. Install in inactive leaf of door pairs.
 - h. Panic Exit Device: As specified in Section 08 71 00.
 - i. Power Assist Door Operator: As specified in Section 08 71 00.
 - j. Electric Strike: As specified in Section 08 71 00.
 - k. Remote Door Lock Button: As specified in Section 08 71 00.
 - l. Door Pull Hardware:
 - (1) Doors Pulls (Standard): Set. Install back to back door pulls.
 - (2) Door Pulls (Type: DP-1): Forms + Surfaces. Style as specified in Section 08 71 00. Install back to back door pulls on aluminum storefront entrance doors.
 - m. Weatherstripping: Manufacturer's standard. Include bottom rail weatherstripping.
 - n. Overhead Stop and Holder: As specified in Section 08 71 00.
- C. Glazing Gaskets: Elastomeric extrusions of manufacturer's standard. Square glass stops.
 - D. Glass and Glazing Materials: As specified in Section 08 81 00.
 - E. Fasteners: Stainless steel type.
 - F. Sealant: Refer to Section 07 92 00.
 - G. Factory Finish: Color and finish to match Storefront system.

2.05 ALUMINUM STOREFRONT SYSTEM (INTERIOR)

- A. Storefront System: Kawneer, Series 450, Center Glazing System.
- B. Framing System: 1-3/4-inch x 4-1/2-inch, aluminum framing system to accept 1/4-inch thick glazing. exterior glazing method.
- C. Schedule: Use at the following interior conditions: Storefronts Relites, Door Frames.
- D. Utilize manufacturer's 90 degree outside corner, 90 degree inside corner at corners.
- E. Provide all accessories necessary to accept flush wood doors with butt hinges into aluminum storefront system. Provide steel reinforcement for door hinge attachment.
- F. Glazing Gaskets: Elastomeric extrusions of manufacturer's standard. Square glass stops.
- G. Fasteners: Stainless steel type.

- H. Sealant: As specified in Section 07 92 00.
- I. Internal Sealants: Type recommended by manufacturer.
- J. Reinforcement: As recommended by manufacturer to achieve deflection limits specified herein.
- K. Factory Finish: Color and finish as specified in Colors and Materials Schedule.
- L. Sheet Metal Trim and Breakshapes: Minimum 0.0403-inch aluminum sheet material, shapes as shown on drawings. Minimum 0.0508 inch aluminum sheet material where exposed faces or legs of material exceed 5 inch widths. Materials color and finish to match storefront system framing.
- M. Filler: Provide manufacturer's standard filler pieces for open backs of jamb, sill, and head framing.
- N. Subsill: Provide manufacturer's standard extruded aluminum subsill and subsill end closures to form a continuous flashing pan at the bottom of exterior storefront framing.
- O. Accessories: Provide all clips, fasteners, connectors, anchors and accessories required for a complete installation and as recommended by manufacturer.

2.07 GLASS AND GLAZING MATERIALS

- A. Glass and Glazing Materials: As specified in Section 08 81 00.
- B. Glass: Provide all clips, fasteners, connectors, etc., required for a complete installation and as recommended by manufacturer.

2.08 FABRICATION

- A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly yet enabling installation and dynamic movement of perimeter seal.
- B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- C. Prepare components to receive anchor devices. Fabricate anchors.
- D. Arrange fasteners and attachments to conceal from view.
- E. Prepare components with internal reinforcement for door hardware and door operator hinge hardware.
- F. Reinforce framing members for imposed loads.

2.09 FINISH – ALUMINUM

- A. Factory Finish: Provide Anodized Finish on all surfaces conforming with; AAMA 611, Architectural Class I, minimum of 0.0007-inch thickness. Coating shall be applied under controlled conditions at factory in manner recommended by manufacturer. Color as indicated in Colors and Materials Schedule.

PART 3 - EXECUTION

3.01 **EXAMINATION**

- A. Verify dimensions, tolerances, and method of attachment with other work.
- B. Verify wall openings and adjoining air and vapor seal materials are ready to receive work of this Section.
- C. Beginning of installation means acceptance of existing conditions.

3.02 **INSTALLATION**

- A. Install storefront framing system in accordance with manufacturer's instructions.
- B. Install aluminum entrance doors in accordance with manufacturer's instructions.
- C. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- D. Provide alignment attachments and shims to permanently fasten system to building structure.
- E. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- F. Provide thermal isolation where components penetrate or disrupt building insulation.
- G. Coordinate attachment and seal of perimeter air and vapor barrier materials.
- H. Pack mineral wool insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- I. Install hardware specified in this Section and in Section 08 71 00 in accordance with hardware and entrance manufacturer's instructions and Section 08 71 00. Adjust for proper operation. Install thresholds on top of finish flooring.
- J. Install glass and infill panels in accordance with Section 08 81 00, to exterior dry method of glazing.
- K. Install perimeter sealant in accordance with Section 07 92 00.

3.03 **ADJUSTING**

- A. Adjust operating hardware for smooth operation.

3.04 **CLEANING**

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- C. Remove excess sealant by method acceptable to sealant manufacturer.

END OF SECTION

**SECTION 08 45 13
TRANSLUCENT WINDOW SYSTEM**

PART 1 - GENERAL

1.01 REFERENCES

- A. AISI (American Iron and Steel Institute) - Stainless Steel - Uses in Architecture.
- B. ANSI Z97.1 - Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.
- C. ASTM A653 – Steel sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- D. ASTM D1003 – Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics
- E. ASTM E283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
- F. ASTM D1929: Standard Test Method for Determining Ignition Temperature of Plastics
- G. ASTM D2843: Standard Test Method for Density of Smoke from the Burning or Decomposition of Plastic
- H. ASTM E84 - Flame spread and smoke development, Standard Test Method for Surface Burning Characteristics of Building Materials
- I. ASTM E330 - Uniform load deflection, Standard Test Method For Structural Performance Of Exterior Windows, Doors, Skylights And Curtain Walls By Uniform Static Air Pressure Difference
- J. AAMA – American Architectural Manufacturers Association.
 - 1. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems.
 - 2. AAMA 605.2 - Voluntary Specification for High Performance Organic Coatings.
- K. AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS - North American Fenestration Standard / Specification for windows, doors and skylights
- L. NFRC 100 – U-Factor
- M. NFRC 201 - Solar Heat Gain Coefficient
- N. NFRC 202 - Visible Transmittance
- O. PCI – Powder Coating Institute.

1.02 SUBMITTALS

- A. Submit under provisions of Section 01 30 00.
- B. Shop Drawings: Submit plan, section, elevation, and perspective drawings as necessary to depict each specified assembly to include flashing, connection, and termination details.
- C. Structural calculations prepared by a structural engineer qualified in the design of Translucent Window System Assemblies licensed in the state where the project is located.
- D. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Test Reports: Independent testing agency or evaluation service reports verifying compliance with specified performance requirements, including air, water, and structural performance data.
 - 2. Manufacturer's color chart listing the full range of colors available for aluminum finishing.
 - 3. Preparation instructions and recommendations.
 - 4. Storage and handling requirements and recommendations.
 - 5. Installation methods and requirements.
- E. Submit samples for each exposed finish Material required, in same thickness and material indicated for the work, in 5-inch-long sections.

1.03 QUALITY ASSURANCE

- A. Manufacturer's Qualifications:
 - 1. Material and products shall be manufactured by a company continuously and regularly employed in the manufacture of specified materials for a period of at least ten consecutive years and which can show evidence of those materials being satisfactorily used on at least six projects of similar size, scope and location. At least three of the projects shall have been in successful use for ten years or longer.
- B. Installer's Qualifications:
 - 1. Installation shall be by an experienced installer, which has been in the business of installing specified translucent Window systems for at least five years and can show evidence of satisfactory completion of projects of similar size, scope and type.

1.04 DELIVERY STORAGE AND HANDLING

- A. Deliver skylight system, components and materials in manufacturer's standard protective packaging.
- B. Store panels on the long edge; several inches above the ground, blocked and under cover in accordance with manufacturer's storage and handling instructions.

1.05 WARRANTY

- A. Manufacturer's Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of skylights that fail in materials or workmanship under normal

use within specified warranty period.

1.07 **ALTERNATES**

- A. See Section 01 23 00 for bidding alternates affecting the Work of this Section.

PART 2- PRODUCTS

2.01 **MANUFACTURER**

- A. Kingspan Light + Air
- B. Kalwall
- C. Substitutions: Under provisions of Section 01 60 00.

2.02 **TRANSLUCENT WINDOW SYSTEM**

- A. Basis of Design: Kingspan, UniQuad Window
- B. Translucent Window System Assemblies assembled from extruded aluminum members capable of withstanding loads as defined by local jurisdiction building code.
- C. Performance Requirements:
 - 1. Structural Members: Sized to support design loads in accordance with Building Code requirements.
 - 2. The glazing joint shall comply with the deflection limitation of IBC Table 1604.3 for exterior walls with flexible finishes – L/120 per ASTM E-330.
 - 3. Water penetration: Meets requirements of ASTM E331 that allows for no water infiltration at a test pressure of 15 psf
 - 4. Air Infiltration: Less than 0.3 cu ft per minute per sq ft (0.09 cu m per minute per sq m) of fixed area when tested to 6.24 psf in accordance with ASTM E283.
 - 5. Air Exfiltration: Less than 0.3 cu ft per minute per sq ft (0.09 cu m per minute per sq m) of fixed area when tested to 6.24 psf in accordance with ASTM E283.
 - 6. Thermal Movement: Design, fabricate, and install assembly to be free from objectionable distortion and stresses in fastening and joinery due to expansion and contraction when subjected to temperature variance.
 - 7. Assembly framing is designed to be self-supporting. The system will impose reactions to the support structure, which include horizontal and vertical loads, due to dead load, live load, and wind load.
 - 8. Thermal and Solar Performance
 - a. To ensure Energy Code compliance, product U-Values must be listed in the NFRC Product Directory and have a NFRC Certified Product Directory (CPD) number.
 - 9. Flammability
 - a. Interior and Exterior Glazing: Class CC1 fire rating classification per ASTM D-635.
 - 10. Sound Transmission Class (STC) Rating, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 / E1332

- a. no infill - STC: 27 - OITC: 19

2.03 TRANSLUCENT WINDOW SYSTEM ASSEMBLIES

A. Framing System

1. Extruded aluminum shall be ANSI/ASTM B-221; 6063-T6 or 6005-T5.
2. All fasteners for aluminum framing to be stainless steel or cadmium plated steel, excluding the final fasteners to the building.
3. All exposed Aluminum shall be finished:
4. The translucent wall light framing is designed to be self-supporting between the support constructions. The deflection of the glazing panel joint and system framing members in a direction normal to the plane of the glazing, when subjected to a uniform load deflection, shall not exceed $L/120$ for the unsupported span per IBC Table 1604.3. All adjacent and support construction must support the transfer of all loads included horizontal and vertical, exerted by the system. Design or structural engineering services for the supporting structure or building components in not included in the curtain wall scope of this section.
5. Aluminum framing exposed to the exterior shall be thermally broken.

B. Translucent Glazing Systems

1. Design, engineer, manufacture, and installation of unitized double-glazed translucent wall system. An assembly of two independent insulated glazing panes in one integrated assembly, incorporated into a complete aluminum frame system that has been tested and warranted by the manufacturer as a single source system. Design shall provide for the replacement of the exterior glazing, independently of the interior glazing without exposing the building's interior or compromising the weather tightness or interfering with the normal working functions of the building. Single pane glazing systems are not acceptable.
2. Overall glazing assembly thickness shall be a minimum 2.75", with two glazing panes and concealed interlocking connector. Thickness of the exterior and interior glazing shall be minimum 8mm thick each
3. Panel shall be extruded in one single formable length. Maximum panel width shall not exceed 2'. Transverse connections are not acceptable.
4. The panels should be manufactured with up stands that are integral to the unit.
5. The up stands shall be 90 degrees to the panel face (standing seam dry glazed concept). Welding or gluing of upstands or standing seams is not acceptable.
6. Free movement of the panels shall be allowed to occur without damage to the weather tightness of the completed system.

2.4 FINISHES

A. Material: Aluminum.

- 1 Finish: Organic coating.
 - a. Color: Anodic coating to AAMA 611. Class: Clear

PART 3 - EXECUTION

3.01 **EXAMINATION**

- A. Verify dimensions, tolerances, and method of attachment with other work.
- B. Verify wall openings and adjoining air and vapor seal materials are ready to receive work of this Section.
- C. Beginning of installation means acceptance of existing conditions.

3.02 **INSTALLATION**

- A. Install window system in accordance with manufacturer's instructions.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Coordinate attachment and seal of perimeter air and vapor barrier materials.
- G. Pack mineral wool insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- H. Install Manufacturer approved perimeter sealant and in accordance with Section 07 92 00.

3.03 **CLEANING**

- A. Clean Surfaces in accordance with Manufacturers requirements
- B. Remove protective material from pre-finished aluminum surfaces.
- C. Remove excess sealant by method acceptable to sealant manufacturer.

END OF SECTION

SECTION 08 62 00
UNIT SKYLIGHT

PART 1 - GENERAL

1.01 REFERENCES

- A. AISI (American Iron and Steel Institute) - Stainless Steel - Uses in Architecture.
- B. ASTM A653 – Steel sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- C. ASTM D1003 – Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics
- D. ASTM E108 - Standard Test Methods for Fire Tests of Roof Coverings
- E. ASTM E283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
- F. ASTM D635: Standard Test Method for Rate of Burning and/or Extent and time of Burning of plastics in a horizontal position
- G. ASTM D1929: Standard Test Method for Determining Ignition Temperature of Plastics
- H. ASTM D2843: Standard Test Method for Density of Smoke from the Burning or Decomposition of Plastic
- I. NRCA (National Roofing Contractors Association) - Roofing Manual.
- J. SMACNA - Architectural Sheet Metal Manual.
- K. AAMA – American Architectural Manufacturers Association.
 - 1. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems.
 - 2. AAMA 605.2 - Voluntary Specification for High Performance Organic Coatings.
- L. AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS - North American Fenestration Standard / Specification for windows, doors and skylights)
- M. Unit skylights must be tested and certified by NFRC for thermal performance. Products must be listed on the NFRC Certified Products directory.
- N. PCI – Powder Coating Institute.

1.02 SUBMITTALS

- A. Submit manufacturer's product data. Include construction details, material descriptions, profiles and finishes of skylight components.
- B. Submit shop drawings. Include elevations and details.
- C. Indicate compliance with specified structural design criteria.

1. Submitted design calculations shall bear seal of a professional engineer licensed in the State in which the skylight is to be installed.
 2. Certify that engineer has reviewed shop drawings.
- D. Submit manufacturer's color charts showing the full range of colors available for factory-finished aluminum.
1. Submit samples for each exposed finish required, in same thickness and material indicated for the work and in size indicated below. If finishes involve normal color variations, include sample sets consisting of two or more units showing the full range of variations expected.
 1. Factory Finished Aluminum Frame: 5-inch long sections.
- E. Submit Installer Certificate, signed by installer, certifying compliance with project qualification requirements.

1.03 QUALITY ASSURANCE

- A. Manufacturer's Qualifications:
1. Material and products shall be manufactured by a company continuously and regularly employed in the manufacture of specified materials for a period of at least ten consecutive years and which can show evidence of those materials being satisfactorily used on at least six projects of similar size, scope and location. At least three of the projects shall have been in successful use for ten years or longer.
- B. Installer's Qualifications:
1. Installation shall be by an experienced installer, which has been in the business of installing specified skylight systems for at least five years and can show evidence of satisfactory completion of projects of similar size, scope and type.

1.04 DELIVERY STORAGE AND HANDLING

- A. Deliver skylight system, components and materials in manufacturer's standard protective packaging.
- B. Store panels on the long edge; several inches above the ground, blocked and under cover in accordance with manufacturer's storage and handling instructions.

1.05 WARRANTY

- A. Manufacturer's Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of skylights that fail in materials or workmanship under normal use within specified warranty period.

1.06 ALTERNATES

- A. See Section 01 23 00 for bidding alternates affecting the Work of this Section.

PART 2 - PRODUCTS

2.01 **MANUFACTURER**

- A. Velux America
- B. Wasco Skylights
- C. Kingspan Light + Air
- D. Substitutions: Under provisions of Section 01 60 00.

2.02 **UNIT SKYLIGHT SYSTEM**

A. Basis of Design: Kingspan, Series 1200 Skylight

- 1. System Description: Triarch dome skylight with Curb Mount (CM) or Self-Flashing (SF) base. Constructed of aluminum extruded framing members with fully welded corners with integrated guttering system for condensation management and drainage. Thermally broken frame only.
- 2. Glazing: Clear Polycarbonate over White prismatic polycarbonate]
- 3. Mounting:
 - a. Curb Mounted (CM)
 - b. Self-flashing (SF), Manufacturers standard aluminum curb
 - c. Curb height: 18' high
 - d. Curb construction: Double wall insulated (DW)
 - e. Termination Bar.

2.03 **FABRICATION**

- A. Fabricated by an ISO 9001:2015 Certified Manufacturer
- B. Fabricate free of visual distortions and defects. Weld corners and joints.
- C. All fasteners and hardware shall be corrosion resistant, Stainless Steel.
- D. Provide a weather tight assembly.

PART 2 - EXECUTION

3.01 **EXAMINATION**

- A. Installer shall examine substrates, supporting structure and installation conditions.
- B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 **PREPARATION**

- B. Dissimilar Metal Protection and Corrosion Protection:

1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.

3.03 INSTALLATION

- A. Install the unit skylight in accordance with the manufacturer's installation recommendations and approved shop drawings.
 1. Coordinate roof membrane installation requirements specified in other Sections.
- B. Skylight curbs bearing on roof deck:
 1. Set units in place and secure curb flange to steel roof deck by self-tapping non-corrosive screw fasteners, spaced at a maximum of 12" on center, staggered.
- C. Apply bituminous paint on metal surfaces of units in contact with dissimilar metals.
- D. Install joint sealants at perimeter joints and within the panel system in accordance with manufacturer's installation instructions.
- E. After installation, remove shipping screws and test vents to ensure that vents operate as intended.
- F. Install the unit skylight in accordance with the manufacturer's installation recommendations and approved shop drawings.

3.04 FIELD QUALITY CONTROL

- A. Water Test: Installer to test skylights according to procedures in AAMA 501.2.
- B. Repair or replace work that does not pass testing or that is damaged by testing and retest work.

3.05 CLEANING

- A. Clean the skylight system inside and outside, immediately after installation.
- B. Refer to manufacturer's written recommendations.

END OF SECTION

**SECTION 08 71 00
DOOR HARDWARE**

PART 1 - GENERAL

1.01 REFERENCES

- A. ANSI/BHMA – A156 Series Standards

1.02 QUALITY CONTROL

- A. Supplier: Finish hardware shall be supplied by a factory authorized builder's hardware distributor for products as specified, or approved and who has been furnishing hardware in the same area as the project for a period of not less than two (2) years. The supplier's organization shall include a member of the American Society of Architectural Hardware Consultants who is available at all reasonable times during the course of work to meet with the Owner, Architect, or Contractor for project hardware consultation.
- B. Installer: Finish hardware shall be installed only by experienced tradesmen, either at the door and frame fabrication plant or at the project site.
- C. Codes:
1. All finish hardware shall comply with applicable local and/or current building codes.
 2. Hardware for fire-rated openings shall also be in compliance with all fire building codes applicable to the district in which the building is located. Provide only hardware that has been tested and listed by UL for the types and sizes of doors required and which complies with the requirements of the door and doorframe labels.
 3. Provide hardware that meets or exceeds handicap accessibility per local building codes. Conform to the Americans with Disabilities Act (ADA) Accessibility Guidelines.
 4. Lever handle locks and latches to have levers return within 1/2 in. of the face of the door.
 5. Knobs or handles or other operating hardware on doors leading to loading platforms, stages, mechanical equipment rooms or other areas hazardous to the blind shall be knurled or otherwise rough to the touch.
 6. Closer adjustment shall not exceed the following opening force:
 - a. Interior doors - 5 pounds pressure.
 - b. Exterior doors - 10 pounds pressure.
 - c. Fire doors - 15 pounds pressure.

1.03 SUBMITTALS

- A. Product Data: Submit one (1) copy of manufacturer's data for each item of finish hardware

along with hardware schedules submitted. Data to be used to assist Architect in reviewing schedule.

B. Samples: If requested by the Architect, submit one (1) sample of each exposed hardware category, finished as required, and tagged with full description for coordination with the hardware schedule. Samples will be reviewed by the Architect for design and finish only, and compliance with other requirements is the responsibility of the Contractor. Units that are acceptable and remain undamaged through submittal procedures may be used on the project.

C. Hardware Schedule:

1. At the earliest possible date, submit five (5) copies of the finish hardware schedule, organized into "hardware sets" and indicating complete designation of every item required for each door opening. Each door must have a complete hardware set for that door. No multiple doors or headings using a "typical" hardware set will be approved. Approval of the hardware schedule does not relieve the Contractor of the responsibility to fulfill the project requirements in accordance with the Contract Documents.

2. Submit a keying schedule in accordance with the instructions from the Owner and/or Architect.

3. After the schedules have been approved by the Architect, submit two (2) copies of the corrected schedules to the Contractor for use and distribution. One additional copy plus catalog cuts of each item and installation and maintenance instructions shall be sent to:

4. Format for Schedule (Sample Only):

HEADING 101 - HW1

ONE SGL DOOR 101 CORRIDOR FROM OFFICE 101 LHR 90
3 ft 0 in. X 7 ft 0 in. X 1-3/4 WD X HM 20 Min

1-1/2 PR. Butts	BB1279 652 4-1/2 X 4-1/2
1 Lockset	35H7J14C
1 Closer	4111 EDA
1 Kickplate	#285 - 10 X 34 - COLOR
1 Wall Bumper	W9 626
3 Silencers	64

5. Templates: Furnish approved hardware schedule and templates for each fabricator of doors, frames, and other work to be factory prepared for the installation of hardware. Upon request, check the shop drawings of such other work to confirm that adequate provisions will be made for the proper installation of hardware.

1.04 **PRODUCT HANDLING AND STORAGE**

A. Packaging: Each item or package is to be separately tagged with identification related to the final hardware schedule. Basic installation instructions shall be included in the packages.

B. Storage: The General Contractor shall provide a locked room at the jobsite for the storage of hardware.

C. Inventory: The hardware supplier shall inventory the hardware with a representative of the

Contractor at or shortly after the hardware is delivered to the jobsite for the purpose of verifying quantities shipped and applied to particular headings of the approved hardware schedule/packing list.

1.05 WARRANTY

- A. Unless otherwise stated, Finish Hardware shall carry a limited warranty against defects in material, workmanship, and operation for a period of at least one (1) year, backed by a factory warranty of the hardware manufacturer, except the door closers shall have a minimum ten (10) year warranty. Exit devices shall have a minimum five (5) year warranty.

1.06 SUBSTITUTIONS

- A. No substitutions of material listed will be allowed without written consent of the Architect, except approved substitutions as listed. When substitutions are requested, they shall be in writing and accompanied by catalog cuts of the proposed item, as well as the specified item. Request for substitutions to be made no less than ten (10) days prior to bid date.

PART 2 - PRODUCTS

2.01 KEYING

- A. All cylinders shall be keyed to the SCHLAGE Master Key System. Permanent keying shall be as directed by the Architect and/or the Owner. All cylinders shall be provided with removable cores.
- B. All cylinders shall be construction keyed and the Contractor provided six (6) construction keys.
- C. All keys shall be stamped "DO NOT DUPLICATE".
- D. Furnish:
 - 4 Master Keys
 - 2 Keys each keyed lock, 6 keys each KA group.

2.02 FINISH

- A. Exposed surfaces of all hardware shall be 630 SATIN STAINLESS STEEL (US32D) unless otherwise stated in this finish hardware specification.
- B. Surface door closers to be sprayed to match adjacent hardware.

2.03 MATERIALS

- A. Items not specifically mentioned but necessary to complete the work shall be furnished, matching the items specified in quality and finish. The use of hardware manufacturer's product numbers and designs is for the purpose of identifying type, function and quality. Request for permission to bid other products of the same type, function and quality is to be made in accordance with instructions described in Section 1.06 Substitutions. All hardware is to be ANSI/BHMA Grade 1, unless specified otherwise.

2.03 MANUFACTURES

<u>ITEM:</u>	<u>MANUFACTURER:</u>	<u>ACCEPTABLE SUB.</u>
Hinges	Hager	Bommer, McKinney
Locksets	Schlage	Best, Sargent, Corbin-Russwin
Power Transfer Device	Von Duprin	Adams Rite
Exit Devices (Egress or Passage)	Von Duprin	Sargent, Corbin-Russwin
Flush Bolts	Trimco	Hager, Ives
Automatic Flushbolts	Trimco	Hager, Glynn Johnson
Coordinators	Trimco	Hager, Glynn Johnson
Dustproof strike	Trimco	Hager, Glynn Johnson
Dead Bolts	Yale	Sargent, Corbin-Russwin
Push and Pulls Plates	Trimco	Hager, Ives
Door Pulls (DP-1)	Forms + Surfaces	
Closers	LCN	Norton Sargent
Automatic Operators	LNC	Dorma, Horton.
Overhead Stops	Glynn-Johnson	Rixon
Kick, Mop & Armor plates	Trimco	Hager, Ives
Stops & Holders	Trimco	Hager, Ives, RBA Door, CRL
Threshold	Pemko	National Guard, Reese, Zero
Weather Striping, Seals & Bottom	Pemko	National Guard, Reese, Zero
Silencers	Ives	Hager, Trimco
Cane Bolt	Lawrence	Stanley

A. Butt Hinges:

1. Sizes: Unless specified in the hardware groups differently hinge height to be:
 - a. 4-1/2 inch for doors 1-3/4 inch thick and up to 36 inch in width.
 - b. 5 inch for doors 1-3/4 inch thick, over 36 inch in width.
2. Quantity: 1-1/2 pair up to and including 90 in. in height. For doors over 90 in. in height, supply one (1) additional butt for each additional 30 in. in height, or fraction thereof.
3. For unusual size or weight doors, furnish type, size and quantity recommended by the butt manufacturer.
4. Hinge pins: stainless steel
5. All exterior and interior reverse bevel locked doors to have non-removable pins (NRP set screw in barrel).
8. Hinges for fire-rated doors shall be BHMA finish 630 Stainless Steel as required for fire-rating.

B. Lockset, Latchsets, Deadbolts

1. Heavy Duty Mortise Locksets.:
 - a. Lock Series and Design: Schlage L Series, ANSI/BHMA Grade 1

- b. Electrified Locksets at all Card Reader Security door locations. Fail Secure unless noted otherwise.
 - c. Design: Lever handle, 07A (Athens) style, 'L' Escucheons (Exterior Doors), '6A' rose (Interior Doors)
 - d. Strike: 16 gage curved lip strike sufficient length to clear trim, with 1" deep box construction.
2. Extra Heavy Duty Cylindrical Lockset.
- a. Lock Series and Design: Schlage Series ND, ANSI/BHMA Grade 1
 - b. Electrified Locksets at all Card Reader Security door locations. Fail Secure unless noted otherwise.
 - c. Design: Lever handle, ATHENS style.
 - d. Strike: 16 gage curved lip strike sufficient length to clear trim, with 1" deep box construction.
- C. Electric Power Transfer:
- 1. Manufacturer and Series: Von Duprin EPT
 - 2. Finish: SP2B, Sprayed Aluminum.
- D. Exit Devices:
- 1. Device Manufacturer and Series: Von Duprin. 35A series, narrow style. ANSI/BHMA Grade 1, touch-bar.
 - 2. Furnish steel channel reinforcement.
 - 3. Glass bead fillers shall be supplied for Hardware where interference with glass light frame occurs.
 - 4. No exposed screws to show through glass doors.
 - 5. Exit devices to carry a five (5) year warranty against defects in material or workmanship.
 - 6. Provide pull plate on opposite side of door to match style and finish of locksets specified. Provide recessed dustproof strikes for vertical rod bottom bolts where no door thresholds are provided.
- E. Flush Bolts and Dustproof Strikes:
- 1. Bolts shall be installed top and bottom inactive leaf of pair of doors. Dustproof strike-mounted in floor or threshold to accept bolt at bottom of inactive leaf. Supply 12 inch standard length for doors up to 84 inch in height. Doors over 84 in. will have top rod extension to place centerline of bolt no more than 72 inch from floor.

- 1. Deadbolt

1. Manufacturer and Series: Yale D series cylindrical deadbolt.
- F. Push and Pulls:
1. Material: 630 stainless steel.
 2. Push plates and pull plates shall be mounted with oval head screws of matching finish.
- G. Door Pulls:
1. Manufacturer & Series: Forms + Surfaces, Compass Collection, Series 800.
 2. Finish: US32D Satin Stainless Steel.
 3. Standoffs: Cylinder Through Hole.
 4. Grips: Straight Flat End. Length: 18 inch.
 5. Pulls shall be mounted center on door stiles and mounted for full operation of lock cylinder.
- H. Door Closers:
1. Door Closers to meet ADA requirements for maximum door-opening force in accordance with ICC A117.1 Section 404.2.8 (Washington State Amendment – IBC Section 1101.2.3). Other than fire doors; exterior hinged doors of 10.0 lbs maximum and interior hinged doors of 5 lbs maximum force for pushing or pulling.
 2. Door Closers to meet ADA requirements for closing speed in accordance with ICC A117.1 Section 404.2.7. Door closers shall be adjusted so that from an open position of 90 degrees, the time required to move the door to an open position of 12 degrees shall be 5 seconds minimum.
 3. Size as recommended by manufacturer.
 4. Spray closers to match adjacent hardware.
 5. Whether specified or not, provide the proper feet to suit the conditions and the proper length arm to allow fullest degree of opening allowed by wall conditions.
 6. Provide drop plates where required.
 7. Contractor shall install all the screws required for the foot.
 8. Provide special closer mounting as required where interference with weatherstrip or sound seal occurs.
 9. Door closer foot brackets shall be rabbet applied where soffit width is not wide enough to clear the door seal.
 10. Door closers to carry a ten (10) year warranty against defects, material, and workmanship.

I. Automatic Operators

1. Manufacturer and Series: LCN Senior Swing 9500 Series, ANSI/BHMA A156.19.
2. Provide door operators with automatic and manual (push) operation and for both leaves of entry doors indicated. Automatic operation of door operators shall be activated by push plates located on exterior and interior sides of doors as indicated, and shall permit manual operation of the door (function as a power assist door closer) when not activated by push plates. Operators shall be equipped with a manual on-off-hold open switch. Operator shall reverse if resistance is encountered and have a locked door motor protection circuit.
3. Actuator push plate shall be square and surface mounted. Push plates shall have international symbol of accessibility engraved on the plate, with the legend "Push to Open."
4. Electrical contractor shall provide 115V, 60Hz, 1 phase 15 amp supply to the door header, conduit and electrical boxes for remote switches.

J. Overhead Stops and Holders:

1. Manufacturer and Series: Glynn Johnson. 100 series. Heavy-Duty concealed overhead.
2. Utilize series specified in hardware groups and size as per manufacturer's recommendation.
3. At labeled openings, provide surface mounted overhead stops GJ 90 Series in lieu of concealed.

K. Kick, Mop, and Armor Plates:

1. Manufacturer Listed: Trimco/BBW.
2. Acceptable Substitutions: Hager, Ives.
3. Material: 630 Stainless Steel.
4. Plates shall be mounted with trusshead screws of matching finish.
5. Sizes: All plates shall be furnished with width 1-1/2 inch less than door width except pairs of doors without mullions shall be 1 inch less than door width. The height shall be 10 inch or as specified in the detailed hardware list.
6. Where door seal, sound seal or weatherstrip is installed on the jamb stop, adjust kick plate width to allow 1/8 inch - 1/4 inch clearance each side.
7. Where kick plate width will interfere with installation of other hardware adjust width for proper clearance.

L. Stops and Holders:

1. Hold Open (Floor Type): Ives FS446. Manual with holder and keeper. Attached by surface screws to door, anchors into concrete floor slab.
2. Hold Open (Floor Type) Storefront Doors: CRL, DL2521A. Manual with holder and keeper. Attached by surface screws to door, anchors into concrete floor slab.
3. There shall be stops to protect all walls, cabinet work or hardware operation. Wall stops shall be used wherever possible, unless otherwise called for in the hardware types. Where floor stops are used, they shall be installed no farther than 8 in. from the latch edge of the door.

M. Weatherstrip and Thresholds:

1. Where it occurs, weatherstrip shall be applied to both sides of meeting stiles.
2. Thresholds: Commercial (CT), extruded aluminum plates. ADA height. Threshold width to match door frame width.
3. Door seal shall be adjusted to allow closing and latching of the door without slamming.
4. Air Leakage: Weatherstrip shall limit air leakage of exterior doors to a maximum rate of 0.2 cfm/sf of assembly area, when tested in accordance with NFRC 400 or AAMA/WDMA/CSA101/I.S.2/A440 at a differential pressure of 1.57 psf (75 Pa). Alternatively, the maximum air leakage rate shall be 0.3 cfm/sf of assembly area when tested at a differential pressure of 6.24 psf (300 Pa).

N. Door Silencers:

1. Quantity: Provide three (3) for each single doorframe and four (4) for each double doorframe on interior doors where gasketing is not provided.
2. Provide W07 for HM Frames.

O. Proximity Card Reader

2. Refer to Access Control Section 28 13 00.
3. Provide all hardware necessary to provide a fully functional hardware system associated with the Access Control System.

2.04 **Key Cabinets:**

- A. Manufacturer: Lund
- B. Acceptable Substitution: HPC, Inc.
- C. Provide one (1) each – 1200.

2.05 **HARDWARE GROUPS**

HW-1A (Exterior aluminum doors in an aluminum entrance system)

3	EA	Pivot Hinges	Aluminum Entrance Supplier
1	EA	Egress Hardware	RX-QEL 35A NLOP
1	EA	Power Transfer Device	EPT-10
1	EA	Rim Cylinder	20-057-ICX
1	EA	FSIC Core	23-030
1	EA	Door Pull	Series 800
1	EA	Overhead Stop	100S
1	EA	Threshold	2705 Series
1	EA	Door Sweep	8198AA
1	EA	Weather Strip	Aluminum Entrance Supplier
1	EA	Proximity Card Reader	See Access Control System

- Balance of hardware by aluminum entrance supplier.

HW-1B (Exterior aluminum doors in an aluminum entrance system)

3	EA	Pivot Hinges	Aluminum Entrance Supplier
1	EA	Electric Egress Hardware	RX-QEL 35A NLOP
1	EA	Power Transfer Device	EPT-10
1	EA	Rim Cylinder	20-057-ICX
1	EA	FSIC Core	23-030
1	EA	Door Pull	Series 800
1	EA	Overhead Stop	100S
1	EA	Threshold	2705 Series
1	EA	Door Sweep	8198AA
1	EA	Weather Strip	Aluminum Entrance Supplier
1	EA	Proximity Card Reader	See Access Control System
1	EA	Automatic Operator	9500 Series
1	EA	Actuator Mount	8310-818T
1	EA	Power Supply	PS914 900-4RL

- Balance of hardware by aluminum entrance supplier.

HW-2A (Exterior metal door and frame – Outward swing with Card Reader)

3	EA	Hinges	BB1191
1	EA	Storeroom Lockset	L9092 EU RX
1	EA	Power Transfer Device	EPT-10
1	EA	Electric Passage Hardware	RX-QEL 35A NLOP
1	EA	Door Sweep	8198AA
1	EA	Overhead Stop	100S
1	EA	Closure	4111 EDA
2	EA	Kick Plate	K Series - 10 X 34
1	EA	Threshold	2705 Series
1	EA	Proximity Card Reader	See Access Control System
1	SET	Weather-stripping	PK55D, 345DP

HW-2B (Exterior metal door and frame – Outward swing with Auto Operator)

3	EA	Hinges	BB1191
1	EA	Storeroom Lockset	L9092 EU RX
1	EA	Power Transfer Device	EPT-10
1	EA	Electric Passage Hardware	RX-QEL 35A NLOP
1	EA	Door Sweep	8198AA
1	EA	Overhead Stop	100S
1	EA	Closure	4111 EDA
2	EA	Kick Plate	K Series - 10 X 34
1	EA	Threshold	2705 Series
1	EA	Proximity Card Reader	See Access Control System
1	EA	Automatic Operator	9500 Series
1	EA	Actuator Mount	8310-853T
1	SET	Weather-stripping	PK55D, 345DP

HW-3 (Exterior metal door and frame – Outward swing, with Egress Hardware)

3	EA	Hinges	BB1191
1	EA	Storeroom Lockset	L9092 EU RX
1	EA	Power Transfer Device	EPT-10
1	EA	Electric Egress Hardware	RX-QEL 35A NLOP
1	EA	Door Sweep	8198AA
1	EA	Overhead Stop	100S
1	EA	Closure	4111 EDA
2	EA	Kick Plate	K Series - 10 X 34
1	EA	Threshold	2705 Series
1	EA	Proximity Card Reader	By Access Control System
1	SET	Weather-stripping	PK55D, 345DP

HW-4A (Exterior metal door and frame – Outward swing, with Card Reader)

3	EA	Hinges	BB1191
1	EA	Storeroom Lockset	RX ND96 EU Vandlgard, Fail Secure
1	EA	Power Transfer Device	EPT-10
1	EA	Electric Passage Hardware	RX-QEL 35A NLOP
1	EA	Door Sweep	8198AA
1	EA	Overhead Stop	100S
1	EA	Closure	4111 EDA
2	EA	Kick Plates	K Series - 10 X 34
1	EA	Threshold	2705 Series
1	SET	Weather-stripping	PK55D, 345DP

HW-4B (Exterior metal door and frame – Outward swing,)

3	EA	Hinges	BB1191
1	EA	Storeroom Lockset	RX ND96 EU Vandlgard, Fail Secure
1	EA	Door Sweep	8198AA
1	EA	Overhead Stop	100S
1	EA	Closure	4111 EDA
2	EA	Kick Plates	K Series - 10 X 34
1	EA	Threshold	2705 Series
1	SET	Weather-stripping	PK55D, 345DP

HW-5	(Pair of exterior metal door and frame – Outward swing)		
6	EA	Hinges	BB1191
1	EA	Storeroom Lockset	RX ND96 EU Vandlgard, Fail Secure
1	EA	Power Transfer Device	EPT-10
1	EA	Electric Passage Hardware	RX-QEL 35A NLOP
1	SET	Automatic Flush bolts	3810
1	EA	Coordinator	3094
1	EA	Dustproof Strike	3910
2	EA	Door Sweep	8198AA
2	EA	Overhead Stop	100S
2	EA	Closure	4111 EDA
4	EA	Kick Plates	K Series - 10 X 34
1	EA	Threshold	2705 Series
1	SET	Weather-stripping	PK55D, 345DP
1	EA	Proximity Card Reader	See Access Control System
HW-6	(interior security door)		
3	EA	Hinges	BB1279
1	EA	Storeroom Lockset	L9092 EU RX
1	EA	Power Transfer Device	EPT-10
1	EA	Closer	4111 EDA
1	EA	Wall Stop	1270 CV
1	EA	Proximity Card Reader	See Access Control System
HW-7	(Mud Room, Lunchroom & Multi-Purpose Room)		
3	EA	Hinges	BB1279
1	EA	Classroom Lockset	L9070 06A
1	EA	Seals	770SP
1	EA	Wall stop	1270 CV
1	EA	Closer	4111 EDA
HW-8	(Interior office door)		
3	EA	Hinges	BB1279
1	EA	Office Lockset	L9050
1	EA	Seals	770SP
1	EA	Overhead Stop	100S
HW-9A	(Interior storage door with Card Reader)		
3	EA	Hinges	BB1279
1	EA	Storage Lockset	L9092 EU RX
1	EA	Power Transfer Device	EPT-10
1	EA	Wall stop	1270 CV
1	EA	Proximity Card Reader	See Access Control System

HW-9B	(Interior storage door)		
3	EA	Hinges	BB1279
1	EA	Storage Lockset	L9080 06A
1	EA	Wall stop	1270 CV
HW-10	(Pair of Interior storage doors)		
6	EA	Hinges	BB1279
1	EA	Storage Lockset	L9070 06A
1	SET	Automatic Flush bolts	3810
1	EA	Coordinator	3094
1	EA	Dustproof Strike	3910
4	EA	Kick Plate	K Series - 10 X 34
2	EA	Overhead Stops	100S
HW-11	(Interior restroom doors)		
3	EA	Hinges	BB1279
1	EA	Passage Lockset	L9010 06A
2	EA	Kick plate	K Series - 10 X 34
1	EA	Closer	4111 EDA
1	EA	Wall stop	1270 CV
HW-12	(Interior restroom door, single user)		
3	EA	Hinges	BB1279
1	EA	Privacy Lockset	L9040 L283-722 06A
1	EA	Wall stop	1270 CV
1	EA	Closer	4111 EDA
HW-13	(Mechanical / Electrical door)		
3	EA	Hinges	BB1279
1	EA	Storage Lockset	L9092 EU RX
1	EA	Power Transfer Device	EPT-10
1	EA	Overhead stop	100S
1	EA	Proximity Card Reader	See Access Control System
HW-14	(Interior Door with Kick plate)		
3	EA	Hinges	BB1279
1	EA	Classroom Lockset	L9070 06A
2	EA	Kick Plate	K Series - 10 X 34
1	EA	Wall stop	1270 CV
HW-15	(Interior Door)		
3	EA	Hinges - Self Closing	BB1279
1	EA	Classroom Lockset	ND70
2	EA	Kick Plates	K Series - 10 X 34
1	EA	Overhead stop	100S
1	EA	Closer	4111 EDA

HW-16 (Interior Door Non-locking, Locker Room)

3	EA	Hinges	BB1279
1	EA	Passage Lockset	ND10
2	EA	Kick Plates	K Series - 10 X 34
1	EA	Closer	4111 EDA
1	EA	Wall stop	1270 CV

HW-17 (Interior Pair of Doors, Fleet Maintenance)

6	EA	Hinges	BB1279
1	EA	Classroom Lockset	ND70
1	SET	Automatic Flush bolts	3810
1	EA	Coordinator	3094
1	EA	Dustproof Strike	3910
4	EA	Kick Plates	K Series - 10 X 34
1	EA	Overhead Stop	100S

HW-18 (Interior Pair of Doors, Fleet Maintenance - Closet)

6	EA	Hinges	BB1279
1	EA	Storage Lockset	ND25x70
1	SET	Automatic Flush bolts	3810
1	EA	Coordinator	3094
1	EA	Dustproof Strike	3910
2	EA	Kick Plates	K Series - 10 X 34

HW-19 (Interior restroom door, single user)

3	EA	Hinges	BB1279
1	EA	Privacy Lockset	ND40
1	EA	Wall stop	1270 CV
1	EA	Closer	4111 EDA

HW-20 (Wire Gate Parts / tool storage)

3	EA	Hinges	By Gate Manufacturer
1	EA	Storage Lockset	RX ND96 EU
1	EA	Power Transfer Device	EPT-10
1	EA	Proximity Card Reader	See Access Control System

- Balance of hardware by Wire Gate & Wall supplier.

HW-21 (SWAT - Exterior metal door and frame)

3	EA	Hinges	BB1191
1	EA	Storeroom Lockset	RX ND96 EU Vandlgard, Fail Secure
1	EA	Power Transfer Device	EPT-10
1	EA	Door Sweep	8198AA
1	EA	Overhead Stop	100S
1	EA	Closure	4111 EDA
2	EA	Kick Plate	K Series - 10 X 34
1	EA	Threshold	2705 Series
1	EA	Proximity Card Reader	See Access Control System
1	SET	Weather-stripping	PK55D, 345DP

HW-22 (Pedestrian Entrance Gates on site)

1	EA	Storeroom Lockset	RX ND96 EU Vandlgard, Fail Secure
1	EA	FSIC Core	23-030
1	EA	Proximity Card Reader	See Access Control System
1	EA	Power Supply	PS914 900-4RL

- Balance of hardware by Gate supplier.

PART 3 – EXECUTION

3.01 PREPARATION

- A. Provide solid blocking for all wall stops and bumpers.
- B. Fasteners: Check all conditions and use fastening devices as needed to secure or anchor all hardware as per manufacturer's published templates. Self-tapping sheet metal screws are not acceptable. All closers and exit devices on wood doors shall be thru-bolted. The Contractor shall be responsible for drilling wood or metal with the recommended hole sizes.

3.02 INSTALLATION

- A. The General Contractor shall be responsible for proper installation and operation of hardware in locations specified. Door closers shall be stalled and adjusted to close and latch the door without slamming.
- B. The General Contractor shall protect exposed hardware surfaces during construction period from damage to products and finishes.
- C. In the absence of other hardware installation requirements in this Section or indicated, the following recommendations shall be used as a guide:
 - 1. Top Hinge: 5-inch, header rabbet to top of hinge.
 - 2. Bottom Hinge: 10-inch, finish floor to bottom of hinge.
 - 3. Center Hinge: Centered between top and bottom hinges.
 - 4. Mortise Locks: 40 5/16-inch, finish floor to center of lock case and strike.
 - 5. Deadlocks and Deadlatches: 48-inch, finish floor to center of cylinder.
 - 6. Exit Devices: 38-inch, finish floor to center of cross bar.
 - 7. Push Plates: 45-inch, finish floor to center of plate.
 - 8. Door Pulls: 42-inch, finish floor to center of pull.
- D. All other hardware shall be installed as recommended by the manufacturer.

3.03 ADJUSTMENT

- A. Adjust and check each operating item of hardware at each door to ensure proper operation or

function of every unit.

- B. Clean adjacent surfaces soiled by hardware installation and/or adjustment.
- C. Whenever hardware installation is made more than one (1) month prior to acceptance or occupancy, make a final check and adjustment of all hardware items during the week prior to acceptance or occupancy. Clean and lubricate operating items necessary to restore proper function and finish of hardware.
- D. Adjust door control devices to compensate for final operation for heating and ventilating equipment.
- E. Instruct Owner's personnel in proper operation and maintenance of hardware and hardware finishes.
- F. Replace units which cannot be adjusted to operate properly.

END OF SECTION

**SECTION 08 81 00
GLASS GLAZING**

PART 1 - GENERAL

1.01 REFERENCES

- A. ASTM C1036 - Standard Specification for Flat Glass.
- B. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass.
- C. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass.
- D. ASTM E774 - Sealed Insulating Glass Units.
- E. IBC - International Building Code.
- F. SIGMA - Sealed Insulated Glass Manufacturers Association.
- G. FGMA - Glazing Manual and Glazing Sealing Systems Manual.
- H. U.S. Consumer Product Safety Commission Standard 16 CFR 1201.
- I. National Fenestration Rating Council (NFRC) Certification.

1.02 QUALITY ASSURANCE

- A. Conform to Flat Glass Marketing Association (FGMA) Glazing Manual and Glazing Sealing Systems Manual and SIGMA for glazing installation methods.
- B. Insulating glass unit shall be manufactured by a SIGMA member.
- C. Provide safety glazing where required by IBC Section 2406.
- D. Glass Design: Glass thickness designations indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing project loads and in-service conditions. Provide glass lites in the thickness designations indicated for various size openings, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the design loads.
- E. Glazing assemblies shall be certified and labeled in accordance to National Fenestration Rating Council (NFRC) standards and in compliance with 2015 Washington State Energy Code Requirements. Coordinate with requirements specified for windows, entrances, and storefronts.

1.03 SUBMITTALS

- A. Submit product data and samples under provisions of Section 01 33 00.
- B. Product Data: Provide manufacturer's product description for each type of glass and product specified.
- C. Samples: Submit two 12 inch x 12 inch samples of each glass type specified. Identify glass manufacturer and glass type clearly on each sample. Submit one sample of each hardware

fitting specified.

1.04 DELIVERY, STORAGE AND PROTECTION

- A. Protect glass materials during delivery, storage, and handling to comply with manufacturer's direction and as required to prevent edge damage.

1.05 WARRANTY

- A. Provide ten (10) year manufacturer's warranty on sealed insulating glass. Include coverage for sealed glass units from seal failure, interpane dusting to misting, and replacement of same.
- B. Replace any units failing to comply at no additional cost to the Owner within 45 days after receipt of written notice.

1.06 ALTERNATES

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

1.07 COLORS

- A. Colors are specified on Colors and Materials Schedule on drawings.

PART 2 - PRODUCTS

2.01 ACCEPTABLE GLASS MANUFACTURERS

- A. Basis of Design:
 - 1. Vitro Architectural Glass. (formerly PPG Industries)
- B. The following manufacturers may provide products equal to products specified.
 - 1. Pilkington.
 - 2. Guardian Glass - Guardian Industries Corporation
- C. Substitutions: Under provisions of Section 01 60 00.

2.02 GLASS MATERIALS

- A. Float Glass: ASTM C1036; Type I, Class 1, clear, quality Q3; 1/8 inch thick minimum.
 - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.
 - 2. Provide HS (heat-strengthened) kind float glass in place of annealed float glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass manufacturer's design requirements.
 - 3. For uncoated glass, comply with glass manufacturer requirements.
 - 4. For coated vision glass, comply with requirements of glass manufacturer.
 - 5. Provide FT (fully tempered) kind float glass in place of annealed or HS (heat strengthened) kind float glass where safety glass is indicated or required.

- B. Safety Glass: ASTM C1048; Fully-tempered with horizontal tempering conforming to CPSC 16 CFR 1201, labeled in accordance with IBC requirements. Provide permanent etched mark on corner of each panel indicating safety glass. Provide in clear, tinted, and mirror glass types. Glazing shall comply with CPSC 16 CFR 1201 Category I for lights 9 square feet or less and Category II for all lights over 9 square feet and all lights in sliding glass patio doors and doors to showers, tubs, hot tubs, saunas and steam rooms.
- C. Mirror Glass: Clear fully-tempered safety glass with copper and silver coating; organic over coating, edges ground smooth.
- D. Insulating Glass Units (Clear Glass): ASTM E774, double pane hermetically sealed unit; 1-inch glazing unit with 1/2-inch air space filled with Argon Gas and two 1/4-inch glass panes; conform to SIGMA Specifications, five (5) year minimum warranty. Low-E coating on insulating unit to side #2 for Visible Light Transmittance of 70%. U-Value = 0.24 for winter. Solar Heat Gain Coefficient of SHGC = 0.39. Vitro Architectural Glass Solarban 60 (2) Clear + Clear (Argon Gas) or equal. Float glass and fully-tempered safety glass. Aluminum spacer to be clear anodized. SHGC and U-value: As required to comply with Washington State Energy Code requirements for fenestration values. Use for Glazing Type: (GL-1).
- E. Insulating Glass Units (Spandrel Glass): ASTM E774, double pane hermetically sealed unit; 1-inch glazing unit with 1/2-inch air space filled with Argon Gas and two 1/4-inch glass panes; conform to SIGMA Specifications, five (5) year minimum warranty ICD High Performance coating Opac-coat -300 2 + Clear (Argon Gas) or equal. Float glass and fully-tempered safety glass. Aluminum spacer to be clear anodized. SHGC and U-value: As required to comply with Washington State Energy Code requirements for fenestration values. Use for Glazing Type: (GL-2)
- F. Spandrel Glass: Provide for exterior pane of insulating glass units where indicated. Fully-tempered safety glass.
 - 1. Vitro ICD, High Performance Coatings, Opaci-Coat 300, Silicone-Coated Spandrel Glass or equal. ASTM C1048, Type 1, Condition C, Quality Q3. 1/4-inch glass panes.

2.03 GLAZING TYPES

Provide glazing system that meets Washington State energy code Thermal Envelope requirements when combined with door, window or storefront system.

- A. Type GL-1 (Exterior Glazing): Insulating glass unit (Clear Glass). Provide safety glazing at locations shown on drawings and required by International Building Code.
- B. Type GL-2 (Exterior Spandrel Glazing): Insulating glass unit. Provide safety glazing at locations shown on drawings and required by International Building Code.
- C. Type GL-3 (Non-Fire Rated Interior Relites and Doors): Single pane of clear fully-tempered safety glass; 1/4 inch thick glass.
- D. Type GL-4 (Framed Mirrors): Single pane of mirror glass. Refer to drawings for sizes.

2.04 GLAZING ACCESSORIES

- A. Setting Blocks: Neoprene; 70-90 Shore A durometer hardness.

- B. Spacer Shims: Neoprene; 50 Shore A durometer hardness.
- C. Glazing Tape: Closed cell polyvinyl chloride foam, black color, coiled on release paper over adhesive on two sides (or one side where noted), maximum water absorption by volume of 2 percent, designed for compression of 25 percent to effect an air and vapor seal; size as required to suit condition.
- D. Glazing Splines: Resilient neoprene extruded shape to suit glazing channel retaining slot; type recommended by aluminum storefront and curtain wall manufacturer.
- E. Glazing Clips: Manufacturer's standard type.
- F. Silicone Sealant: ASTM C920; Class A; single component; solvent curing; capable of water immersion without loss of properties; cured Shore A hardness of 15-25; stock color selected by Design Consultant.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.
- B. Beginning of installation means acceptance of substrate.

3.02 PREPARATION

- A. Clean contact surfaces with solvent and wipe dry.
- B. Seal porous glazing channels or recesses.
- C. Prime surfaces scheduled to receive sealant.

3.03 EXTERIOR GLAZING - WET METHOD (SEALANT AND SEALANT)

- A. Install glazing in doors and windows per manufacturer's recommendations.
- B. Install removable stops with glazing centered in space by inserting spacer shims both sides at 24-inch, interval (maximum), 1/4 inch below sight line.
- C. Fill gaps between glazing and stops with sealant to depth of bite on glazing, but not more than 3/8-inch below sight line to ensure full contact with glazing and continue the air and vapor seal.
- D. Apply sealant to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.04 INTERIOR GLAZING - DRY METHOD (TAPE AND TAPE)

- A. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch above sight line.
- B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- C. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or

unit.

- D. Place glazing tape on free perimeter of glazing in same manner described above.
- E. Install removable stops without displacement of tape. Exert pressure on tape for full continuous contact.
- F. Knife trim protruding tape.
- G. Mirrors: Install mirrors with glazing tape (adhesive one side only) applied horizontally to wall construction behind mirror at 10 inch (maximum) on center and at wood trim retainers.

3.05 CURE, PROTECTION AND CLEANING

- A. Protect exterior glass from breakage immediately upon installation by use of crossed streamers attached to framing and held away from glass. Do not apply markers to surfaces of glass. Remove nonpermanent labels and clean surfaces. Cure sealants for high early strength and durability.
- B. Remove and replace glass which is broken, chipped, cracked, abraded, or damaged in other ways during construction period; including natural causes, accidents, and vandalism.
- C. Wash and polish glass on both faces not more than four (4) days prior to date scheduled for inspections intended to establish date of completion in each area of project. Comply with glass product manufacturer's recommendations for final cleaning.

END OF SECTION

**SECTION 08 91 00
LOUVERS**

PART 1 - GENERAL

1.01 REFERENCES

- A. AMCA 500 (Air Movement Control Association) - Test Method for Louvers, Dampers, and Shutters.
- B. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate.
- C. ASTM A653 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality.
- D. ASTM A527 - Sheet Steel, Zinc-Coated (Galvanized) by the Hot-Dip Process, Lock-Forming Quality.
- E. ASTM B209 - Aluminum-Alloy Sheet and Plate.
- F. ASTM B221 - Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
- G. SMACNA - Architectural Sheet Metal Manual.
- H. AAMA 611 – Specification for Anodized Architectural Aluminum.
- I. AAMA 2605 – Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Architectural Extrusions and Panels.
- J. Aluminum Association – Aluminum Design Manual.
- K. PCI – Powder Coating Institute.

1.02 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Shop Drawings: Indicate louver layout plan and elevations, opening and clearance dimensions, tolerances; head, jamb and sill details; blade configuration, screens, blackout areas required, and frames.
- C. Product Data: Provide data describing design characteristics, maximum recommended air velocity, design free area, materials and finishes.
- D. Samples: Submit samples illustrating finish and color of exterior and interior surfaces.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. PCI 3000 Certification: The powder coating applicator shall submit current documentation illustrating PCI 3000 Certification.

1.03 OPERATION AND MAINTENANCE DATA

- A. Submit under provisions of Section 01 77 00.

- B. Maintenance Data: Include lubrication schedules and adjustment requirements.

1.04 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three (3) years documented experience.
- B. PCI Certified Applicator: The powder coating applicator shall be a Powder Coating Institute, PCI 3000 Certified Company. PCI 3000 certification shall include certification for AAMA 611 and AAMA 2605 performance standards.

1.05 COORDINATION

- A. Coordinate the work with wall construction.
- B. Coordinate the work with installation of mechanical ductwork.

1.06 COLORS

- A. Colors are specified on Colors and Materials Schedule on drawings.

1.07 ALTERNATES

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

1.08 WARRANTY – POWDER COATED HIGH-PERFORMANCE (PVDF) FINISH

- A. Manufacturer's Warranty: Furnish twenty 20 year warranty providing coverage that coatings:
 1. Will not chip, crack or peel (lose adhesion).
 2. Will not chalk in excess of ASTM D4214 number 8 rating, determined by procedure outlines in ASTM D4214.
 3. Will not change color more than five Delta-E Hunter units (square root of the sum of square Delta L, Delta a, and Delta b) as determined by ASTM D2244, Method 6.3. Fading or color changes may not be uniform if surfaces are not equally exposed to sun and elements. Mica and metallic coatings are exempt due to inability to accurately measure color, mica and metallic flakes reflect and scatter light in random patterns.
- B. Applicator's Warranty: Furnish ten 10 year warranty providing coverage against failure of PVDF based coating over improper pretreatment where coating was not applied in accordance with ASTM D1730, Type B, Method 5 or ASTM B449, Section 5.

PART 2 - PRODUCTS

2.01 METAL WALL LOUVERS

- A. Basis of Design: C/S Group, Model A4177, high performance, drainable, fixed blade louver; sizes as shown on drawings. Fixed louver fabricated from minimum 0.070 inch thickness aluminum extrusions at head and blades, 0.080 inch thickness sills, and 0.125 inch thickness jambs and mullions. 4-inch depth with insect screen on interior face.
- B. Standard 4 ft. x 4 ft. louver shall have the following performance criteria:

1. Free Area: Minimum of 8.80 sq. ft. (55%)
2. Point of Zero Water Penetration: 1087 fpm.
3. Air Flow: 7806 cfm @ 887 fpm
4. Maximum Pressure Drop: 0.12 in. H₂O @ 887 fpm

2.02 FASTENERS

- A. Fasteners: Stainless steel fasteners of type, size and spacing as recommended by louver manufacturer to suit installation condition.

2.03 METAL FLASHINGS

- A. Material as specified in Section 07 62 00.
- B. Install metal flashing at exterior wall openings for louvers in accordance to Building Exterior Opening Protection Legend.
- C. Factory Finish: Metal flashing color and finish to match metal Siding.

2.04 FINISH

- A. Factory Finish: Provide High-performance Fluoropolymer (70% Kynar 500 / Hylar 5000 polyvinylidene fluoride – PVDF) powder coating finish on all surfaces conforming with; AAMA 2605 requirements. Coating shall be applied under controlled conditions at factory or custom paint shop in manner recommended by paint manufacturer. Color as indicated in Colors and Materials Schedule.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that prepared openings and flashings are ready to receive work and opening dimensions are as indicated on shop drawings.
- B. Verify that electric power is available and of the correct characteristics.

3.02 INSTALLATION

- A. Install louver assembly in accordance with manufacturer's instructions.
- B. Install louvers level and plumb.
- C. Install metal flashings and align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.
- D. Secure louvers in opening framing with concealed fasteners.
- E. Install perimeter sealant and backing rod in accordance with Section 07 92 00.

3.03 **ADJUSTING**

- A. Adjust work under provisions of Section 01 77 00.
- B. Adjust operable louvers for freedom of movement of control mechanism. Lubricate operating joints.

3.04 **CLEANING**

- A. Clean work under provisions of 01 77 00.
- B. Strip protective finish coverings.
- C. Clean surfaces and components.

END OF SECTION

**SECTION 09 22 16
NON-STRUCTURAL METAL FRAMING**

PART 1 - GENERAL

1.01 REFERENCES

- A. ASTM A653 - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.
- B. ASTM C645 - Non-structural steel framing members.
- C. ASTM C754 - Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
- D. GA 203 - Installation of Screw-Type Steel Framing Members to Receive Gypsum Board.
- E. Steel Stud Manufacturers Association (SSMA) – Product Technical Information.

1.02 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Product Data: Provide data describing standard framing member materials and finish, product criteria, load charts, limitations, and installation.

1.03 QUALITY ASSURANCE

- A. Perform work in accordance with GA 203 and ASTM C754.
- B. Maintain one (1) copy of each document on site.

1.04 QUALIFICATIONS

- A. Installer: Company specializing in performing the work of this Section with minimum five (5) years documented experience.

1.05 COORDINATION

- A. Coordinate work under provisions of Section 01 31 00.

1.06 ALTERNATES

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

1.07 COLORS

- A. Colors are specified on Colors and Materials Schedule on drawings.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Scafco Corporation.

- B. Steeler Inc.
- C. Substitutions: Under provisions of Section 01 60 00.

2.02 FRAMING MATERIALS

- A. Studs: ASTM A653 galvanized rolled steel, channel shaped, punched for utility access:
 - 1. Non-Bearing Stud Thickness: Minimum 25 gauge, except ASTM C754 limiting heights shall not be exceeded for maximum deflection of $l/240$. Minimum 20 gauge for applications to receive ceramic tile finishes, or where required for fire-rated construction.
 - 2. Load-Bearing Stud Thickness: See Structural Drawings.
- B. Ceiling Grid Suspension Systems: ASTM C645.
- C. Runners: Of same material and thickness as studs, bent leg retainer notched to receive studs with provision for crimp locking to stud.
- D. Furring and Bracing Members: Of same material as studs; thickness to suit purpose.
- E. Fasteners: GA 203. Self-drilling, self-tapping screws.
- F. Sheet Metal Backing: 20 gauge (0.9 mm thick) galvanized steel for reinforcement of wall-mounted items. Similar to Metal-Lite, Inc. "Flush Mount" product.
- G. Anchorage Devices: Power actuated driven and drilled expansion bolts.
- H. Sealant: As specified in Section 07 92 00.
- I. Slip Track: Extended leg-ceiling runner over standard track or ceiling runner system designed to permit vertical deflection of structure, but not lateral deflection of wall. Slip track shall maintain integrity of fire-rated partitions. Similar to Dietrich Metal Framing, Inc. "SLP-TRK" products.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify site conditions under provisions of Section 01 31 00.
- B. Verify that conditions are ready to receive work.
- C. Verify that rough-in utilities are in proper location.

3.02 CEILING FRAMING INSTALLATION

- A. Install in accordance with ASTM C754.
- B. Coordinate location of hangers with other work.
- C. Install ceiling framing independent of walls, columns, and above ceiling work.
- D. Reinforce openings in ceiling suspension system that interrupt main carrying channels or

furring channels, with lateral channel bracing. Extend bracing minimum 24 in. past each end of openings.

- E. Laterally brace entire suspension system.

3.03 ERECTION

- A. Align and secure top and bottom runners at 24 in. (600 mm) o.c.
- B. Stud splicing not permissible.
- C. Fabricate corners using a minimum of three (3) studs.
- D. Double stud at wall openings, door and window jambs, not more than 2 in. (50 mm) from each side of openings.
- E. Brace stud framing system rigid. Brace all partitions that terminate below ceiling structure at intervals not-to-exceed 10 ft.
- F. Coordinate erection of studs with requirements of doorframes; install supports and attachments.
- G. Backing: Secure to studs. Install backing for support of plumbing fixtures, toilet accessories, and hardware. Backing shall be installed to provide a smooth wall surface.
- H. Refer to drawings for indication of partitions extending to finished ceiling only and for partitions extending to the structure above. Maintain minimum 3/4 in. clearance under structural building members to avoid deflection transfer to studs. Provide extended leg ceiling runner slip track attached to structure. Slip track shall not be rigidly attached to wall framing or finishes, and shall prevent lateral deflection of wall.
- I. Coordinate placement of insulation in stud spaces made inaccessible after stud framing erection.

3.04 ERECTION TOLERANCES

- A. Install member to provide surface plane with maximum variation of 1/8 in. in 10 ft in any direction.

END OF SECTION

**SECTION 09 29 00
GYPSUM BOARD**

PART 1 - GENERAL

1.01 REFERENCES

- A. ANSI A118.9 – Test Method and Specifications for Cementitious Backer Units
- B. ASTM C475 - Joint Treatment Materials for Gypsum Wallboard Construction.
- C. ASTM C557 - Adhesive for Fastening Gypsum Wallboard to Wood Framing.
- D. ASTM C645 – Non-structural steel framing members.
- E. ASTM C665 - Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
- F. ASTM C754 - Installation of Framing Members to Receive Screw Attached Gypsum Panel Products.
- G. ASTM C840 - Application and Finishing of Gypsum Board.
- H. ASTM C1002 – Steel Self Piercing Tapping Screws for the application of Gypsum Panel Products, metal plaster bases to wood or steel studs.
- I. ASTM C1278 – Standard Specification for Fiber Reinforced Gypsum Panel.
- J. ASTM C1396 – Standard Specification for Gypsum Board.
- K. ASTM E119 - Fire Tests of Building Construction and Materials.
- L. GA-214 – Recommended Levels of Gypsum Board Finish.
- M. GA-216 - Recommended Specifications for the Application and Finishing of Gypsum Board.
- N. GA-600 - Fire Resistance Design Manual.
- O. NWCB – Northwest Wall and Ceiling Bureau Technical Library.

1.02 SUBMITTALS

- A. Shop Drawings: Show locations, fabrication, and installation of control and expansion joints including plans, elevations, sections, details of components, and attachments to other units of work.
- B. Product Data: Provide manufacturer's product information for each product specified.

1.03 QUALITY ASSURANCE

- A. Applicator: Company specializing in performing the work of this Section with minimum five (5) years experience.

1.04 REGULATORY REQUIREMENTS

- A. Conform to applicable code for fire rated assemblies.

1.05 ALTERNATES

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

1.06 COLORS

- A. Colors are specified on Colors and Materials Schedule on drawings.

1.07 DELIVERY, STORAGE, AND PROTECTION

- A. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic and other causes. Neatly stack gypsum boards flat to prevent sagging.
- C. Handle gypsum boards to prevent damage to edges, ends and surfaces. Do not bend or otherwise damage metal corner beads and/or trims.
- D. Steel framing and related accessories shall be stored and handled in accordance with AISI's "Code of Standard Practice".

PART 2 - PRODUCTS

2.01 GYPSUM BOARD MATERIALS

- A. Acceptable Manufacturers: The design is based on the specified products of the United States Gypsum Company, LLC. Subject to compliance with project requirements, other acceptable manufacturers are Georgia-Pacific Gypsum, Certainteed Gypsum and National Gypsum.
- B. Gypsum Wallboard: ASTM C1396; fire resistive type, UL rated; 5/8-inch thick, maximum permissible length; ends square cut, tapered edges. Product: USG SHEETROCK Gypsum Panel, Firecode X.
- C. Gypsum Wallboard (Moisture & Mildew Resistant): ASTM C1396; fire resistive type, 5/8-inch thick, maximum permissible length; ends square cut, tapered and beveled edges. USG SHEETROCK Mold Tough, Firecode X.
- D. Cementitious Backer Board (CBB): ANSI A118.9; 5/8-inch thick; cementitious backer board. Moisture resistant, Mold resistant. Product: USG DUROCK Glass-Mat Tile Backerboard.
- E. Exterior Soffit Board: ASTM C1396; fire resistive type, 5/8-inch thick, USG SHEETROCK Mold Tough Firecode X.
- F. Substitutions: Under provisions of Section 01 60 00.

2.03 ACCESSORIES

- A. Provide manufacturer's standard trim accessories for gypsum board work, per ASTM C 1047. Provide with either knurled or perforated expanded flanges for nailing or stapling, and beaded for concealment of flanges, in joint compound.
- B. Fasteners: ASTM C1002 Buglehead screws, length as recommended by U.S. Gypsum Handbook, required for penetration into framing members.
- C. Acoustical Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board.
- D. Corner Beads: Metal.
- E. Edge Trim: GA 216; Type LC, L, LK bead.
- F. Joint Materials: GA 216; reinforcing tape, joint compound, adhesive, and water.
- G. Control Joint: GA 216; roll-formed zinc control joint with removable strip, similar to USG No. 093 or ClarkDietrich™ 093 Control Joint.
- H. Metal Furring Channels: GA 216; roll-formed zinc furring channel 25 gauge, 3/4 in.
- I. Metal Reveals: Fry Reglet. Drywall Reveal Molding. Depth of GWB, width as indicated on drawings. Use factory fabricated channel reveal "intersection" at all intersecting reveals. Equivalent products manufactured by Stockton Products are acceptable.
 - 1. Reveal Molding: Type DRM, non-vented. 1-3/4" and 2" widths.
 - 2. Reveal Channel Screed: Type DCS, non-vented. 1-3/4" and 2" widths.
 - 3. L-Shaped Trim Molding: Type DRML-75.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that site conditions are ready to receive work.

3.02 GYPSUM BOARD INSTALLATION

- A. Install gypsum board in accordance with GA 216, and GA 600.
- B. Single Layer Applications: Erect single layer board horizontal, perpendicular to framing with ends and edges occurring over firm bearing.
- C. Multiple Layer Applications: Offset joints of successive layers from joints of preceding layers; conform to requirements of fire-rated horizontal assemblies and/or acoustic performance.
- D. Use screws when fastening gypsum board to metal furring or framing.
- E. Erect exterior gypsum soffit board perpendicular to supports, with staggered end joints over supports.
- F. Treat cut edges and holes in moisture resistant gypsum board and exterior gypsum soffit board with sealant.
- G. Control Joints: Install control joints to provide for movement at the following conditions, in specific locations approved by Architect for visual effect. Control joints in fire-rated partitions

shall be backed with fire-rated gypsum wallboard or fire safing insulation as tested to maintain required rating.

1. Building expansion or control joints in substrate.
 2. Walls, Partitions, or Furring: Straight runs that exceed 30 ft.
 3. Ceilings: Dimensions that exceed 50 ft in either direction with perimeter relief or 30 ft without perimeter relief. Changes in direction of ceiling framing or furring.
 4. Exterior Soffits: Dimensions that exceed 30 ft in either direction.
- H. Place corner beads at external corners. Use longest practical length. Place edge trim where gypsum board abuts dissimilar materials.
- I. Apply gypsum board to curved walls in accordance with GA-216.

3.03 ACOUSTICAL ACCESSORIES INSTALLATION

- A. Install acoustical sealant at gypsum board perimeter at:
1. All penetrations of partitions by conduit, pipe, ductwork, and rough-in boxes.
 2. Perimeter of all partitions shown to receive acoustic insulation, where abutting dissimilar materials.

3.04 JOINT TREATMENT

- A. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
- B. Feather coats onto adjoining surfaces so that camber is maximum 1/32 in.
- C. Seal gypsum wallboard prior to texturing in accordance with manufacturer's instructions.
- D. Apply one (1) coat tape system (fire tape) at walls and ceilings exposed in attic and attic mechanical rooms.

3.05 LEVELS OF FINISH (per GA-214)

- A. Level 1 Concealed Areas:
All joints and interior angles shall have tape embedded in joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable.
- B. Level 2 Backer board: All joints and interior angles shall have tape embedded in joint compound, leaving a thin coating of joint compound over all joints and interior angles. Fastener heads and accessories shall be covered with a coat of joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable.
- C. Level 3 Exposed Warehouse and Shop Areas:
All joints and interior angles shall have tape embedded in joint compound and two (2) separate coats of joint compound applied over all joints, angles, fastener heads, and accessories. All joint compound shall be smooth and free of tool marks and ridges.
- D. Level 4 Exposed Office Areas:
All joints and interior angles shall have tape embedded in joint compound and three (3) separate coats of joint compound applied over all joints, angles, fastener heads, and

accessories. All joint compound shall be smooth and free of tool marks and ridges.

3.07 TOLERANCES

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 in. in 10 ft in any direction.

END OF SECTION

**SECTION 09 30 00
TILING**

PART 1 – GENERAL

1.01 REFERENCES

- A. ANSI A108.1A – Installation of Ceramic Tile in Wet-Set Method, with Portland Cement Mortar.
- B. ANSI A108.1B – Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex Portland Cement Mortar.
- C. ANSI A108.5 - Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex Portland Cement Mortar.
- D. ANSI A108.10 - Installation of Grout in Tile Work.
- E. ANSI A118.1 - Dry-Set Portland Cement Mortar.
- F. ANSI A118.3 – Chemical Resistant, Water-Cleanable, Tile-Setting and Grouting Epoxy.
- G. ANSI A118.4 – Modified Dry-Set Cement Mortar.
- H. ANSI A118.6 – Standard Cement Grouts for Tile Installations
- I. ANSI A118.7 – High Performance Cement Grouts for Tile Installation.
- J. ANSI A137.1 - Standard Specifications for Ceramic Tile.
- K. TCNA (Tile Council of North America) - Handbook for Ceramic Tile Installation.

1.02 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Product Data: Provide instructions for using mortars and grouts.
- C. Samples: Mount tile and apply grout on one plywood panels, 12 x 12 inch size illustrating pattern, color variations, and grout joint size variations.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements ANSI A137.1.

1.03 MAINTENANCE DATA

- A. Submit under provisions of Section 01 77 00.
- B. Maintenance Data: Include recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.

1.04 QUALITY ASSURANCE

- A. Conform to TCNA Handbook.

1.05 **QUALIFICATIONS**

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum five (5) years experience.
- B. Installer: Company specializing in performing the work of this Section with minimum five (5) years experience.

1.06 **DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, store, protect, and handle products to site under provisions of Section 01 60 00.
- B. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.07 **ENVIRONMENTAL REQUIREMENTS**

- A. Do not install adhesives in an unventilated environment.
- B. Maintain manufacturer's recommended temperature during installation of mortar materials.

1.08 **EXTRA MATERIALS**

- A. Furnish under provisions of Section 01 77 00.
- B. Provide 1 sf of each size, color, and surface finish of tile specified.

1.09 **COLORS**

- A. Colors are specified on Colors and Materials Schedule on drawings.

1.10 **ALTERNATES**

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

PART 2 - PRODUCTS

2.01 **TILE MATERIALS**

- A. Manufacturers
 - 1. DalTile.
 - 2. United tile.
 - 3. Substitutions: Under provisions of Section 01 60 00.
- B. Glazed Wall (Accent) Tile (TL-1): United Tile, INAX Tile, Biyusal Series, 1"x6" mosaic tile.
- C. Porcelain Wall/Floor Tile (TL-2): United Tile, Portobello, St. Martin Series, Field pressed, Matte finish, 12"x24" tile.
- D. Porcelain Wall Tile (TL-3): Daltile, Emerson Wood Series, Matte finish, 6"x48" tile.

- E. Mosaic floor (Shower) Tile (TL-4): United Tile, Crossville, Nest Series, Unpolished finish, 1"x6" mosaic tile.
- F. Glazed Wall Tile (TL-5): United Tile, Mosa Classics, Tide Series, 4"x 8" tile.
- G. Glazed Wall (Accent) Tile (TL-6): United Tile, Mosa Classics, Tide Series, 4"x8" tile.
- H. Glazed Ceramic Wall Tile (TL-7): Daltile, Artcrafted Series, Glossy Finish, 3"x12" tile.
- I. Porcelain Wall/Floor Tile (TL-8): United Tile, Portobello, St. Martin Series, Field pressed, Matte finish, 6"x12" cove base tile.

2.02 MORTAR AND GROUT MATERIALS

- A. Manufacturers
 - 1. Laticrete.
 - 2. Mapei.
 - 3. Custom Building Products.
 - 4. Flextile.
 - 5. Substitutions: Under provisions of Section 01 60 00.
- B. Mortar Materials: ANSI A118.3 – Epoxy Mortar.
- C. Grout: ANSI A118.6, tile grout, un-sanded, latex or polymer modified, color as selected. ANSI A118.3 epoxy grout.
- D. Mix and proportion pre-mix grout materials in accordance with manufacturer's instructions.

2.03 ACCESSORIES

- A. Metal Edging Floor Tile (TR-1): Schluter-Systems, Schiene, finish as indicated in drawings, height flush with top of finish tile.
- B. Metal Edging Floor Tile (Tile to Lower Surface Covering, TR-2): Schluter-Systems, Reno-U, finish as indicated in drawings, height flush with top of finished tile, fill void with thinset to prevent denting or crushing.
- C. Metal Edging Wall Tile (Outside Corners and other Tiled Edges, TR-3): Schluter-Systems, Quadec, finish as indicated in drawings, height flush with top of finished tile. Square outer corner profile.
- D. Metal Edging Wall Tile (Edge Protection, TR-4): Schluter-Systems, Jolly, finish as indicated in drawings, height flush with top of finished tile. Edge protection profile.
- E. Metal Edging at Floor/Wall Tile (Cove-Shaped Transition, TR-5): Schluter-Systems, Dillex-EHK, finish as indicated in drawings, provide inside corners, outside corners, connectors, and components as necessary for a complete installation.

- F. Concealed Access Panels at Tiled Walls: Schluter-Systems, Rema, concealed access panel system consisting of magnets clamped to lateral, moveable guide shoes and ferro-magnetic metal counter-plates.

2.04 UNDERLAYMENT

- A. Manufacturers:

- 1. DalTile.
- 2. The Noble Company.
- 3. Schluter Systems.
- 4. Ardex Americas.
- 5. Substitutions: Under provisions of Section 01 60 00.

- B. Cleavage Membrane: Nobleseal CIS, high-performance crack isolation and control joint bridging membrane per ASTM A118.12, 0.030-inch thick membrane, CPE sheet laminated to non-woven fabric both sides; 1-14 "Extra-Heavy Service" rating per ASTM C 627.

- C. Uncoupling Membrane:

- 1. Schluter Systems. Schluter-DITRA, uncoupling, waterproofing and vapor management layer; 1/8 inch thick, high-density polyethylene (HDPE) membrane.
- 2. Ardex UI 740 Flexbone high load-bearing, uncoupling, waterproofing membrane; 1/8 inch thick, polyethylene membrane with bonded fleece layer.

- D. Waterproofing Membrane: Chloraloy shower pan liner and waterproofing/cleavage membrane, 0.040-inch thick CPE sheet.

2.05 SEALER

- A. AquaMix, Inc. Grout Sealer.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are ready to receive work.

3.02 PREPARATION

- A. Protect surrounding work from damage or disfiguration.
- B. Clean surfaces.
- C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

3.03 INSTALLATION

- A. Install tile per TCNA and manufacturer's recommendations.

- B. Thinset Method:
1. Floor Tile: F122 (over concrete with waterproof membrane for wet areas or with cleavage membrane in dry areas on above grade slabs.
 2. Wall Tile: W244 (over cementitious backer board in wet areas.
- C. Install underlayment, adhesive, tile, and grout in accordance with manufacturer's instructions.
- D. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.
- E. Place edge strips at exposed tile edges.
- F. Install metal floor edging at flooring transitions between tile to carpet, tile to tile, tile to wood flooring, and tile to exposed concrete slabs.
- G. Where access panels are required in restroom tiled walls; install concealed access panel system (Schluter-Systems).
- H. Install metal tile wall edging (Schluter-Systems) at vertical exposed outside corners of tiled walls.
- I. Cut and fit tile tight to penetrations through tile. Form corners neatly.
- J. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, excess mortar, or excess grout.
- K. Sound tile after setting. Replace hollow sounding units.
- L. Provide expansion joints in accordance with TCNA recommendations and as indicated. Keep expansion joints free of mortar and grout. Apply sealant to joints.
- M. Allow tile to set as required by manufacturer's instructions.
- N. Grout tile joints.
- O. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

3.05 CLEANING

- A. Clean tile and grout surfaces.

3.06 PROTECTION OF FINISHED WORK

- A. Protect finished Work under provisions of Section 01 50 00.
- B. Do not permit traffic over finished floor surface for four (4) days after installation, or as recommended by manufacturer.

END OF SECTION

**SECTION 09 51 00
ACOUSTICAL CEILINGS**

PART 1 – GENERAL

1.01 REFERENCES

- A. ASTM C635 - Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
- B. ASTM C636 - Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
- C. ASTM C665 - Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
- D. ASTM E580 – Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions.
- E. ASTM E1264 - Classification of Acoustical Ceiling Products.
- F. Ceilings and Interior Systems Contractors Association (CISCA) - Acoustical Ceilings: Use and Practice.
- G. UL - Fire Resistance Directory and Building Material Directory.
- H. IBC – International Building Code.
- I. ASCE Standard 7 – Minimum Design Loads for Buildings and Other Structures.

1.02 SYSTEM DESCRIPTION

- A. Suspension system to rigidly secure acoustical ceiling system including integral mechanical and electrical components with maximum deflection of 1/360.

1.03 QUALITY ASSURANCE

- A. Installer: Company with five (5) years minimum experience. Approved by manufacturer.

1.04 REGULATORY REQUIREMENTS

- A. Conform to applicable code for fire rated assembly and combustibility requirements for materials and seismic standards.
- B. Conform to International Building Code (IBC) and ASCE Standard 7 for seismic resistance requirements.

1.05 ENVIRONMENTAL REQUIREMENTS

- A. Maintain uniform temperature of minimum 60 degrees F (16 degrees C), and humidity of 20 to 40 percent prior to, during, and after installation.

1.06 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.

- B. Product Data: Provide data on metal grid system components and acoustical units.
- C. Samples: Submit samples illustrating material and finish of acoustical units.
- D. Shop Drawings: Submit shop drawings for all areas requiring seismic bracing to indicate layout and types of bracing materials.
- E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.07 **SEQUENCING/SCHEDULING**

- A. Do not install acoustical ceilings until building is enclosed, sufficient heat is provided, dust-generating activities have terminated, and overhead work is completed, tested and approved.
- B. Schedule installation of acoustic units after interior wet work is dry.
- C. Coordinate and schedule installation of mechanical/electrical items incorporated and cut into ceiling tile/panels and/or suspension system.

1.08 **EXTRA STOCK**

- A. Provide extra quantity of acoustic units under provisions of Section 01 77 00.
- B. Provide minimum twelve (12) extra panels in cartons delivered to Owner.

1.09 **ALTERNATES**

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

1.10 **COLORS**

- A. Colors are specified on Colors and Materials Schedule on drawings.

PART 2 - PRODUCTS

2.01 **SUSPENSION SYSTEM**

- A. Acceptable Manufacturers
 - 1. Armstrong World Industries
 - 2. USG Interiors, Inc. (Donn Systems).
 - 3. Rockfon LLC, Chicago, IL.
 - 4. CertainTeed
 - 5. MDC Interior Solutions.
 - 6. Substitutions: Under provisions of Section 01 60 00.
- B. Suspension Grid

1. Heavy duty class; ASTM C635 non- rated.
2. Type (SS-1): Armstrong. Prelude XL. Fire-Guard. 15/16 in. face, exposed Tee grid. Hot dipped galvanized steel. Finish: White. Use with acoustical ceiling tile ACT-1.
3. Type (SS-2): Armstrong. Prelude XL. Fire-Guard. 15/16 in. face, exposed Tee grid. Hot dipped galvanized steel. Finish: Black. Use with wood ceiling system WCS-1 and acoustical ceiling tile ACT-2.

C. Main Runners, Cross Tees, and Wall Angles

1. Cold rolled steel
 - a. Positive lock grid components.
 - b. Pull out tension 300 lbs.
 - c. Double web construction.
2. Standard factory painted finish on exposed surfaces - "White" color.
3. Maximum deflection allowed: 1/360, including load carrying capacities for light fixtures, HVAC elements and acoustical panels.

D. Hanger Wire

1. Minimum 12 gauge galvanized, soft annealed, mild steel.
2. Lateral bracing and vertical struts per ASCE Standard 7 and ASTM E580.

E. Accessories

1. Stabilizer bars, clips, splices, curved wall angles, hold down clips; per IBC and manufacturer's standards.
2. Armstrong - BERC2 Clips shall be used instead of 2" perimeter angles and end stabilizers, in accordance with ICC-ES-ESR1308
3. MDC Interior Solutions, Zintra Acoustic Ceiling Baffles, Provide adjustable cable suspension kit.

F. All components of ceiling suspension system shall be the products of one (1) manufacturer.

2.02 **ACOUSTICAL PANEL UNITS**

A. Acceptable Manufacturers

1. Armstrong, referenced manufacturer. Other manufacturer's products shall match referenced product characteristics and appearance.
2. USG.
3. BPB America, Inc.
4. CertainTeed.

5. MDC Interior Solutions.
6. Substitutions: Under provisions of Section 01 60 00.

B. Products

1. Type (ACT-1): 24 inch x 24 inch x 3/4 inch; lay-in.
 - a. Armstrong – Ultima with Airguard Coating: 1901, Class A per ASTM E1264, flame spread 25 or less; CAC = 35, NRC = 0.75; light reflectance of 0.90, high light reflectance; sag resistance, fine texture, beveled tegular edge. Washable, impact-resist, scratch-resist, anti-mold and soil-resist.
2. Type (ACT-2): 24 inch x 24 inch x 1 inch; lay-in.
 - a. Armstrong – Calla: 2820BK, Class A per ASTM E1264, flame spread 25 or less; CAC = 35, NRC = 0.85; sag resistance, fine texture, square lay-in edge. Impact-resist, anti-mold and soil-resist. Infill panel, use with wood ceiling system WCS-1.
3. Type (WCS-1): 12 in. x 96 in.; Wood Ceiling System.
 - a. Armstrong – Woodworks Grille – Forte: 6334L8S17, 3/4 in. wide x 4 in. high slats, 2-1/4 in. space between slats, 4 slats per panel, veneered ceiling panels with notched backers. Use with infill panel, ACT-2.
4. Acoustical Ceiling Baffles (ACB).
 - a. MDC Interior Solutions, Zintra Acoustic Ceiling Baffles.
 - b. Boxed Baffle System.
 - c. Random Series, includes the following Box Baffle Profiles:
 - (1) Box Baffle A.
 - (2) Box Baffle B.
 - (3) Box Baffle C.
 - (4) Box Baffle D.
 - (5) Box Baffle E.
 - d. Include manufacturers adjustable cable suspension kit.
 - e. Colors and Pattern as indicated on drawings.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify site conditions are ready to receive work.
- B. Verify that layout of hangers will not interfere with other work.
- C. Beginning of installation means acceptance of existing conditions.

3.02 INSTALLATION - LAY-IN GRID SUSPENSION SYSTEM

- A. Install suspension system in accordance with ASTM C636 and manufacturer's instructions, and as supplemented in this section.
- B. Install system capable of supporting imposed loads to a deflection of 1/360 maximum.
- C. Locate system on room axis according to reflected plan.
- D. Install after major above ceiling work is complete. Coordinate the location of hangers with other work.
- E. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability. Support fixture loads by supplementary hangers located within 6 in. of each corner, or as required by ASTM E580.
- H. Do not eccentrically load system, or produce rotation of runners.
- I. Install edge molding at intersection of ceiling and vertical surfaces, using longest practical lengths. Miter corners. Provide edge moldings at junctions with other interruptions.
- J. Install light fixture boxes constructed of gypsum board above light fixtures in accordance with UL assembly requirements.
- K. Installation shall conform to International Building Code (IBC) and ASCE Standard 7 for seismic resistance.

3.03 INSTALLATION - ACOUSTICAL UNITS

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Install units after above ceiling work is complete.
- D. Install acoustical units level, in uniform plane, and free from twist, warp and dents.
- E. Cut tile to fit irregular grid and perimeter edge trim. Double cut and field paint exposed edges of tegular units.

3.04 ERECTION TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 in. in 10 ft.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION

**SECTION 09 61 15
MOISTURE VAPOR EMISSION CONTROL**

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Pre-formed moisture suppression membrane installed over concrete subfloor as a floor covering underlayment.
- B. This Section includes two-coat, 100% solids epoxy moisture management system formulated to suppress excessive moisture vapor in new or existing concrete prior to the installation of an ARDEX Topping with sealer, or Underlayment with flooring.
 - 1. ARDEX MC™ ULTRA Two-Coat Moisture Control System – consisting of two components: (1.) ARDEX MC ULTRA PRIMER and (2.) ARDEX MC ULTRA SEALER
 - 2. ARDEX V1200™ Self-Leveling Underlayment
 - 3. ARDEX ARIDFIX™ Two-Part, Low Viscosity Rigid Polyurethane
 - 4. ARDEX ARIDSEAL™ RAPID PLUS Fast Setting Semi-Rigid Joint Sealant
 - 5. ARDEX K 301™ Self-Leveling Exterior Concrete Topping
 - 6. ARDEX MRP™ Moisture Resistant Patch

1.02 REFERENCES

- A. ASTM International:
 - 1. ASTM F2170 - Relative Humidity in Concrete Floor Slabs Using in situ Probes
 - 2. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
 - 3. ASTM C1583 - Standard Test Method for Tensile Strength of Concrete Surfaces and the Bond Strength or Tensile Strength of Concrete Repair and Overlay Materials by Direct Tension
 - 4. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials
 - 5. ASTM D1308 - Chemical Resistance of Finishes
 - 6. F. ASTM F3010 – 13 – Two-Component Resin Based Membrane-Forming Moisture Mitigation Systems for Use Under Resilient Floor Coverings.

1.03 SUBMITTALS

- A. Section 01 33 00 – Submission procedures.

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- B. Product Data: Provide data indicating product physical characteristics, performance criteria, and limitations of use. Also include installation instructions for each material and product used and the manufacturer's Material Safety Data Sheets.
- C. Manufacturer's Current Installation Instructions.
- D. Manufacturer's Current Pre-Installation Checklist.
- E. Manufacturer's warranty registration with concrete subfloor moisture test results and building ambient air temperature and relative humidity test results.
- F. Qualification Data: For Installer

1.04 COORDINATION

- A. Section 01 31 00 Project Management and Coordination: Coordination with other work having a direct bearing on work of this section.
- B. Coordinate the work of this section and directly related sections with concrete floor construction and repair.
- C. Coordinate the work of this section and directly related sections with finish flooring work.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle products to site under provisions of Section 01 60 00.
- B. Store products in manufacturer's unopened packaging until ready for installation in accordance with manufacturer's recommended guidelines.
- C. Deliver products in original packaging, labeled with product identification, manufacturer, batch number and shelf life.
- D. Store products in a dry area with temperature maintained between 50° and 85° F (10° and 29° C) and Protect from direct sunlight.

1.06 ENVIRONMENTAL REQUIREMENTS

- A. Store materials for three (3) days prior to installation in area of installation to achieve temperature stability.

1.07 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- B. Do not install material below 50° F (10° C) surface and air temperatures. These temperatures must also be maintained during and for 48 hours after the installation of products included in this section. Install quickly if substrate is warm and follow warm weather instructions available from the ARDEX Technical Service Department.

1.08 ALTERNATES

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

1.09 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing specified moisture suppression membrane with minimum three (3) years documented experience.
- B. Manufacturer Experience: Provide products of this section by companies which have successfully specialized in production of this type of work for not less than 5 years. Contact Manufacturer Representative prior to installation.
- C. Installer: Company specializing in installing moisture suppression membrane with minimum three (3) years documented experience approved by manufacturer.
- D. Installation of the ARDEX product must be completed by a factory trained applicator, such as an ARDEX Level Master Elite® or ARDEX Choice Contractor, using mixing equipment and tools approved by the manufacturer. Please contact ARDEX Engineered Cements (724) 203-5000 for a list of recommended installers.

1.10 WARRANTIES

- A. Provide manufacturer's warranties under provisions of Section 01 77 00.
- B. 15-Year ARDEX MC™ ULTRA Moisture Control Warranty.
1. Certified applicator must file a pre-installation checklist with the manufacturer and receive written confirmation of the approval to proceed in order to obtain the extended 15-year ARDEX MC™ ULTRA Moisture Control Warranty.
- C. Warranties are to be presented in writing, signed by a legal representative of the manufacturer.

1.11 MOISTURE TESTING

- A. Moisture testing must be conducted in accordance with the latest version of ASTM F2170, Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes. A maximum reading up to 95% Relative Humidity is allowed.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. ARDEX Americas, ARDEX MC™ ULTRA.
1. Location: 400 Ardex Park Drive Aliquippa, Pennsylvania 15001 USA.
2. Phone: 724-203-5000 – Fax: 724-203-5001.
3. Web Site: www.ardexamericas.com
- B. Substitutions:

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1. Under provisions of Section 01 60 00.

2.02 **MOISTURE SUPPRESSION SYSTEM FOR FLOORING PRODUCTS**

A. TOPICAL MOISTURE MITIGATION SYSTEM

1. Two-Coat Moisture Control System for Concrete to Receive ARDEX Toppings and Underlayments.
 - a. Acceptable Products: ARDEX MC™ ULTRA; Manufactured by ARDEX Engineered Cements: 400 Ardex Park Drive, Aliquippa, PA 15001 USA 724-203-5000
2. Performance and Physical Properties: Meet or exceed the following values for material cured at 70° F+/-3° F (21° C+/-3° C) and 50% +/-5% relative humidity:
 - a. Application: Roller
 - b. Material Requirements on CSP 3 Prepared Concrete:
 - 1) Max 170 sq. ft. per mixed unit of ARDEX MC ULTRA PRIMER.
 - 2) Max 100 sq. ft. per mixed unit of ARDEX MC ULTRA SEALER.
 - c. Permeability: ≤0.02 perms, ASTM E96
 - d. 14 pH solution: No effect, ASTM D1308
 - e. Working Time: 30 minutes
 - f. Pot Life: 30 minutes
 - g. VOC: 0g/l, calculated SCAQMD 1113

B. HYDRAULIC CEMENT UNDERLAYMENT

1. Hydraulic Cement-based Self-Leveling Underlayment
 - a. Acceptable Products: ARDEX V1200™; Manufactured by ARDEX Engineered Cements: 400 Ardex Park Drive, Aliquippa, PA 15001 USA, (724) 203-5000, www.ardexamericas.com.
 - 1) Primer: No additional primer required.
2. Performance and Physical Properties: Meet or exceed the following values for material cured at 70° F+/-3° F (21° C+/-3° C) and 50% +/-5% relative humidity:
 - a. Application: Barrel Mix or Pump.
 - b. Flow Time: 10 minutes.
 - c. Initial Set: Approx. 30 minutes.

- d. Final Set: Approx. 60 minutes.
 - e. Compressive Strength: Minimum 4000 psi at 28 days, ASTM C109M.
 - f. Flexural Strength: 1000 psi at 28 days, ASTM C78.
 - g. VOC: 0 g/l, calculated SCAQMD 1113.
- C. WATER: Water shall be clean, potable, and sufficiently cool (not warmer than 70°F).

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Verify existing conditions before starting work.
 - 1. Concrete Sub Floor:
 - a. Verify internal RH of the concrete according to ASTM F-2170.
 - b. Record readings and submit with manufacturer's warranty registration.
 - c. Do not install if relative humidity levels within the concrete exceed 95% RH.

3.02 PREPARATION

- A. Concrete Subfloors: Prepare substrate in accordance with manufacturer's instructions.
 - 1. Prior to proceeding please refer to ASTM F710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring. All concrete subfloors must be sound, solid, clean, and free of all oil, grease, dirt, curing compounds and any substance that might act as a bond breaker before application.
 - 2. Mechanical preparation of the surface is required to obtain a minimum ICRI concrete surface profile of 3 (CSP 3). This substrate preparation must be by mechanical means, such as shot blasting.
 - 3. The concrete must have a minimum tensile strength of at least 200 psi when tested in accordance with ASTM C1583. The concrete surface can be damp, but must be free of standing water.
 - 4. Prior to beginning the installation, measure the relative humidity within the concrete (ASTM F2170). For these relative humidity methods, the RH shall not exceed 98%.
 - 5. If the concrete substrate is too uneven to provide a uniform film thickness of the ARDEX MC™ ULTRA (typically CSP 6 or higher), the substrate can be pre-smoothed using ARDEX K 301™ Self-Leveling Exterior Concrete Topping or ARDEX MRP™

Moisture Resistant Patch.

3.03 APPLICATION OF ARDEX MC™ ULTRA:

- A. Examine substrates and conditions under which materials will be installed. Do not proceed with installation until unsatisfactory conditions are corrected.
- B. Coordinate installation with adjacent work to ensure proper sequence of construction. Protect adjacent areas from contact due to mixing and handling of materials.
- C. Mixing: Comply with manufacturer's printed instructions and the following.
 - 1. Each individual unit of ARDEX MC™ ULTRA PRIMER AND ARDEX MC™ SEALER contains separate, premeasured quantities of the hardener (Part A) and the resin (Part B). The hardening agent (Part A) is added to the resin (Part B).
 - 2. After opening each container, stir the individual components thoroughly before blending. The hardening agent (Part B) is added to the resin (Part A). Pour all of the hardener into the resin portion and stir thoroughly for a minimum of 3 minutes using a low speed drill and an epoxy mixing paddle. Once mixed, pour some of the epoxy back into the hardener container, stir for 10 seconds, and then pour all of the contents back into the resin container. Mix for an additional 30 seconds before applying.
- D. Application: Comply with manufacturer's printed instructions and the following.
 - 1. Apply the first coat of freshly mixed ARDEX MC™ ULTRA PRIMER (yellow) to the prepared concrete surface in a uniform direction at an application rate of up to 170 sq. ft. per unit to achieve a coating thickness of 9 - 10 mils. Use a short-nap paint roller or notched squeegee for smoother surfaces, and a longer nap roller for more uneven substrates. ARDEX MC™ ULTRA PRIMER can also be applied with a paintbrush for hard to reach areas and in corners.
 - 2. While the first coat is still in a fresh state (maximum 30 minutes), broadcast an excess of fine sand that is less than 1/50 of an inch in gran size (98.5% passing sieve size #35 or #30) consistently over the entire area. Avoid standing or walking on the freshly applied sealer when broadcasting the sand. Allow this coat to dry for a minimum of 6 hours at 70°F before applying the sealer coat.
 - 3. Once an area has been completely covered with sand, the surface of the sand can be lightly walked on being careful not to expose the sealer at any time. Use about 1lb. of sand per square foot of area. Once the sand broadcasting process is complete, avoid all additional traffic over the surface for a minimum of 6 hours.

Note: When broadcasting the sand use a NIOSH approved dust mask in conformance with OSHA requirements regarding handling of sand.
 - 4. Working in a direction that is 90° angle to direction that the first coat was applied, apply the sealer coat of ARDEX MC™ ULTRA SEALER (green) at a coverage rate of 100 sq. ft. per unit (14 - 16 mils).
 - 5. While this second coat is still in a fresh state (maximum 30 minutes), broadcast an excess of fine sand that is less than 1/50 of an inch in grain size (98.5% passing sieve size #35 or #30) consistently over the entire area. Avoid standing or walking

on the freshly applied sealer when broadcasting the sand.

6. Once an area has been completely covered with sand, the surface of the sand can be walked on being careful not to expose the sealer at any time. Use about 1lb. of sand per square foot of area. Once the sanding process is complete, avoid all additional traffic over the surface for a minimum of 16 hours.

Note: When broadcasting the sand use a NIOSH approved dust mask in conformance with OSHA requirements regarding handling of sand.

7. After 16 hours, broom sweep and vacuum the surface to remove all loose sand. Protect this surface from construction traffic and dirt and debris using Masonite or similar until the ARDEX or topping is installed.
8. The clean prepared surface of sand is the priming system for the ARDEX Underlayment, such as ARDEX V1200™ Self-Leveling Concrete Underlayment. No additional priming is required. Install the ARDEX Underlayment in accordance with printed instructions found in the corresponding technical brochure.
9. It is not necessary to re-test the substrate for moisture emissions prior to installing the coating or floor covering.

3.04 FIELD QUALITY CONTROL

- A. Where specified, field sampling of the ARDEX products is to be done by taking an entire unopened bag/unit of the product being installed to an independent testing facility to perform testing. There is no in-situ test method applicable for this system.
- B. If any jobsite condition interferes with compliance with manufacturer's instructions, contact manufacturer and obtain written job-specific procedures. Notify architect or owner's representative as required in the Quality Section of this project manual describing the interfering jobsite condition and manufacturer's job-specific instructions.

3.05 FLOORING INSTALLATION

- A. Adhesives - Apply adhesive to mineral-coated surface of moisture suppression membrane. Use only water-based adhesives. Do not use solvent-based adhesives.
- B. Protection - Prior to the installation of the finish flooring, the surface of the underlayment should be protected from abuse by other trades by the use of plywood, Masonite or other suitable protection course.
- C. Protect moisture suppression membrane from damage during flooring installation. Do not tear, rip, puncture, or delaminate membrane when applying trowel-on adhesive. Repair damaged areas according to membrane manufacturer's instructions before flooring installation. Provide continuous, intact moisture suppression membrane under entire designated flooring area.
- D. Install flooring according to flooring manufacturer's instructions:
 1. Engineered Wood:
 - a. Install to manufacturer's instructions for floating floors.
 - b. Refer to Section 09 64 00 for flooring installation.

2. Tile Carpet:
 - a. Adhere directly to moisture suppression membrane using carpet manufacturer's recommended adhesive.
 - b. Refer to Section 09 68 00 for carpet installation.

END OF SECTION

**SECTION 09 64 00
WOOD FLOORING**

PART 1 - GENERAL

1.01 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Shop Drawings: Indicate seaming plan, borders, and patterns.
- C. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns and colors available.
- D. Samples: Submit two samples illustrating color and pattern for each floor material for each color specified.

1.02 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle products to site under provisions of Section 01 60 00.

1.03 ENVIRONMENTAL REQUIREMENTS

- A. Store materials to installation in area of installation to achieve temperature stability per manufacturer's instructions.
- B. Maintain ambient temperature required by adhesive manufacturer three (3) days prior to, during, and twenty-four (24) hours after installation of materials.

1.04 MAINTENANCE DATA

- A. Submit under provisions of Section 01 77 00.
- B. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

1.05 EXTRA MATERIALS

- A. Furnish under provisions of Section 01 77 00.
- B. Provide a minimum of 20 sq ft of each type of flooring material specified.

1.06 WARRANTIES

- A. Provide manufacturer's warranties under provisions of Section 01 77 00.
- B. All of the above warranties are to be presented in writing, signed by a legal representative of the manufacturer.

1.07 ALTERNATES

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

1.08 **COLORS**

- A. Colors are specified in on Colors and Materials Schedule on drawings.

PART 2 – PRODUCTS

2.01 **MANUFACTURERS – WOOD FLOORING (WF)**

- A. Oregon Lumber Company, 1-800-824-5671, (www.oregonlumber.com). Worthwood Collection, Engineered End Grain Flooring, Engineered 7"x7".
1. Species: European White Oak.
 2. Construction: Engineered 3-ply.
 3. Plank size: 86.6" x 7", tongue and groove.
 4. Thickness: 5/8".
 5. Wear layer: 4.2mm.
 6. Edges: square.
 7. Finish: Prefinished, urethane finish.
- B. Substitutions: Under provisions of Section 01 60 00.

2.02 **ACCESSORIES**

- A. Subfloor Filler: Type recommended by flooring material manufacturer.
- B. Concrete Slab Control Joint and Construction Joint Sealant: Type recommended by floor covering manufacturer and compatible with filler and mastic.
- C. Primers and Adhesives: Types recommended by flooring manufacturer.
- D. Edge Strips: As specified in Section 09 30 00.
- E. Moisture Vapor Emission Control: Moisture management system as specified in Section 09 61 15 Moisture Vapor Emission Control.

PART 3 - EXECUTION

3.01 **EXAMINATION**

- A. Verify that surfaces are smooth and flat with maximum variation of 1/16 inch in 3 ft and are ready to receive work.
- B. Verify concrete subfloors comply with flooring manufacturer's maximum acceptable moisture levels; maximum test results of 75% Relative Humidity as determined by ASTM F2170; and concrete subfloors shall exhibit negative alkalinity, carbonization, or dusting.
1. Moisture Testing: Moisture testing must be conducted in accordance with the latest version of ASTM F2170 Standard Test Method for Determining Relative Humidity in

Concrete Floor Slabs using in situ Probes.

2. All concrete subfloors shall be tested for moisture levels regardless of the grade level or time in place before covering with flooring.
 3. Install moisture management system (moisture vapor emission control) at concrete subfloors when moisture testing results exceed the flooring manufacturer's maximum acceptable moisture level for flooring installation over concrete subfloors.
- C. Verify floor and lower wall surfaces are free of substances that may impair adhesion of new adhesive and finish materials.

3.02 PREPARATION

- A. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.
- B. Prohibit traffic until filler is cured.
- C. Vacuum clean substrate.
- D. Apply primer to surfaces.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Spread only enough adhesive to permit installation of materials before initial set.
- C. Set first row in place; check for straightness and adjust as necessary. Install the following rows in the same manner.
- D. Provide expansion gap at all perimeters and fixed objects per manufacturer's instructions.
- E. Provide square end cuts as required to prevent a row from being out-of-square.
- F. Terminate flooring at centerline of door openings where adjacent floor finish is dissimilar.
- G. Install edge strips at unprotected or exposed edges, and where flooring terminates.
- H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances.

3.04 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean, seal, and wax floor surfaces in accordance with manufacturer's instructions.

3.05 PROTECTION OF FINISHED WORK

- A. Protect finished work under provisions of Section 01 50 00.
- B. Prohibit traffic on floor finish for 48 hours after installation.

END OF SECTION

**SECTION 09 65 00
RESILIENT FLOORING**

PART 1 - GENERAL

1.01 REFERENCES

- A. ASTM E648 – Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.
- B. ASTM F1066 - Vinyl Composition Floor Tile.
- C. ASTM F1303 – Sheet Vinyl Floor Covering with Backing.
- D. ASTM F1861 – Resilient Wall Base.
- E. FS RR-T-650 - Treads, Metallic and Non-metallic, Non-skid.
- F. ASTM F2170 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.

1.02 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Shop Drawings: Indicate seaming plan, borders, and patterns.
- C. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns and colors available.
- D. Samples: Submit samples illustrating color and pattern for each floor material for each color specified.

1.03 REGULATORY REQUIREMENTS

- A. Conform to applicable code for flame/smoke rating requirements in accordance with ASTM E684.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle products to site under provisions of Section 01 60 00.

1.05 ENVIRONMENTAL REQUIREMENTS

- A. Store materials for three (3) days prior to installation in area of installation to achieve temperature stability.
- B. Maintain ambient temperature required by adhesive manufacturer three (3) days prior to, during, and twenty-four (24) hours after installation of materials.

1.06 MAINTENANCE DATA

- A. Submit under provisions of Section 01 77 00.

- B. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

1.07 EXTRA MATERIALS

- A. Furnish under provisions of Section 01 77 00.
- B. Provide a minimum of 20 sq ft of each type of flooring, 10 lf of base, of each material specified.

1.08 WARRANTIES

- A. Provide manufacturer's warranties under provisions of Section 01 77 00.
- B. All of the above warranties are to be presented in writing, signed by a legal representative of the manufacturer.

1.09 ALTERNATES

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

1.10 COLORS

- A. Colors are specified in on Colors and Materials Schedule on drawings.

PART 2 – PRODUCTS

2.01 MANUFACTURERS – RUBBER FLOOR (RF)

- A. ECORE Athletic flooring, Fit Collection, 8mm thickness, Roll Goods, 48"x 25 Feet.
- B. Substitutions: Under provisions of Section 01 60 00.

2.02 MANUFACTURERS - RUBBER BASE MATERIALS

- A. Roppe, 700 Series.
- B. Johnsonite.
- C. Burkemercer Flooring Products.
- D. Substitutions: Under provisions of Section 01 60 00.

2.03 BASE MATERIALS

- A. Base: Roppe, 700 Series. ASTM F1861, Type TP, Group 2 (layered), thermoplastic extruded rubber; 4 inch high ; 1/8 inch thick; top set, coved toe base (coil - continuous lengths).

2.04 ACCESSORIES

- A. Subfloor Filler: Water-resistant; type recommended by flooring material manufacturer.
- B. Concrete Slab Control Joint and Construction Joint Sealant: Type recommended by floor covering manufacturer and compatible with filler and mastic.

- C. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer.
- D. Edge Strips (TR-6): Rubber floor to Resinous floor – Johnsonite, Wheeled transition, CTA-XX-3, Color as indicated in drawings.
- E. Sealer and Wax: Types recommended by flooring manufacturer.
- F. Moisture Vapor Emission Control: Moisture management system as specified in Section 09 61 15 Moisture Vapor Emission Control Membrane.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are smooth and flat with maximum variation of 1/4 inch in 10 ft and are ready to receive work.
- B. Verify concrete subfloors comply with flooring manufacturer's maximum acceptable moisture levels; maximum test results of 75% Relative Humidity as determined by ASTM F2170; and concrete subfloors shall exhibit negative alkalinity, carbonization, or dusting.
 - 1. Moisture Testing: Moisture testing must be conducted in accordance with the latest version of ASTM F2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs using in situ Probes.
 - 2. All concrete subfloors shall be tested for moisture levels regardless of the grade level or time in place before covering with flooring.
 - 3. Install moisture management system (moisture vapor emission control) at concrete subfloors when moisture testing results exceed the flooring manufacturer's maximum acceptable moisture level for flooring installation over concrete subfloors.
- C. Verify floor and lower wall surfaces are free of substances that may impair adhesion of new adhesive and finish materials.

3.02 PREPARATION

- A. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.
- B. Prohibit traffic until filler is cured.
- C. Vacuum clean substrate.
- D. Apply primer to surfaces.

3.03 INSTALLATION – MOISTURE MANAGEMENT SYSTEM

- A. Install moisture management system (moisture vapor emission control) to concrete subfloors in accordance with manufacturer's instructions.

3.04 INSTALLATION – RUBBER SHEET FLOORING

- A. Install in accordance with manufacturer's instructions.

- B. Spread only enough adhesive to permit installation of materials before initial set.
- C. Set flooring in place, press with heavy roller to attain full adhesion.
- D. Lay flooring with joints and seams parallel to building lines to produce minimum number of seams.
- E. Install sheet flooring parallel to room. Provide minimum of 1/3 full roll width. Double cut sheet and continuously seal.
- F. Terminate flooring at centerline of door openings where adjacent floor finish is dissimilar.
- G. Install edge strips at unprotected or exposed edges, and where flooring terminates.
- H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
- I. Install feature strips, edge strips, and floor markings where indicated. Fit joints tightly.

3.05 INSTALLATION - BASE

- A. Fit joints tight and vertical. Maintain minimum measurement of 18 in. between joints.
- B. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.
- C. Install base on solid backing. Bond tight to wall and floor surfaces.
- D. Scribe and fit to doorframes and other interruptions.

3.06 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean, seal, and wax floor and base surfaces in accordance with manufacturer's instructions.

3.07 PROTECTION OF FINISHED WORK

- A. Protect finished work under provisions of Section 01 50 00.
- B. Prohibit traffic on floor finish for 48 hours after installation.

END OF SECTION

**SECTION 09 67 23
RESINOUS FLOORING SYSTEM**

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide labor, materials, equipment and supervision necessary to install a minimum 1/8" nominal thickness decorative epoxy/urethane flooring system as outlined in this specification to new or existing concrete surfaces.
- B. The manufacturer's application instructions for each product used are considered part of this specification and should be followed at all times.

1.02 SUBMITTALS

- A. Technical Data: Submit manufacturer's product data, safety data sheets (SDS) and installation instructions.
- B. Samples: Submit samples of resinous flooring system. Samples shall be construed as examples of finished color and texture of the system only.
- C. Applicator Approval: Submit letter from manufacturer stating applicator is approved to install the resinous flooring system.
- D. Warranty: Submit copy of manufacturer's standard sample warranty, identifying the terms and conditions stated in section 1.7 Warranty.

1.03 QUALITY ASSURANCE

- A. Qualifications: Applicator shall be approved to install specified system.
- B. Requirement of Regulatory Agencies: Specified materials shall meet existing Federal, State and local VOC regulations.
- C. Field Sample:
 - 1. Install a field sample of at least 100 square feet at the project site or pre-selected area as agreed to by owner's representative, applicator and manufacturer.
 - 2. Apply material in accordance with manufacturer's written application instructions.
 - 3. Field sample will be standard for judging color and texture on remainder of project.
 - 4. Maintain field sample during construction for workmanship comparison.
 - 5. Do not alter, move, or destroy field sample until work is completed and approved by Owner's representative.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Materials shall be delivered in original sealed containers, clearly marked with supplier's name, brand name and type of material.

- B. Storage and Handling: Recommended material storage temperature is 75 °F (23.8 °C). Handle products to prevent damage to container. All materials shall be stored in compliance with local fire and safety requirements. Do not store at high temperatures or in direct sunlight.

1.05 PROJECT CONDITIONS

- A. Read and follow the Safety Data Sheet (SDS) and container labels for detailed health and safety information.
- B. Do not proceed with application of materials when substrate temperature is less than 60 °F (15.5 °C), if precipitation is imminent, or to a damp, unclean or frosty surface. It is recommended to maintain a minimum substrate temperature of 60 °F (15.5 °C) for a minimum of 48 hours before, during and after installation, or until cured. Special precautions are to be taken when ambient and/or substrate temperatures are approaching, at, or above 85 °F (29.4 °C).
- C. Coordinate flooring work with other trades. Applicator shall have sole right of access to the specified area for the time needed to complete the application and allow the flooring system to cure adequately.
- D. Protect adjacent surfaces from damage resulting from installation of the system. If necessary, mask and/or cover adjacent surfaces, fixtures, equipment, etc. by suitable means.
- E. Provide adequate ventilation.
- F. Provide a suitable work station to mix coating materials.
- G. Maintain work area in a neat and orderly condition, removing empty containers, rags and trash daily from the site.

1.06 WARRANTY

- A. Manufacturer's standard warranty.

1.07 COLORS

- A. Colors are specified on Colors and Materials Schedule on drawings.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. Sherwin Williams, Resuflor Deco Quartz BC23, 1/8" nominal thickness.
- B. Substitutions: Under provisions of Section 01 60 00.

2.02 MATERIALS

- A. Resuflor, Deco Quartz Materials:
 - 1. Primer: Resuprime 3579.
 - 2. First receiver coat: Resuflor 3561.
 - 3. First Broadcast: GP5900F.

4. Second receiver coat: Resuflor 3561.
5. Second Broadcast: GP5900F.
6. Grout Coat: Resuflor 3746.
7. Top Coat: Resuflor 3746.

2.03 MATERIAL PERFORMANCE CRITERIA

- A. Typical physical properties of cured material used on this project are:
1. Resinous flooring: Abrasion, impact and chemical resistant, high performance, resin based, monolithic floor surfacing designed to produce a seamless floor.
 2. System Characteristics:
 - a. Color and Patterns: as indicated from Manufactures standard.
 - b. Slip Resistance: Provide slip resistant finish.
 - c. Texture: 3746 – clear (1 coat).

2.04 ACCESSORIES

- B. Miscellaneous materials such as cleaning agents, adhesives, closed cell backer rod, deck drains, etc., shall be compatible with the specified system.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that the work done under other sections meets the following requirements:
1. That the concrete deck surface is free of ridges and sharp projections, sound and dry.
 2. That the concrete was cured for a minimum of 28 days. (Minimum of 3,500 psi compressive strength). The use of concrete curing agents, if any, shall be of the sodium silicate base only; others require written approval by resinous flooring system manufacturer.
 3. That damaged areas of the concrete substrate be restored to match adjacent areas. Use 70714/70715 epoxy and oven-dry silica aggregate approved by resinous flooring system manufacturer for filling and leveling at a ratio of one part epoxy mixed with four parts aggregates by volume.
 4. That due to hydrostatic, capillary and moisture vapor pressure, substrates in contact with ground must have a properly installed, effective vapor barrier. Moisture vapor emission of concrete not to exceed 3 lbs./1,000 sq. ft./24 hrs., when tested by the quantitative calcium chloride test method (ASTM F1869). Relative Humidity is not to exceed 75% when tested by in-situ Probe Test (ASTM F2170).

3.02 PREPARATION

- A. Cleaning: Surfaces contaminated with oil or grease shall be vigorously scrubbed with a power broom and a strong non-sudsing detergent. Thoroughly wash, clean, and dry. Areas where oil or other contaminants penetrate deep into the concrete may require removal by mechanical

methods. Do not apply materials unless surface is clean and dry.

- B. Shot-Blasting: Mechanically prepare surface by shot-blasting to industry standard surface texture (ICRI's CSP3-4) without causing additional surface defects in substrate. Shot-blasting does not remove deep penetrating oils, grease, tar or asphalt stains. Proper cleaning procedures should be followed to ensure proper bonding of the deck coating. Note: If shot-blasting is not practical, contact NEOGARD® Technical Service at techservice@neogard.com.
- C. Cracks: After shot blasting, fill all non-moving cracks with 70714/70715 epoxy, mixed with P1934 fumed silica to form a paste. The mix ratio is one part 70714/70715 epoxy to 3 parts P1934 fumed silica by volume.
- D. Control and Cold Joints: Fill control and cold joints flush with 70718/70719 flexible epoxy @ 3/4" depth. Install backer rod if necessary to limit depth to 3/4".
- E. Expansion and Isolation Joints: Expansion and isolation joints \approx / < 1" in width, shall be sealed with 70995 or 70991 sealants. Sealant shall be applied to inside of joint only, not applied to floor surface.

3.03 CLEANING

- A. Remove debris resulting from completion of coating operation from the project site.
- B. Reference resinous flooring system manufacturer's maintenance instructions for typical cleaning methods.

3.04 PROTECTION

- A. After completion of application, allow system to cure for 11 hours @ 75°F (23.8°C) before allowing foot traffic, 24 hours before allowing heavy load traffic.

END OF SECTION

**SECTION 09 68 00
CARPETING**

PART 1 - GENERAL

1.01 REFERENCES

- A. ASTM D2859 - Test Method for Flammability of Finished Textile Floor Covering Materials.
- B. ASTM E84 - Surface Burning Characteristics of Building Materials.
- C. ASTM E648 - Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.
- D. NFPA 253 - Test for Critical Radiant Flux of Floor Covering Systems.
- E. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.

1.02 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Shop Drawings: Indicate seaming plan, method of joining seams, and direction of carpet.
- C. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, color available, and method of Installation.
- D. Samples: Submit samples illustrating color and pattern for each carpet material specified.
- E. Submit samples of edge strip material for each color specified.
- F. Manufacturer's Installation Instructions: Indicate special procedures, and perimeter conditions requiring special attention.

1.03 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing specified carpet with minimum three (3) years documented experience.
- B. Installer: Company specializing in installing carpet with minimum three (3) years documented experience approved by manufacturer.

1.04 REGULATORY REQUIREMENTS

- A. Conform to applicable code for flame/smoke rating requirements in accordance with ASTM E84.

1.05 ENVIRONMENTAL REQUIREMENTS

- A. Store materials for three (3) days prior to installation in area of installation to achieve temperature stability.

- B. Maintain minimum 70 degrees F ambient temperature three (3) days prior to, during and twenty-four (24) hours after installation.

1.06 MAINTENANCE DATA

- A. Submit under provisions of Section 01 77 00.
- B. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

1.07 EXTRA MATERIAL

- A. Furnish under provisions of Section 01 77 00.
- B. Provide a minimum of 100 sf of carpeting of each type, color, and pattern specified.

1.08 WARRANTIES

- A. Provide manufacturer's warranties under provisions of Section 01 77 00.
- B. Manufacturer's ten (10) year Colorfastness to Light warranty.
- C. Manufacturer's five (5) year Colorfastness to Atmospheric Contaminants warranty.
- D. Wear – Ten (10) Year Wear Warranty: Provide Owner a written warranty from manufacturer that shall warrant that no part of the wearing surface shall wear more than 10% by weight for a period of ten (10) years. This warranty is full term non-prorated providing for replacement of worn areas with the same type of material at no cost to the Owner.
- E. All of the above warranties are to be presented in writing, signed by a legal representative of the manufacturer.

1.09 COLORS

- A. Colors are specified on Colors and Materials Schedule on drawings.

1.10 ALTERNATES

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

PART 2 - PRODUCTS

2.01 MANUFACTURER - CARPET

- A. Shaw Contract.
- B. Substitutions: Under provisions of Section 01 60 00.

2.02 CARPET MATERIALS

- A. Carpet (CPT-1): Collection - Off The Grid, Style - Beyond Tile, 5T218
 - 1. Construction: Multi-Level pattern cut/loop.
 - 2. Tufted Weight: 30oz/sq.yd.

3. Backing: Ecoworx Tile.
4. Product Type: Carpet Tile, 12"x48".
5. Install: Staggered.

2.03 ACCESSORIES

- A. Sub-Floor Filler: Type recommended by carpet manufacturer.
- B. Sealant: Type recommended by carpet manufacturer and compatible with carpet mastic.
- C. Moisture Vapor Emission Control: Moisture management system as specified in Section 09 61 15 Moisture Vapor Emission Control.
- D. Transition Strips:
 1. Coordinate transition strips with Section 09 30 00 Tiling Accessories.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are smooth and flat with maximum variation of 1/4 inch in 10 ft and are ready to receive work.
- B. Verify concrete subfloors comply with flooring manufacturer's maximum acceptable moisture levels; maximum test results of 80% Relative Humidity as determined by ASTM F2170; and concrete subfloors shall exhibit negative alkalinity, carbonization, or dusting.
 1. Moisture Testing: Moisture testing must be conducted in accordance with the latest version of ASTM F2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs using in situ Probes.
 2. All concrete subfloors shall be tested for moisture levels regardless of the grade level or time in place before covering with flooring.
 3. Install moisture management system (moisture vapor emission control) at concrete subfloors when moisture testing results exceed the flooring manufacturer's maximum acceptable moisture level for flooring installation over concrete subfloors.

3.02 PREPARATION

- A. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler.
- B. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.
- C. Vacuum clean substrate.

3.03 INSTALLATION – MOISTURE MANAGEMENT SYSTEM

- A. Install moisture management system (moisture vapor emission control) to concrete subfloors in accordance with manufacturer's instructions.

3.03 INSTALLATION

- A. Apply carpet and adhesive in accordance with manufacturers' instructions.
- B. Verify carpet match before cutting to ensure minimal variation between dye lots.
- C. Double cut carpet, to allow intended seam and pattern match. Make cuts straight, true, and unfrayed.
- D. Locate seams in area of least traffic.
- E. Join seams in accordance with manufacturer's instructions. Form seams straight, not overlapped or peaked, and free of gaps.
- F. Lay carpet tight and flat on subfloor, well fastened at edges, with a uniform appearance. Provide consistent color, pattern, and texture match within any one area.
- G. Do not change run of pile in any room where carpet is continuous through a wall opening into another room. Locate change of color or pattern between rooms under door centerline.
- H. Cut and fit carpet around interruptions.
- I. Fit carpet tight to intersection with vertical surfaces without gaps.
- J. Where wall bases are scheduled, cut carpet tight to walls. Fit carpet tight to vertical interruptions, leaving no gaps.
- K. Install carpet continuously to stair treads, full width. Install in one (1) piece. Adhere over entire surface. Fit accurately and securely, tight to treads and risers.

3.04 CLEANING

- A. Remove excess adhesive without damage, from floor, base, and wall surfaces.
- B. Clean and vacuum carpet surfaces.

END OF SECTION

**SECTION 09 72 16
VINYL-COATED WALL COVERINGS**

PART 1 - GENERAL

1.01 REFERENCES

- A. ANSI/ASTM E84 – Test Method for Surface Burning Characteristics of Building Materials.
- B. CFFA-W-101-C – Quality Standard for Vinyl Coated Fabric Wall Covering.
- C. CFFA 120 – Standard Test for Mildew Resistance.
- D. CFFA 300 – Standard Test for Bacterial Growth.
- E. NFPA 255 - Test of Surface Burning Characteristics of Building Materials.
- F. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

1.02 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing commercial wall fabrics with five (5) years documented experience.
- B. Applicator: Company specializing in installing wall fabrics with five (5) years documented experience.

1.03 REGULATORY REQUIREMENTS

- A. Conform to applicable code for flame/fuel/smoke ratings when tested to ANSI/ ASTM E84.

1.04 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01 33 00.
- B. Indicate on shop drawings, wall elevations with seaming layout.
- C. Provide product data on wall covering and adhesive.
- D. Submit samples under provisions of Section 01 33 00.
- E. Submit three (3) samples of wall covering 12 x 12 in. in size illustrating color, finish, and texture in each color.
- F. Submit manufacturer's installation instructions under provisions of Section 01 33 00.
- G. Submit test reports verifying flame/fuel/smoke ratings, when tested by an agency by authority having jurisdiction.

1.05 **DELIVERY, STORAGE, AND HANDLING**

- A. Deliver product to site under provisions of Section 01 60 00.
- B. Store and protect products under provisions of Section 01 60 00.
- C. Inspect roll and panels materials on site to verify acceptance.
- D. Protect packaged adhesive from temperature cycling and cold temperatures.
- E. Do not store roll goods on end.

1.06 **ENVIRONMENT REQUIREMENTS**

- A. Provide continuous ventilation and heating facilities to maintain substrate surface and ambient temperatures above 70 degrees F, unless required otherwise by manufacturer's instructions.
- B. Do not apply adhesive when substrate surface temperature is below 70 degrees F or relative humidity is above 40 percent.
- C. Maintain these conditions twenty-four (24) hours before, during, and after installation of adhesive wall covering.
- D. Provide lighting level of 80 ft candles measured mid-height at substrate surfaces.

1.07 **ALTERNATES**

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

1.08 **COLORS**

- A. Colors are specified on Colors and Materials Schedule on drawings.

PART 2 - PRODUCTS

2.01 **MATERIALS**

- A. Type II Vinyl Roll Stock (WC-1): Momentum Textiles and Wallcovering (Lanark Wallcovering), Loire, #LYN-LR-XX.
 - 1. Total Width: 52/54 in.
 - 2. Total Weight: 20 oz/lin. yd.
 - 3. Backing: Nonwoven
 - 4. Repeat: 25-1/4" V x 54" H.
 - 5. Installation: Non-reverse hang, straight across match.
- B. Type II Vinyl Roll Stock (WC-2): Koroseal, Costa.
 - 1. Total Width: 52-54 in.
 - 2. Total Weight: 20 oz.

3. Backing: Non-Woven.
 4. Repeat: 24" V x 52" H.
 5. Installation: Non-reverse hang, straight match.
- C. Adhesive: Water-based type recommended by wall covering manufacturer to suit application to substrate.
 - D. Substrate Filler: As recommended by adhesive and wall covering manufacturers; compatible with substrate.
 - E. Substrate Primer: As recommended by adhesive and wall covering manufacturers; compatible with substrate.
 - F. Substitutions: Under provisions of Section 01 60 00.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify that substrate surfaces are ready to receive work and conform to requirements of the wall covering manufacturer.
- B. Verify flatness tolerance of surfaces does not vary more than 1/8 in. in 10 ft nor vary at a rate greater than 1/16 in./ft.
- C. Beginning of installation means acceptance of surfaces and substrate.

3.02 PREPARATION

- A. Fill cracks and smooth irregularities with filler; sand smooth.
- B. Wash surfaces with trisodium phosphate, rinse, and neutralize; wipe dry.
- C. Sand glossy surfaces. Shellac marks that may bleed.
- D. Remove electrical, telephone, and communication systems wall plates and covers.
- E. Vacuum clean surfaces free of loose particles.
- F. Prime substrate in accordance with manufacturer's recommendations.

3.03 INSTALLATION

- A. Apply adhesive and wall covering in accordance with manufacturer's instructions.
- B. Use wall covering in roll number sequence.
- C. Razor trim edges on flat worktable. Do not razor cut on gypsum board surfaces.
- D. Apply wall covering smooth, without wrinkles, gaps or coverlaps.
- E. Horizontal seams are not acceptable.

- F. Do not seam within 2 in. of internal corners or within 6 in. of external corners.
- G. Install wall covering before installation of bases, hardware, or items attached to or spaced slightly from wall surface. Do not install wall covering more than 1/4 in. below top of base.
- H. Cover spaces above and below windows, above doors, in pattern sequence from roll.
- I. Where wall covering tucks into doorframe reveals, or metal wall board or plaster stops, apply covering with contact adhesive within 6 in. of wall covering termination. Ensure full contact bond.
- J. Remove excess wet adhesive from seam before proceeding to next wall covering sheet. Wipe clean with dry cloth.

3.04 **CLEANING**

- A. Clean wall coverings of excess adhesive, dust, dirt, and other contaminants.
- B. Replace wall plates and accessories removed prior to work of this Section.

END OF SECTION

**SECTION 09 84 10
ACOUSTICAL WALL MATERIAL**

PART 1 - GENERAL

1.01 REFERENCES

- A. ANSI/ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.

1.02 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing commercial acoustical wall panels with five (5) years documented experience.
- B. Applicator: Company specializing in installing acoustical wall panels with five (5) years documented experience.

1.03 REGULATORY REQUIREMENTS

- A. Class A rating when tested to ANSI/ASTM E84.

1.04 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01 33 00.
- B. Indicate on shop drawings, wall elevations with panel layout.
- C. Provide product data on wall panel and adhesive.
- D. Submit samples under provisions of Section 01 33 00.
- E. Submit one (1) sample of wall panel 12 x 12 in. in size illustrating color, finish, and texture.
- F. Submit manufacturer's installation instructions under provisions of Section 01 33 00.
- G. Submit test reports verifying flame/fuel/smoke ratings, when tested by an agency by authority having jurisdiction.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver product to site under provisions of Section 01 60 00.
- B. Store and protect products under provisions of Section 01 60 00.
- C. Inspect materials on site to verify acceptance.

1.06 ENVIRONMENT REQUIREMENTS

- A. Provide continuous ventilation and heating facilities to maintain substrate surface and ambient temperatures above 70 degrees F, unless required otherwise by manufacturer's instructions.
- B. Do not apply (adhesive) when substrate surface temperature is below 70 degrees F or relative humidity is above 40 percent.

- C. Maintain these conditions twenty-four (24) hours before, during, and after installation of adhesive wall covering.

1.07 ALTERNATES

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

1.08 COLORS

- A. Colors are specified on Colors and Materials Schedule on drawings.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Manufacturers of acoustical wall panel:
 - 1. MDC Interior Solutions, Zintra.
- B. Substitutions: Under provisions of Section 01 60 00.

2.02 MATERIALS

- A. Acoustical Wall Material: 1/2 inch (12MM) Acoustic Sheets.
 - 1. Acoustical sheet shall be tiles constructed of a single homogenous material composition of 60% pre-consumer recycled PET polyester felt. Thickness: 12 mm (nominal).
 - 2. Sizes: Pattern and sizes as shown on drawings. Standard maximum sheet size is 48.2 in. wide x 110.3 in. high (nominal). Thickness tolerance of +/- .02 inches. Width and length tolerance of +/- 1/8 inches. Custom sizes available; produced with factory cuts. Sheets are to be manufactured according to field dimensions supplied by the installing contractor.
 - 3. Edge profile shall be: Square.
 - 4. Sheet finish shall be: Color and finish shall be integral to the polyester felt material process, with natural variations in color. Lightfastness shall be AATCC 16.3 Option 3; sheet color change at 40AFU is 4.5. Premium wood print, printed single sided.
 - 5. Mounting shall be: Adhesive mount.
 - 6. Acoustical Performance: Sheets shall have a minimum NRC of .25 in accordance with ASTM C423.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify that substrate surfaces are ready to receive work and conform to requirements of the wall panel manufacturer.
- B. Verify flatness tolerance of surfaces does not vary more than 1/8 in. in 10 ft nor vary at a rate

greater than 1/16 in./ft.

- C. Beginning of installation means acceptance of surfaces and substrate.

3.02 PREPARATION

- A. Fill cracks and smooth irregularities with filler; sand smooth.
- B. Vacuum clean surfaces free of loose particles.
- C. Prepare substrate in accordance with manufacturer's recommendations.

3.03 INSTALLATION

- A. Apply acoustic wall material in accordance with manufacturer's instructions.

3.04 CLEANING

- A. Clean wall panels of excess adhesive, dust, dirt, and other contaminants.

END OF SECTION

**SECTION 09 91 00
PAINTING**

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Field-Applied paints, stains, sealers and other coatings.
- B. Shop-Applied paints, stains, sealers and other coatings.

1.02 REFERENCES

- A. Master Painters Institute (MPI) Architectural Painting Specification Manual.
- B. Master Painters Institute (MPI) Maintenance and Repainting Manual.
- C. AAMA – American Architectural Manufacturers Association.
- D. AAMA 2605 – Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Architectural Extrusions and Panels.
- E. ASTM B449 – Standard Specification for Chromates on Aluminum
- F. ASTM D1730 – Preparation of Aluminum and Aluminum-Alloy Surfaces for Painting
- G. ASTM D7803 – Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Powder Coating
- H. PCI – Powder Coating Institute.

1.03 SUBMITTALS

- A. Samples:
 - 1. Submit per Section 01 33 00 and the following:
 - a. Submit 8 in. x 10 in. color samples of color selections indicated on Colors and Materials Schedule on drawings. Submit samples in gloss selections scheduled.
 - b. Furnish additional required samples until colors, finishes, and textures are reviewed and Architect issues written authorization to proceed.
 - c. Retain approved samples for reference.
- B. Materials and Products Lists:
 - 1. Submit complete lists of products proposed for use in scheduled finish systems.
 - a. Arrange in same format as scheduled in this Section, and list MPI product numbers applicable to each system.
 - b. Include applicable manufacturer's recommendations.

- c. Include additional information requested by Architect.

1.04 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum three (3) years documented experience.
- B. Applicator: Company specializing in performing the work of this Section with minimum three (3) years documented experience.

1.05 REGULATORY REQUIREMENTS

- A. Conform to applicable code for flame and smoke rating requirements for finishes.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle products to site under provisions of Section 01 60 00.
- B. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- C. Container label to include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- D. Store paint materials at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.
- E. Apply manufacturer's standard protective coverings to shop-applied finished surfaces.
- F. Deliver, store and handle shop-applied finished components in manner to prevent damage to finishes. Furnish touch-up paint along with each material shipment.

1.07 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
- C. Minimum Application Temperatures for Latex Paints: 45 degrees F (7 degrees C) for interiors; 50 degrees F (10 degrees C) for exterior, unless required otherwise by manufacturer's instructions.

1.08 EXTRA MATERIALS

- A. Furnish under provisions of Section 01 77 00.
- B. Maintenance Materials: Leave 1/2 gallon of each type and color of paint and other coating products for maintenance purposes.
 - 1. Label for positive identification.
 - 2. Store where directed.

3. Turn over to Owner at jobsite and obtain signed receipt.

1.09 WARRANTY

- A. Furnish two (2) year warranty in accordance with referenced services "Manual" on full value of work included in this Section.
 1. Warrant work to be in accordance with Specifications, standards and requirements incorporated in referenced manual.
 2. Warranty not applicable to defective items through faulty work by other trades, or for failure of substrates.
 3. Warranty does not assume any liability for claim other than repairing painting and finishing defects, as determined by Manual.

1.10 WARRANTY – POWDER COATED HIGH-PERFORMANCE (PVDF) FINISH

- A. Manufacturer's Warranty: Furnish twenty (20) year warranty providing coverage that coatings:
 1. Will not chip, crack or peel (lose adhesion).
 2. Will not chalk in excess of ASTM D4214 number 8 rating, determined by procedure outlines in ASTM D4214.
 3. Will not change color more than five Delta-E Hunter units (square root of the sum of square Delta L, Delta a, and Delta b) as determined by ASTM D2244, Method 6.3. Fading or color changes may not be uniform if surfaces are not equally exposed to sun and elements. Mica and metallic coatings are exempt due to inability to accurately measure color, mica and metallic flakes reflect and scatter light in random patterns.
- B. Applicator's Warranty: Furnish ten (10) year warranty providing coverage against failure of PVDF based coating over improper pretreatment where coating was not applied in accordance with ASTM D1730, Type B, Method 5 or ASTM B449, Section 5 for aluminum surfaces and ASTM D7803 for galvanized steel surfaces.

1.11 COLORS

- A. Colors are specified on Colors and Materials Schedule on drawings.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Materials shall be in accordance with the MPI Architectural Painting Specification Manual "Approved Product" listing and shall be from a single manufacturer for each system used.
- B. Conform also to governing regulations such as Federal and State requirements for pollution, safety, and health. Finishes shall have flamespread ratings that do not exceed those permitted by the IBC.
- C. Materials not specifically indicated, but required, such as linseed, oil, shellac, thinners, shall be the highest quality product of an approved manufacturer listed in the MPI Architectural

Painting Specification Manual.

- D. Mixing: Furnish ready-mixed products.

2.02 MATERIALS – POWDER COATED HIGH-PERFORMANCE (PVDF) FINISH

- A. Materials shall be in accordance with the (PCI) Powder Coating Institute's published recommendations, specifications and performance standards.
- B. Materials shall be of the highest quality product of an approved manufacturer complying with PCI and AAMA 2605 specification and performance standards.
- C. Shop-Applied Finish: Powder Coated High-Performance (PVDF) Fluoropolymer Resin Finish. Fluoropolymer finish containing minimum 70 percent PVDF resins, four coat system, minimum 1.2 mils dry film thickness, complying with PCI and AAMA 2605 specification and performance standards. Finish material component surfaces after fabrication process.
1. Custom Color: Allow for custom color as indicated in Colors and Materials Schedule.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- C. Test shop applied protective coatings (primers) for compatibility with subsequent cover materials.
- D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
1. Plaster and Gypsum Wallboard: 12 percent.
2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
3. Interior Wood: 15 percent, measured in accordance with ASTM D2016.
4. Exterior Wood: 15 percent, measured in accordance with ASTM D2016.
5. Concrete Floors: 8 percent.

3.02 MATERIALS NOT TO BE FINISHED

- A. The following receive no finish except as indicated:
1. Metals as listed:
- a. Brass, bronze, copper, plated metals, and stainless steel.
2. Plastic laminate surfacing.
3. Glass, unless otherwise noted.

4. Electronic switchplates; lighting fixtures.
5. Finish hardware.

3.03 PREPARATION

- A. Prepare surfaces as follows and as specified in the MPI Architectural Painting Specifications Manual and the MPI Maintenance Repainting Manual. Consult manuals for surface preparations not indicated.
- B. Remove electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.
- C. Correct defects and clean surfaces that affect work of this Section. Remove existing coatings that exhibit loose surface defects.
- D. Seal with shellac and seal marks which may bleed through surface finishes.
- E. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- F. Aluminum Surfaces Scheduled for Paint Finish: Remove surface contamination by steam or high-pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.
- G. Surfaces Scheduled for Shop-Applied Powder Coated High-Performance (PVDF) Fluoropolymer Resin Finish: Prepare surfaces in accordance with PCI and AAMA 2605 specification and performance standards.
- H. Asphalt, Creosote, or Bituminous Surfaces Scheduled for Paint Finish: Remove foreign particles to permit adhesion of finishing materials. Apply compatible sealer or primer.
- I. Insulated Coverings: Remove dirt, grease, and oil from canvas and cotton.
- J. Concrete Floors: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.
- K. Gypsum Board Surfaces: Fill minor defects with filler compound. Spot prime defects after repair.
- L. Galvanized Surfaces: Prepare surfaces to receive specified coating systems by removing contaminants, oils and pre-treatments, including chromate passivation, using one of the following methods approved by the paint manufacturer:
 1. Apply a commercial clean and etch solution conforming to MPI #25 – Etching Cleaner in accordance with manufacturer’s instructions.
 2. Provide brush-off blast cleaning of the surface in accordance with SSPC-SP 7, using air pressures and abrasives that produce a suitable surface with minimal damage to underlying zinc coating.
 3. Contractor may test surfaces for chromate passivation and use alternate methods of preparation as recommended by the paint manufacturer for galvanized surfaces that are confirmed to be negative for pre-treatment or passivation.
 4. Coordinate with galvanized metal manufacturer for factory priming, where applicable,

and prepare and prime factory-primed surfaces as recommended by the paint manufacturer to receive the specified topcoats. Test coat factory-primed surfaces for paint compatibility and adhesion.

- M. Concrete Surfaces Scheduled to Receive Paint Finish: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
- N. Plaster Surfaces: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
- O. Uncoated Steel and Iron Surfaces: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Spot prime paint after repairs.
- P. Exposed Structural Steel and Miscellaneous Metal Surfaces (Except Galvanized Surfaces). Remove grease, mill scale, weld splatter, dirt, and rust. White metal blast clean (SSPC SP-5) surfaces of entire member to remove scale coating; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint after cleaning.
- Q. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Prime metal items including shop primed items.
- R. Interior Wood Items Scheduled to Receive Paint Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats.
- S. Interior Wood Items Scheduled to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats.
- T. Exterior Wood Scheduled to Receive Paint Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior calking compound after prime coat has been applied.
- U. Exterior Wood Scheduled to Receive Transparent Finish: Remove dust, grit, and foreign matter; seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes with tinted exterior calking compound after sealer has been applied.
- V. Wood and Metal Doors Scheduled for Painting: Seal top and bottom edges with primer.

3.04 APPLICATION

- A. Perform the work in accordance with MPI Architectural Painting Specifications Manual and manufacturer's directions. Where these may be in conflict, the more stringent requirements govern.
- B. All work shall be "Premium Grade" in accordance with referenced MPI manuals.
- C. Perform the work for Shop-Applied Powder Coated High-Performance (PVDF) Fluoropolymer Resin Finish in accordance with PCI and AAMA 2605 specification and performance

standards. Where these may be in conflict, the more stringent requirements govern.

- D. Apply products in accordance with manufacturer's instructions.
- E. Do not apply finishes to surfaces that are not dry.
- F. Apply each coat to uniform finish.
- G. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.
- H. Vacuum clean surfaces free of loose particles. Use tack cloth just prior to applying next coat.
- I. Allow applied coat to dry before next coat is applied.
- J. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- K. Prime concealed surfaces of woodwork with primer paint.
- L. Prime concealed surfaces of interior woodwork scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with mineral spirits.

3.05 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

- A. Paint exterior exposed conduit, pipes and other miscellaneous unfinished electrical and mechanical equipment, components, assemblies and devices; including exposed related brackets and supports.
 - 1. Electrical Panelboards.
 - 2. Gas Meter Assembly.
 - 3. Pipe and fittings.
 - 4. Electrical Transformer.
- B. Refer to Division 22, Division 23 and Division 26 for schedule of color coding and identification banding of equipment, duct work, piping, and conduit.
- C. Paint shop primed equipment. Paint shop prefinished items occurring at interior areas.
- D. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- E. Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, except where items are prefinished.
- F. Paint interior surfaces of air ducts that are visible through grilles and louvers with one coat of flat black paint, to visible surfaces. Paint dampers exposed behind louvers and grilles to match face panels.
- G. Paint exposed conduit and electrical equipment occurring in finished areas.
- H. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.
- I. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings

removed prior to finishing.

3.06 PATCHING

- A. As work is completed in room areas, repair surfaces damaged by other trades requiring touch-up or refinishing. Surfaces where touch-up of damaged areas remains distinguishable from surrounding undamaged areas under normal viewing conditions shall be refinished to nearest corners or intersections.

3.07 CLEANING

- A. As work proceeds, and on completion of work, promptly remove all spilled, splashed or splattered products so as not to damage surfaces.
1. During work progress, keep premises free from any unnecessary accumulation of tools, equipment, surplus materials, and debris.

3.08 PAINTING AND FINISHING TITLES AND CODE NUMBERS

- A. References are from referenced manual unless otherwise indicated. They indicate coating system, grades, and acceptable manufacturers and products.

3.09 GLOSS

- A. All finishes: Gloss as scheduled.

3.10 EXTERIOR PAINTING AND FINISHING SCHEDULE

(All Work Premium Grade)

- A. Paint exterior surfaces in accordance with the following MPI Painting Specification Manual requirements:
1. Asphalt Surfaces: (traffic markings)
EXT 2.1B: Alkyd Zone / Traffic Marking.
 2. Concrete Vertical Surfaces: (exposed concrete including soffits)
EXT 3.1A: Latex G1 flat finish (Art – Security Wall).
EXT 3.1G: Water Repellent Clear Sealer.
 3. Concrete Horizontal Surfaces: (plaza, sidewalks, curbs, paving and traffic markings)
EXT 3.2F: Alkyd Zone / Traffic Marking. (fire lane curbs and traffic markings)
EXT 3.2H: Clear Sealer. W.B. (plaza, sidewalks, curbs and paving)
 4. Concrete Masonry Units: (smooth and split face concrete block and concrete brick)
Water repellent clear sealer. Product as specified in Section 04 20 00.
 5. Precast Architectural Concrete (PAC): (exposed surfaces)

Water repellent clear sealer: Product as specified in Section 03 45 00.

- 6 Structural Steel Framing and Metal Fabrications (Field-Applied): (columns, beams, joists, metal stair systems, metal railing systems and metal fabrications)

EXT 5.1J: Polyurethane, pigmented (over high build epoxy) G6 gloss finish.

- 7 Galvanized (Protective Coating) Structural Steel Framing and Metal Fabrications (Field-Applied): (columns, beams, joists, metal stair systems, metal railing systems and metal fabrications)

EXT 5.3L: Polyurethane, pigmented (over high build epoxy) G6 gloss finish.

- 8 Structural Steel Framing and Metal Fabrications (Shop-Applied): (columns, beams, joists, metal stair systems, metal railing systems and metal fabrications)

Shop-Applied Finish: Powder Coated High-Performance (PVDF) Fluoropolymer Resin Finish.

9. Galvanized (Protective Coating) Metal: (hollow metal doors and frames, miscellaneous steel, pipes, metal decking, ducts, ladders, bollards, sheet metal flashing and trim)

EXT 5.3D: Polyurethane, pigmented (over high build epoxy) G6 gloss finish.

10. Galvanized Steel subject to salt environment:

Locations: Wash Bay 121 and Wash Bay Equipment 122 in Building 'B'; Salt and Sand Bins Structure 'E'; and Fuel Center Structure 'H'.

a. Basis of Design: Marine Grade Epoxy Paint system over galvanized steel. Devoe High Performance Coatings.

b. Field-Applied Finish:

c. Galvanized (Protective Coating)

i. Metal Components: Metal fabrications, brackets, support bases, pipes, etc.

ii. Structural Steel Framing: columns, beams, and joists

iii. Miscellaneous steel, pipes, metal decking, ducts, ladders, bollards, sheet metal flashing and trim

Devran 201H Epoxy Prime: High performance, chemically cured, rust inhibitive epoxy primer

Devthane 379H Finish: High performance, low VOC, two component chemically-cured aliphatic urethane gloss finish.

11. Dimension Lumber:

EXT 6.2L: Semi-transparent stain finish.

12. Plastic:

EXT 6.8A: Latex G1 finish.

3.12 INTERIOR PAINTING AND FINISHING SCHEDULE

(All Work Premium Grade)

A. Paint interior surfaces in accordance with the following MPI Painting Specification Manual requirements:

1. Concrete Vertical Surfaces: (including horizontal soffits)
INT 3.1A: Latex G3 eggshell finish.
2. Concrete Horizontal Surfaces: (floors and stairs)
INT 3.2E: Concrete stain finish.
Concrete floor sealer as specified in Section 03 30 00.
Architectural Polished Concrete Finishing as specified in Section 03 35 20.
Resinous Coating System as specified in Section 09 67 23.
3. Structural Steel and Metal Fabrications:
INT 5.1G: Polyurethane, pigmented (over high build epoxy) G6 gloss finish.
5. Galvanized Metal:
INT 5.3D: Epoxy G5 semi-gloss finish. (hollow metal doors and frames)
INT 5.3P: Alkyd Dry Fall, G5 semi-gloss finish. (exposed pipes, ducts, conduits)
6. Aluminum:
INT 5.4F: High Performance Architectural Latex, G3 eggshell finish.
9. Dressed Lumber: (including doors, door and window frames, casings, moldings, etc.)
Factory Finish: Transparent finish as specified in Section 08 14 16. (flush wood doors and frames).
Factory Finish: Transparent finish as specified in Section 06 20 23. (millwork)
10. Manufactured Wood Casework and Interior Finished Carpentry:
Shop Finish: Transparent finish as specified in Section 06 20 23. (interior finish carpentry, trim, base, millwork, etc).
Shop Finish: As specified in Section 12 32 00. (manufactured wood casework).
11. Wood Floors: (including hardwood flooring, etc.)
As specified in Section 09 64 00.

13. Plaster and Gypsum Board:

INT 9.2B: High Performance Architectural Latex, G3 eggshell finish.

PVA Primer (high humidity conditions): Use at locker rooms, mud rooms, showers and laundry rooms.

14. Canvas and Cotton Coverings: (mechanical insulation)

INT 10.1B: Alkyd eggshell finish.

3.15 **FIELD QUALITY CONTROL**

A. Conform to referenced manual's standards for work, unless otherwise indicated.

3.16 **REPLACEMENT OF HARDWARE AND MISCELLANEOUS ITEMS**

A. Reinstall items previously required to be removed.

3.17 **CLEANING**

A. At conclusion of project, thoroughly clean paint and splatters from glass, mirrors, and other surfaces. Take care not to scratch surfaces.

B. Clean residue of work of this section from any other surfaces.

C. At work's conclusion, leave premises neat and clean.

END OF SECTION

**SECTION 10 14 00
SIGNAGE**

PART 1 - GENERAL

1.01 REFERENCES

- A. ICC/ANSI A117.1 - Accessible and Usable Buildings and Facilities.

1.02 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Shop Drawings: Indicate sign styles, lettering font, foreground and background colors, locations, overall dimensions of each sign.
- C. Samples: Submit sample signs, illustrating type, style, letter font, and colors specified; method of attachment.
- D. Manufacturer's Installation Instructions: Include installation template and attachment devices.

1.03 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three (3) years documented experience.

1.04 REGULATORY REQUIREMENTS

- A. Install in conformance with Title III of the Americans and Disabilities Act, Public Law 101-336.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle products to site under provisions of Section 01 60 00.
- B. Package signs, labeled in name groups.

1.06 ALTERNATES

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

1.07 COLORS

- A. Colors are specified on Colors and Materials Schedule.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Plaque and Letter Signs
 - 1. Inpro Corporation, Muskego, WI; 800-222-5556

2. Gemini USA, Cannon Falls, MN 800-538-8377 (letters & logos), 877-877-2922 (plaques)
 3. Apco Northwest, Seattle, WA: 800-815-8028
 4. Graphic Systems, Inc., Fort Wayne, IN 260-485-9667
 5. Compliance Signs: 800-578-1245
- B. Traffic Signs
1. Zumar Industries, Tacoma, WA: 253-536-7740
 2. My Parking Sign, 800-952-1457
- C. Substitutions under provisions of Section 01 60 00.

2.02 EXTERIOR SIGNAGE

- A. Facility Monument Sign:
1. Per City of Federal Way Standards
 2. Double sided Monument Sign, Non-illuminated.
 3. Overall sign size. 72 inches (width) x 40 inches (height) x 9 ½ inches (thickness)
 4. Aluminum Cabinet Construction
 5. 3M Vinyl Letters
 6. Concrete foundation the architectural precast concrete veneer, similar in color and texture to Operations Building.
- B. Building Identification Sign; Building Address:
1. Size and Location: 8” tall Building Name and street Address sign at Building ‘A’, 18” tall Building Letter Identification signs at buildings ‘B’ thru “F”
 2. Cast aluminum dimensional text.
 3. Dimensional Text (Letters/Numbers):
 - a. Material: Cast aluminum text with threaded studs.
 - b. Finish: Cast aluminum, brushed satin.
 - c. Number Thickness: 1/2 in. minimum.
 - d. Number Size: 8” High.
 - e. Text Style: Helvetica Medium.
 - f. Type Code: All letters uppercase text.
 - g. Mounting: Flush mount; conceal fasteners.

- h. Location: as indicated.
- i. Manufacturer: Similar to Gemini, Inc. or ZAX Signage Systems, exterior cast aluminum signage (603) 889-4126.

C. Van Accessible Parking Signs

- 1. Accessible parking sign with "Van Accessible" and "State Disabled Parking Permit Required" messages.
- 2. Location: At van accessible parking stall.
- 3. Manufacturer: Zumar Industries, Inc. (800) 426-7967.
 - a. Model Number: Washington State Regulatory Sign #R7-801. Note: include "Van Accessible" notation.
- 4. Installation: Posts are 2-3/8 in. O.D. galvanized steel with exposed end capped. Attachment bolts and nuts to be peened to deter removal.

D. Accessible Parking Signs

- 1. Accessible parking sign with "State Disabled Parking Permit Required" message.
- 2. Location: At accessible parking stall.
- 3. Manufacturer: Zumar Industries, Inc. (800) 426-7967.
 - a. Model Number: Washington State Regulatory Sign #R7-801.
- 4. Installation: Posts are 2-3/8 in. O.D. galvanized steel with exposed end capped. Attachment bolts and nuts to be peened to deter removal.

2.03 INTERIOR SIGNAGE

A. Accessible Restroom Sign.

- 1. ADA, Men, Women, Unisex restroom signage with accessible symbol.
- 2. Plaque size: 6"x 9".
- 3. Plaque Material: Acrylic with matte finish.
- 4. Manufacturer: Compliance Signs, Designer ADA Series, 1-800-578-1245, (www.compliancesigns.com).
- 5. Colors: Select from Manufacturer's full range of standard colors.
- 6. Mounting: Adhesive mounting strips.

D. Area of Refuge Sign.

- 1. Braille Area of Refuge Sign with Accessibility Symbol.
- 2. Plaque size: 6"x9"

3. Plaque material: Acrylic with matte finish.
 4. Manufacturer: Compliance Signs, 1-800-578-1245, (www.compliancesigns.com).
 5. Colors: Select from Manufacturer's full range of standard colors.
 6. Mounting: Adhesive mounting strips.
 7. Sign Locations: Building A.
- E. Maximum Occupancy Sign.
1. Engraved Maximum Occupancy (Custom Wording) Sign.
 2. Plaque size: 12"x4".
 3. Plaque material: Plastic.
 4. Manufacturer: Compliance Signs, 1-800-578-1245, (www.compliancesigns.com).
 5. Colors: Black.
 6. Mounting: Adhesive mounting strips.
 7. Sign Locations: Lunch Room (Building A), Multi-purpose Room (Building A).

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install signs after all wall and ceiling surfaces are painted and finished.
- C. Install centered and level, in line and in accordance with manufacturer's instructions. Mount signs as indicated and in accordance with the provisions of ICC/ANSI A117.1.
- D. Install exterior pole-mounted sign in minimum 2 ft 0 in. deep by 12 in. diameter concrete base. Locate traffic signage per Pierce County requirements relative to roadway and sign height.
- E. Clean and polish in accordance with manufacturer's recommendations.

END OF SECTION

**SECTION 10 20 00
INTERIOR SPECIALTIES**

PART 1 - GENERAL

1.01 REFERENCES

- A. ASTM A 36 - Standard Specification for Carbon Structural Steel.
- B. ASTM A 500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- C. ASTM A 1011 - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.

1.02 SUBMITTALS

- A. Product Data and Samples: Submit per Section 01 33 00.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. In accordance with Section 01 60 00 and the following:
 - 1. Acceptance at Site:
 - a. Verify undamaged condition.
 - 2. Protection (prior to installation):
 - a. Store out of harm's way.
 - 3. Handle to prevent marring finishes.

1.04 SEQUENCING/SCHEDULING

- A. Phase in properly with Construction Schedule per Section 01 33 00.

1.05 COLORS

- A. Colors are specified on Colors and Materials Schedule on drawings.

1.06 ALTERNATES

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

PART 2 - PRODUCTS

2.01 OVERHEAD DOOR TRACK PROTECTION

- A. Location: Building B, Wash Bay room 121, Roller Service Doors.
- B. Manufacturers: Basis of Design, Omega Industrial Safety, Omega Z-Guard, Wall mounted track guard.

1. Substitutions: "Or Equal". Under provisions of Section 01 60 00
- B. Material: Constructed of hot rolled, cold formed 3/16 inch steel meeting the requirements of ASTM E 36 steel, modified to a minimum yield of 36 ksi .
 1. Z-Guard shall be a minimum of 5 inches Wide with a minimum projection from the wall of 6 inches by 48 inches tall. The vertical flange shall have two wall mounting holes to accommodate 1/2 inch anchors suitable for anchoring to the specific wall construction. Track Guard shall be a Z-Shaped configuration, with a flared inside edge and mitered inside corners to eliminate catch points.
 2. Finish: Heat cured, polyester based powder coating with sea spray and ultraviolet enhancements. The standard color is OSHA approved Traffic Safety Yellow.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify installation conditions as satisfactory to receive work of this Section. Do not install until any unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

- A. Install in accordance with specifications and manufacturer's directions. Where these may be in conflict, the more stringent requirements apply.

3.04 PROTECTION

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

END OF SECTION

**SECTION 10 21 13.16
PLASTIC-LAMINATE-CLAD TOILET COMPARTMENTS**

PART 1 - GENERAL

1.01 REFERENCES

- A. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- B. NEMA LD-3 - High Pressure Decorative Laminates.
- C. ANSI/ICC A117.1 – Accessible and Usable Buildings and Facilities.

1.02 SUBMITTALS

- A. Submit shop drawings, product data, and samples under provisions of Section 01 33 00.
- B. Submit shop drawings indicating partition layout and dimensions, panel and door sizes, door swings, elevations, anchorage and mounting details, and finishes.
- C. Submit product data for components, hardware, and accessories.
- D. Submit two (2) samples 3 x 6 in. in size illustrating each panel color selected.

1.03 REGULATORY REQUIREMENTS

- A. Conform to the Americans with Disabilities Act Accessibility Guidelines and ANSI/ICC A117.1 – Accessible and Usable Buildings and Facilities.

1.04 FIELD MEASUREMENTS

- A. Verify field measurements are as shown on drawings.

1.05 ALTERNATES

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

1.06 COLORS

- A. Colors are specified on Colors and Materials Schedule on drawings.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Subject to conformance with specification requirements, the following manufacturer's floor mounted, overhead braced systems are acceptable.
 - 1. ASI Group (Accurate Partitions Corp.)
 - 2. Bradley Corporation.
 - 3. General Partition Manufacturing Corp.

4. Knickerbocker Partition Corp.
5. Substitutions: Under provisions of Section 01 60 00.

2.02 MATERIALS

- A. Particleboard Core: 45 lb density, industrial grade.
- B. Plastic Laminate: NEMA LD-3 General Purpose Type 0.050 inch thick.
- C. Adhesive: Manufacturer's standard waterproof, permanent type.

2.03 ACCESSORIES

- A. Pilaster Shoe: Formed ASTM A167 Type 304 stainless steel with No. 4 finish, 3 inch high, with adjustable screw jack.
- B. Head Rails: Continuous clear anodized extruded aluminum tube, with anti-grip profile and cast socket wall brackets.
- C. Panel to Wall Attachment: Zamac or aluminum brackets.
- D. Exposed Fasteners: Non-ferrous with tamper proof heads.
- E. Hardware - Zamac:
 1. Pivot hinges, gravity type, adjustable for door close positioning.
 2. Nylon bearings.
 3. Concealed door latch. Door latches on accessible stalls shall meet accessibility requirements.
 4. Door strike and keeper with rubber bumper.
 5. Coat hook with rubber bumper.
 6. Door pull for out-swinging doors.

2.04 FABRICATION

- A. Fabricate partitions by applying single sheet plastic laminate finish to faces and edges of core material using adhesive and pressure bonding.
- B. Seal edges of cutouts. Bevel corners and edges.
- C. Doors and Panels:
 1. Thickness: 1 inch. 1
 2. Door Width: 24 inch.
 3. Door Width for Accessible Stalls: 36 inch out-swinging.

- 4. Height: 58 inch.
- D. Thickness of Pilasters: 1-1/4 inch.

2.05 FINISHING

- A. Plastic Laminate, Single Color: Color as indicated on drawings, matte finish.
- B. Stainless Steel Surfaces: No. 4 finish.
- C. Exposed Zamac Zinc Alloy Surfaces: Satin chrome plated.
- D. Aluminum: Anodized to clear color.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify site conditions under provisions of Section 01 31 00.
- B. Verify correct spacing of and between plumbing fixtures.
- C. Verify correct location of backing.

3.02 INSTALLATION

- A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.
- B. Maintain 3/8 to 1/2 inch space between wall and panels and between wall and end pilasters.
- C. Attach panel angles securely to walls using anchor devices into solid backing.
- D. Attach panels and pilasters to brackets with tamper proof through bolts and nuts. Locate head rail joints at pilaster centerlines.
- E. Anchor urinal screen panels to walls with two (2) panel brackets securely attached to solid backing.
- F. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster. Conceal floor fastenings with pilaster shoes.
- G. Equip each door with two (2) hinges, one (1) door latch, one (1) coat hook and bumper; out swinging door with pull.
- H. Install door strike and keeper with door bumper on each pilaster in alignment with door latch.
- I. Field touch-up of scratches or damaged finish will not be permitted.
- J. Replace damaged or scratched materials with new materials.

3.03 ERECTION TOLERANCES

- A. Maximum Variation From True Position: 1/4 inch.
- B. Maximum Variation From Plumb: 1/8 inch.

3.04 **ADJUSTING**

- A. Adjust work under provisions of Section 01 77 00.
- B. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch
- C. Adjust hinges to position doors in partial opening position when unlatched. Return out-swinging doors to closed position.
- D. Adjust adjacent components for consistency of line or plane.

END OF SECTION

**SECTION 10 21 23.10
CUBICLE CURTAINS AND TRACKS**

PART 1 - GENERAL

1.01 PERFORMANCE REQUIREMENTS

- A. Track: To support vertical test load of 50 lbs without visible deflection of track or damage to supports.
- B. Size track to support moving loads, sufficiently rigid to resist visible deflection.

1.02 SUBMITTALS

- A. Submit shop drawings under provisions of Section 01 33 00.
- B. Submit shop drawings indicating a reflected ceiling plan view of curtain track, hangers and suspension points, and attachment details.
- C. Submit product data under provisions of Section 01 33 00.
- D. Submit 12 in. sample length of curtain track including typical splice and wall and ceiling hanger and escutcheon.
- E. Submit manufacturer's installation instructions under provisions of Section 01 33 00.

1.03 MAINTENANCE DATA

- A. Submit maintenance data under provisions of Section 01 77 00.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site under provisions of Section 01 60 00.
- B. Store and protect products under provisions of Section 01 60 00.

1.05 COLORS

- A. Colors are specified on Colors and Materials Schedule on drawings.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers of Cubicle Curtain Tracks.
 - 1. InPro Corporation, Clickeze Privacy Systems.
 - 2. General Carrier Co.
 - 3. Imperial Fastener Co.

2.02 **MATERIALS**

- A. Steel Sheet: ASTM A424, Type I, commercial quality.

2.03 **ACCESSORIES**

- A. Cubicle Tracks: Surface mounted type track shall be extruded natural anodized aluminum, 1-3/8 in. x 3/4 in. minimum. Extrusion shape to provide for roller carriers to ride upon V-Shape channels formed by reinforced inside corners of extrusion creating a four (4) point carrier suspension and eliminating dust transmission in the track. There shall be a reinforcing spine with center aligning groove for easy drilling during installation. Where bends are required, track shall be bent from one continuous length. All bends to be of single 14 in. minimum radius, without distortion of track configuration, and allowing free travel of carriers at all points. Splices will not be allowed. Maximum track weight per foot: 0.38 lb. Minimum wall thickness: 0.58 in. Alloy to be equivalent to ASTM B221 alloy 6-63-T5.
- B. Curtain Carriers: General Carrier #1062N, corrosive proof axle and hook, with two (2) wheels of self-lubricating, noiseless molded high strength plastic. Confirm amount of carriers needed for vinyl cubicle shower curtain.
- C. End Caps: General wall socket end stop.
- D. Vinyl Cubicle Shower Curtain: Inpro Corp, Super Bio Stat vinyl. Heavy duty, 13 gauge, flame retardant, anti-microbial Super Bio Stat vinyl, anti-static, antimicrobial, flame retardant, stain resistant, odor resistant, water repellent, wear resistant, scrubbable, and colorfast. Curtain Width: manufacturer curtains of one piece, sized 10% wider than the track length but no less than 12" extra fullness. Width tolerance +/- 3". Curtain Height: 96" high. Curtain Heading: 4-ounce nickel plated grommets, 6" on center for carriers, top hem to be triple-turned hem over nylon tape for rugged wear. Seams: curtains are to be seamless with sanitary "no scum" side and bottom edges, sewing thread to be triple-ply twisted nylon. Color: White.

PART 3 – EXECUTION

3.01 **EXAMINATION**

- A. Verify that surfaces and above ceiling supports are ready to receive work.
- B. Verify field measurements are as shown on drawings.
- C. Beginning of installation means installer accepts existing surfaces and conditions.

3.02 **INSTALLATION**

- A. Include all fittings and hardware as necessary for installation.
- B. Install curtain track secure and rigid, true to ceiling line.
- C. Install wall socket end cap and stop device.
- D. Secure suspended track to ceiling system.
- E. Install carriers ensuring smooth operation. Provide one (1) curtain carrier for every 6 in. of track plus one (1) carrier per assembly.

END OF SECTION

**SECTION 10 22 13
WIRE MESH PARTITIONS**

PART 1 - GENERAL

1.01 SUBMITTALS

- A. Submit accordance with Section 01 33 00.
- B. Product Data:
- C. Shop Drawings:
 - 1. Submit drawings indicating fabrication and installation of wire mesh partitions.
 - 2. Approved shop drawings shall indicate field measurements prior to fabrication.
 - 3. Plans, elevations and large scaled details showing anchorage and accessory items.
- D. Selection Samples: For each finish product specified, provide two color charts representing manufacturer's full range of available colors.
- E. Verification Sample: Provide one (1) sample, minimum size 12 inches square, representing actual product and color selected.

1.02 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
 - 1. Five (5) years (min.) experience in the manufacturing of wire-mesh partition and gate systems.
 - 2. Member: Woven Wire Products Association.
- B. Installer Qualifications:
 - 1. Three (3) years (min) experience with wire-mesh-systems' installation

1.03 DELIVERY, STORAGE, AND HANDLING

- A. In accordance with Section 01 60 00 and the following:
 - 1. Acceptance at Site:
 - a. Verify undamaged condition.
 - 2. Protection (prior to installation):
 - a. Store out of harm's way.
 - 3. Handle to prevent marring finishes.

1.04 SEQUENCING/SCHEDULING

- A. Phase in properly with Construction Schedule per Section 01 33 00.

1.05 COLORS

- A. Colors are specified on Colors and Materials Schedule on drawings.

1.06 ALTERNATES

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. The G-S Company, Basis of Design: Sure-Guard™ Normal-Duty wire mesh partitions as complete units produced by The G-S Company, including necessary mounting accessories, fittings and fasteners.
- B. Wire Cage USA.
- C. WireCrafters
- D. SpaceGaurd Products
- E. Substitution: Under provisions of Section 01 60 00.

2.02 WOVEN WIRE MESH PARTITIONS

- A. Partitions shall be framed to fit with 2 inches nominal clearance around pipes, ducts and structure. Cap bar installation and access into floor sockets shall require top rail to be a minimum of 3 inches clear of overhead structure.
- B. Beveled panels shall be provided to accommodate sloping floors and ceilings.
- C. Panel module shall be a maximum of 5 feet wide by 12 feet high. Configurations shall be made of combinations of panel modules,
- D. Provide anchors and fasteners appropriate for substrate material.
- E. Material:
 - 1. Material: Steel.
 - 2. Wire Mesh: No. 10 gauge, 1-1/2 inch diamond woven wire mesh clinched to frames.
 - 3. Vertical frames: 1-1/4 inch by 5/8 inch by 13 gauge "C" channels with slotted holes for 1/4-inch bolts at 18 inches O.C. horizontal Frames: 1 inch by 1/2 inch by 11 gauge channels – mortise and tenon all corners.
 - 4. Horizontal Reinforcing Members: 2 (two) 1 inch by 1/2 inch by 11-gauge channels riveted toe-to-toe thru mesh and welded to vertical frames.
 - 5. Cap Rail: 2-1/4 inch by 1-inch channel with 1/4-inch "U" bolts 2 feet-0 inches O.C.
 - 6. Corner and Intersecting Posts: 1-1/4 inch by 1-1/4 inch by 1/8-inch angle for 90-degree corners, 1-1/2 inch pipe posts for other than 90 degree, 1-1/4 inch by 1-1/4 inch tubes for 3 and 4 way intersections.
 - 7. Vertical Flat Bar Stiffening Mullions: For partitions 12 feet high or higher:
 - a. 1/4 inch by 2-inch vertical flat bar mullion posts for partitions 12 feet high.
 - 8. Line Post: For freestanding partitions, provide 3 inch by 4.1# channel line posts at 20 lineal feet O.C. (max) with 5 inch by 18 inch by 1/4-inch base plates.
 - 9. Hinged Door Frames: 1-1/4 inch by 1/2 inch by 11 gage channel with 1/8 inch by 1-

1/4 inch flat bar band on three sides, 1-3/8 inch by 3/4 inch angle welded to lock side. Each door to have 1-1/2 pair butt hinges welded to both door and transom bar, and a mortise type cylinder lock. Entry by key, exit by recessed thumb turn.

10. Finish: Electro-statically sprayed enamel in color as selected by Architect from manufacturer's color charts.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify installation conditions as satisfactory to receive work of this Section. Do not install until any unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

- A. Install in accordance with specifications and manufacturer's directions. Where these may be in conflict, the more stringent requirements apply.
- B. Erect partitions plumb, rigid, properly aligned and securely fastened in place, complying with approved shop drawings.
- C. Erector to provide additional field bracing and clips as required for a rigid secure installation.
- D. Adjust moving components for smooth operation without binding.

3.04 PROTECTION

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

END OF SECTION

**SECTION 10 22 26
FOLDING PANEL PARTITIONS**

PART 1 - GENERAL

1.01 REFERENCES

- A. ASTM E557 Standard Practice for Architectural Application and Installation of Operable Partitions
- B. ASTM E84 - Surface Burning Characteristics of Building Materials.
- C. ASTM E90 - Airborne Sound Transmission Loss of Building Partitions.
- D. ASTM E413 - Classification for Determination of Sound Transmission Class.

1.02 SUBMITTALS

- A. Submit shop drawings, product data, and samples under provisions of Section 01 33 00.
- B. Shop Drawings: Indicate opening sizes, track layout, details of track and required supports, track loads, adjacent construction and finish trim, and stacking sizes.
- C. Product Data: Describe partition operation, hardware, and accessories, samples of colors and finishes available.
- D. Samples: Upon color selection by Design Consultant, provide two (2) samples of surface finish 12 x 12 in. in size, illustrating quality, color, texture, weight.

1.03 OPERATION AND MAINTENANCE DATA

- A. Submit under provisions of Section 01 77 00.
- B. Describe cleaning materials detrimental to fabric and hardware finish.
- C. Include recommended cleaning methods, cleaning materials, and stain removal methods.

1.04 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum five (5) years documented experience.

1.05 REGULATORY REQUIREMENTS

- A. Conform to applicable code for fire rated panel construction and combustibility requirements for materials.

1.06 FIELD MEASUREMENTS

- A. Verify that field measurements are as shown on shop drawings.
- B. Coordinate with work of other sections for overhead track support requirements, tolerances, and openings.

- C. Coordinate with Section 03 30 00.

1.07 **ALTERNATES**

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

1.08 **COLORS**

- A. Colors are specified on Colors and Materials Schedule on drawings.

PART 2 - PRODUCTS

2.01 **FOLDING PANEL PARTITION SYSTEM**

A. Manufacturers:

1. Basis of Design: Modernfold Inc. Acousti-Seal Premier – Electric Partition (933E) electrically operated continuously hinged operable partition.
2. Advanced Equipment Corporation.
3. Substitutions: “Or Equal”. Under provisions of Section 01 60 00.

B. Components:

1. Panel Construction: Shall be a nominal 3.00 inch thick in manufacturer’s standard width (48.00 inch maximum), continuously hinged. Panel construction shall have been fire tested in an independent laboratory in accordance with ASTM E84 test procedure and shall have attained a Class “A” Flame Spread Rating. Panel skins shall be of Class A Flame Spread rated tackable moisture resistant gypsum board on top of minimum 18 GA steel face, assembled to a minimum 16GA steel frame.
2. Panel Finish Carnegie, Xorel: Factory-applied, Class “A” rated material over tackable subsurface.
3. Panel Weight: Weight of panels shall be a minimum of 8 lbs. per sq. ft. depending on size and STC specified.
4. Seals: Seals shall be as follows:
 - a. Vertical seals between panels shall consist of aluminum tongue and groove astragals providing an interlock a nominal 0.50 inch for panel stability plus light/sound seals.
 - b. Horizontal Bottom Seals: Panels shall be equipped with automatic operable bottom seals providing 2-inch nominal operating clearance and shall automatically drop as panels are positioned without the need for special tools or cranks.
 - c. Horizontal Top Seals: Continuous contact continuous contact extruded vinyl bulb shape with pairs of non-contacting vinyl fingers to prevent distortion without the need for mechanically operated parts.
5. Suspension System:

- a. No. 30 Suspension, Structural Aluminum Track, shall be of clear anodized architectural grade extruded aluminum alloy 6063-T6. Track design shall provide precise alignment at the trolley running surfaces and provide integral support for adjoining ceiling, soffit, or plenum sound barrier. Guide rails and/or track sweep seals shall not be required. Track shall be connected to the structural support by pairs of minimum 3/8" diameter threaded steel hanger rods.
 - 1) Carriers: One trolley in alternating panels with 3-inch diameter glass reinforced nylon, all steel precision-ground ball-bearing wheels. Steel wheeled or reinforced polymer trolleys on aluminum track not permitted. Trolleys shall attach to panels with 1/2-inch diameter pendent bolt mounted to welded steel mounting plate.
 - b. Factory assembled power unit shall be UL listed and include motor, electronic torque limiter, two key control stations wired in series, emergency release, and all necessary equipment for electric operation. Roller chain drive shall attach to carrier of lead panel. Limit switches shall be provided to prevent over-travel. Motor shall be able to operate 50-60 hz and 208-230 volts, single phase with adequate horsepower to operate partition effectively.
 - c. Provide all mounting brackets and fasteners required to mount track to structural member(s) overhead. Exposed track soffit shall be extended max. 3/4 inch below ceiling and be finished in baked enamel to match ceiling grid.
6. Acoustical Performance: Acoustical performance of the operable wall panel construction shall have been tested in an independent acoustical laboratory on a fully operational 14 ft 0 inch x 9 ft 0 inch unit in accordance with ASTM E90 test procedure, and shall have attained an acoustical rating of no less than 50 STC.
 7. Pocket Doors: Type 3 pocket doors. Pocket door shall be nominally 3" thick. Panel faces shall be laminated to appropriate substrate to meet the STC requirement. STC rating shall be determined by the partitions selected for use with the pocket doors. Pocket doors shall be secured in the closed position by the face-activated expanding internal mechanism. The operating mechanism to be located approximately 42" from the floor in the door face. The top mechanism extends from the top rail of the pocket door and latches in the horizontal header. A jamb plate shall be attached to the floor to capture the bottom mechanism. Hinges shall be of steel and project no more than 1/4" beyond panel faces. Each pocket door "leaf" to have a minimum of four hinges. Jambs shall be of 6063-T6 aluminum and be adjustable + or - 3/8". Weight of the pocket doors shall be based on sound rating of the partition selected. Pocket doors shall be manually opened and closed. Pocket doors shall be secured in the closed position by the face-activated expanding internal mechanism. Pocket doors used with electrically operated partitions are to be equipped with limit switches which prevent the partition from operating until the pocket doors are completely open.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Confirm track supports are laterally braced and will permit track to be level within manufacturer's recommended position tolerances and parallel to the floor surface.

- C. Confirm floor flatness tolerance required by manufacturer has been achieved.
- D. Beginning of installation means installer accepts existing conditions.

3.02 INSTALLATION

- A. Install partition in accordance with manufacturer's instructions to achieve STC rating specified.
- B. Install track system capable of supporting imposed loads with maximum deflection not to exceed manufacturer's requirements.
- C. Fit and align partition assembly level and plumb.
- D. Install foot bolts on panels and recessed floor trim to receive bolt.

3.03 ADJUSTING

- A. Adjust work under provisions of Section 01 60 00.
- B. Adjust partition assembly to provide smooth operation from stacked to drawn position.
- C. Visually inspect partition in drawn position for light leaks to identify a potential acoustic leak. Adjust to achieve light seal.

3.04 CLEANING

- A. Clean work under provisions of Section 01 77 00.
- B. Clean finish surfaces and partition accessories.

END OF SECTION

**SECTION 10 26 13
CORNER GUARDS**

PART 1 - GENERAL

1.01 SUBMITTALS

- A. Product Data and Samples: Submit per Section 01 33 00.

1.02 DELIVERY, STORAGE, AND HANDLING

- A. In accordance with Section 01 60 00 and the following:
 - 1. Acceptance at Site:
 - a. Verify undamaged condition.
 - 2. Protection (prior to installation):
 - a. Store out of harm's way.
 - 3. Handle to prevent marring finishes.

1.03 SEQUENCING/SCHEDULING

- A. Phase in properly with Construction Schedule per Section 01 33 00.

1.04 COLORS

- A. Colors are specified on Colors and Materials Schedule on drawings.

PART 2 - PRODUCTS

2.01 CORNER GUARDS

- A. Manufacturers:
 - 1. InPro Corporation.
 - 2. Substitutions: Under provisions of Section 01 60 00.
- B. Products:
 - 3. Low Profile, Tape-On, Coner Guard, Rigid Vinyl material.
 - 4. Size: 2" x 2" x full height. 90-degree corner.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify installation conditions as satisfactory to receive work of this Section. Do not install until any unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.02 **PREPARATION**

- A. Protect surrounding surfaces to preclude damage from work of this Section.

3.03 **INSTALLATION**

- A. Install in accordance with specifications and manufacturer's directions. Where these may be in conflict, the more stringent requirements apply.

END OF SECTION

**SECTION 10 28 13
TOILET ACCESSORIES**

PART 1 - GENERAL

1.01 REFERENCES

- A. ICC/ANSI A117.1 - Accessible and Usable Buildings and Facilities.
- B. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- C. ASTM A269 - Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
- D. ASTM A366 - Steel, Carbon, Cold-Rolled Sheet, Commercial Quality.
- E. ASTM B456 - Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
- F. NEMA LD-3 - High Pressure Decorative Laminates.

1.02 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Product Data: Provide data on accessories describing size, finish, details of function, attachment methods.
- C. Samples: Submit samples of each component, illustrating color and finish.
- D. Manufacturer's Installation Instructions: Indicate special procedures, and perimeter conditions requiring special attention.

1.03 REGULATORY REQUIREMENTS

- A. Install in conformance with ICC/ANSI A117-1.

1.04 COORDINATION

- A. Coordinate the work with the placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments.

1.05 SEQUENCING AND SCHEDULING

- A. Coordinate the work of this Section with Section 06 10 00 for the placement of blocking to receive anchor attachments. Contractor to provide blocking for all accessories and toilet compartments, including Owner furnished accessories.

1.06 KEYING

- A. Master key all accessories.

1.07 COLORS

- A. Colors are specified on Colors and Materials Schedule on drawings.

1.08 **ALTERNATES**

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

PART 2 - PRODUCTS

2.01 **MANUFACTURERS**

- A. Subject to conformance with specification requirements, the following manufacturers are acceptable:
 - 1. Bobrick Washroom Equipment, Inc.
 - 2. American Specialties.
 - 3. Bradley.
 - 4. Georgia Pacific.
 - 5. GoJo.
- B. Substitutions: Under provisions of Section 01 60 00.

2.02 **MATERIALS**

- A. Stainless Steel Sheet: ASTM A167, Type 304.
- B. Tubing: ASTM A269, stainless steel.
- C. Plastic Laminate: NEMA LD-3, Fire Rated Type; 0.125 in. thick, matte finish, color as selected.
- D. Adhesive: Contact type, waterproof.
- E. Concealed Fasteners, Screws, and Bolts: Hot-dip galvanized of type and size as required.
- F. Exposed Fasteners, Screws, and Bolts: Tamper-proof, stainless steel of type and size as required.
- G. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

2.03 **FABRICATION**

- A. Weld and grind joints of fabricated components, smooth.
- B. Form exposed surfaces from single sheet of stock, free of joints. Form surfaces flat without distortion. Maintain surfaces without scratches or dents.
- C. Fabricate grab bars of tubing, free of visible joints, return to wall with end attachment flanges.
- D. Shop assemble components and package complete with anchors and fittings.
- E. Provide steel anchor plates, adapters, and anchor components for installation.

2.04 FINISHES

- A. Galvanizing Ferrous Metals: ASTM A123 to 2.0 oz/sq yd. Galvanize ferrous metal and fastening devices.
- B. Shop Primed Ferrous Metals: Pretreat and clean, spray apply one (1) coat primer and bake.
- C. Enamel: Pretreat to clean condition, apply one (1) coat primer and minimum two (2) coats epoxy baked enamel.
- D. Chrome/Nickel Plating: ASTM B456; Satin finish.
- E. Stainless Steel: No. 4 Satin finish.
- F. Back paint components where contact is made with building finishes to prevent electrolysis.

2.05 TOILET ACCESSORIES

Refer to Colors and Materials Schedule for toilet accessories specifications, not listed below.

- A. Grab Bars: B-6806 Series, concealed mounting flange, 1-1/2 inch diameter tubing, 18-gauge, straight bars. Install (3) grab bars at each ADA water closet stall; refer to drawings for minimum grab bar lengths and mounting requirements.
- B. Shower Curtain Rod, B-207, 36" width and 79" width.
- C. Shower curtain hooks, 204-1.
- D. Vinyl Shower Curtain: Bobrick 204-2, 42" wide and 84" wide x 72" high.
- E. Utility Shelf Mop / Broom Holder: B-239; utility shelf with mop / broom holders and rag hooks. Install (1) utility shelf mop / broom holder at each janitor room.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that site conditions are ready to receive work and dimensions are as indicated on shop drawings.
- B. Verify exact location of accessories for installation.

3.02 PREPARATION

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.

3.03 INSTALLATION

- A. Install accessories in accordance with manufacturers' instructions and ANSI A117.1.
- B. Install plumb and level, securely and rigidly anchored to substrate.

3.04 ADJUSTING AND CLEANING

- A. Adjust all moving parts to operate perfectly.
- B. Clean all exposed surfaces.
- C. Leave installations free of imperfections, premises free of any residue of work of this section.

END OF SECTION

**SECTION 10 44 00
FIRE PROTECTION SPECIALTIES**

PART 1 - GENERAL

1.01 REFERENCES

- A. NFPA 10 - Portable Fire Extinguishers.

1.02 SUBMITTALS

- A. Section 01 33 00 - Submittals: Procedures for submittals.
- B. Product Data: Provide extinguisher operational features, color and finish, anchorage details, rough-in measurements, location and details.

1.03 ENVIRONMENTAL REQUIREMENTS

- A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

1.04 ALTERNATES

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

1.05 COLORS

- A. Colors are specified on Colors and Materials Schedule on drawings.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturers:
 - 1. J. L. Industries.
 - 2. Larsens' Manufacturing Co.
 - 3. Potter – Roemer.
 - 4. Substitutions: Under provisions of Section 01 60 00.
 - 5. Specification is based on products manufactured by Larsen's.

2.02 EXTINGUISHERS

- A. Multipurpose dry chemical type, Larsen's MP5, 2A-10BC U.L. rating. Provide maintenance/inspection recordkeeping tag on each extinguisher meeting requirements of NFPA 10 and local authority having jurisdiction. Extinguishers shall be properly charged with charging/inspection date noted on tag.

2.03 **CABINETS**

- A. Larsen's Model No. 2409-5R Semi-Recessed in Building A and 2409-SM Surface-Mounted Building B and at site structures. Duo narrow glass door style with "Larson-Loc" lock and handle, clear anodized aluminum construction, with tempered glass. Provide mounting bracket for fire extinguisher inside cabinet so that extinguisher is clearly visible with door closed.
- B. Provide Fire-Rated Cabinets at rated wall assemblies.
- C. Mounting Hardware: Appropriate to cabinet and wall construction.

PART 3 - EXECUTION

3.01 **EXAMINATION**

- A. Section 01 31 00 – Project Management and Coordination: Verification of existing conditions before starting work.
- B. Verify rough openings for cabinet are correctly sized and located.

3.02 **INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Provide
- B. Install cabinets plumb and level in wall openings.
- C. Secure cabinets rigidly in place in accordance with manufacturer's instructions.
- D. Place extinguishers and accessories in cabinets.

END OF SECTION

**SECTION 10 51 00
LOCKERS**

PART 1 – GENERAL

1.01 SUBMITTALS

- A. Product Data and Samples: Submit per Section 01 33 00.

1.02 DELIVERY, STORAGE, AND HANDLING

- A. In accordance with Section 01 60 00 and the following:
1. Acceptance at Site:
 - a. Verify undamaged condition.
 2. Protection (prior to installation):
 - a. Store out of harm's way.
 3. Handle to prevent marring finishes.

1.03 COLORS

- A. Colors are specified on Colors and Materials Schedule on drawings.

PART 2 – PRODUCTS

2.01 GRAVITY LATCH VENTILATED ALL-WELDED LOCKERS

- A. Furnish and install Gravity Latch Ventilated Lockers: Hallowell. www.hallowell-list.com. (1-971-336-1928.) Single tier and double tier as indicated on drawings; unit size 24" x 22" x 72", unibody all-welded construction. 16-gauge, 1-1/2" high continuous bottom with reinforcing channels welded to the underside at each side panel providing a ridged unit base. 18-gauge continuous sloping top. 16-gauge diamond perforated sides are integral with front vertical frame. Solid end panels are 16-gauge. 18-gauge solid back. Standard doors are 14-gauge diamond perforated. Deep-drawn seamless stainless steel recessed handle. Continuous vertical door strike at both hinge and latch side. 12-gauge latch hooks MIG welded to frame, gravity lift-type multi-point spring loaded latching. 16-gauge continuous piano hinges. Integral frame locker base, 4" high, 16-gauge formed sheet steel with double return flanges at the front and rear; a full depth horizontal channel shall be MIG welded under the locker bottom front-to-back at the left and right side of each welded locker unit as well as beneath each vertical side panel for maximum rigidity. Shelves are 16-gauge. Provide hooks. Provide number tags. Provide filler panels, corner fillers, sloped tops, finished ends, and all components and accessories for complete installation. Provide in quantity shown on drawings.
- B. Substitutions: Under provisions of Section 01 60 00.

2.02 BENCH

- A. Furnish and install Benches: Hallowell. www.hallowell-list.com. (1-971-336-1928.) Heavy-Duty Steel Pedestal. Fabricated from 1-1/2" diameter 14-gauge steel tube welded to top and bottom 11-gauge formed flanges, each flange to have three anchoring holes. Benchtops size: 48" long x 20" wide x 1-1/4" thick. Backless. Laminated hardwood finished with one coat

deep penetrating sealer and two coats of heavy body high impact hot hydraulically applied lacquer. Provide all components and accessories for complete installation. Provide in quantity shown on drawings.

- B. Substitutions: Under provisions of Section 01 60 00.

PART 3 – EXECUTION

3.01 INSPECTION

- A. Verify installation conditions as satisfactory to receive work of this Section. Do not install until any unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.02 PREPARATION

- A. Protect surrounding surfaces to preclude damage from work of this Section.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's installation instructions. Secure lockers to walls and locker platforms to prevent overturning. Anchor benches to concrete slab.

END OF SECTION

**SECTION 10 70 00
EXTERIOR SPECIALTIES**

PART 1 – GENERAL

1.01 REFERENCES

- A. ASTM A 36 - Standard Specification for Carbon Structural Steel.
- B. ASTM A 500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- C. ASTM A 1011 - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
- D. ASTM B 241 - Standard Specification for Aluminum and Aluminum-Alloy
- E. ASTM B 597 - Standard Practice for Heat Treatment of Aluminum Alloys
- F. ASTM D 624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers; 2000.
- G. ASTM D 2632 - Standard Test Method for Rubber Property--Resilience by Vertical Rebound; 2001.
- H. OSHA 29 CFR 1910.23 - Guarding Floor and Wall Openings and Holes.
- I. National Association of Architectural Metal Manufacturers (NAAMM): NAAMM FP 1001 - Guide Specifications for Design of Metal Flagpoles

1.02 SUBMITTALS

- A. Product Data and Samples: Submit per Section 01 33 00.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. In accordance with Section 01 60 00 and the following:
 - 1. Acceptance at Site:
 - a. Verify undamaged condition.
 - 2. Protection (prior to installation):
 - a. Store out of harm's way.
 - 3. Handle to prevent marring finishes.

1.04 SEQUENCING/SCHEDULING

- A. Phase in properly with Construction Schedule per Section 01 33 00.

1.05 COLORS

- A. Colors are specified on Colors and Materials Schedule on drawings.

1.06 **ALTERNATES**

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

PART 2 - PRODUCTS

2.01 **ALUMINUM FLAGPOLE**

- A. Location: Located West side of Operations Building, Building A
- B. Manufacturers:
1. Flags A Flying.
 2. The Liberty Flagpole Company.
 3. United States Flag Store.
 4. American Flagpole & Flag Company
 5. Substitutions: "Or Equal". Under provisions of Section 01 60 00.
- C. Flagpole: Furnish and install one-piece, commercial grade aluminum, cone tapered, ground set flagpole, 30 feet high, with interior halyard system (inside stainless steel cable and winch system), pole minimum 0.188 inch wall thickness, top pole diameter of 3-1/2 inch. Satin Anodized finish.
- D. Accessories: Provide all components and accessories for complete installation. Furnish and install the following: gold anodized aluminum ball, internal revolving truck, counterweight, beaded retainer sling, snap hooks, halyard, aluminum flash collar, hot-dip galvanized steel foundation sleeve and steel base plate and steel support plate with welded grounding spike. Provide (1) 5 x 8 nylon American flag and (1) 5 x 8 Washington State flag. Flags made in the USA.
- E. Installation: In accordance with manufacturer's installation instruction and details.

2.02 **INDUSTRIAL HANDRAILS / GUARDRAILS**

- A. Location: Located at Waste Transfer Dock, Building G.
- B. Manufacturer: Basis of Design: Omega Industrial Safety, Omega Guardrail / Handrails.
- C. Acceptable Manufacturers:
1. Omega Industrial Safety
 2. Edge Fall Protection
- D. Substitutions: "Or Equal". Under provisions of Section 01 60 00. Material:
- E. Materials.
1. Handrails shall be a two-rail design with a 42 inches top rail height, 21 inches (533 mm) mid-rail height with posts on maximum 8 ft centers, with anchors and fittings. Handrail shall be assembled at the job-site to be assembled as a mechanically fastened system.
 2. Completed system of handrail, posts and framing of members shall be capable of withstanding a load of at least 200 lbs applied in any direction at any point on the top rail.

3. System shall comply with OSHA-compliant barrier, and BOCA building code.
 4. Handrail shall fasten directly to the concrete slab to achieve maximum strength and rigidity. Steel handrail shall meet or exceed ASTM A 500, Grade B round or square tubing.
 5. Pipe railings, posts and top and intermediate railings shall be at least 1-1/2 inches nominal diameter.
 - a. Size: 1-1/2 inch nominal.
 - b. Size: 2 inches
- F. Provide a minimum of 4-inch-high kick plate where required by OSHA 29 CFR 1910.23 Guarding floor and wall openings and holes.
- G. Finish: Heat cured, polyester based powder coating with sea spray and ultraviolet enhancements. Standard color is OSHA. approved Traffic Safety Yellow

2.03 DOCK BUMPERS

- A. Location: Located at Waste Transfer Dock, Building G. Two (2) at end wall per Trash dumpster bay.
- B. Manufacturer: Basis of Design: Durable Corporation, Dura-Soft Bumper
- C. Acceptable Manufacturers:
3. Durable Corporation
 4. Vestil Manufacturing
 5. Loading Dock Supply LLC
 6. Beacon Industries
- D. Substitutions: "Or Equal". Under provisions of Section 01 60 00. Material:
- E. Materials.
1. Bumper: Durable Corporation, Dura-Soft Bumper, Rubber pads with loop pads punched to receive 3/4-inch steel supporting rods; 3/8-inch-thick steel face equal to rubber surface dimensions.
 - a. Projection from Wall: 5-1/2 inches.
 - b. Vertical Height: 12 inches; 4-inch bolt hole centers.
 2. Attachment Hardware: Provide anchor bolts in sizes as required by project in order to mount to face of concrete dock face.

2.03 HDPE PIPE BOLLARD COVERS

- A. Location: All pipe Bollards on site.
- B. Manufacturer: Omega Industrial Safety.
- C. Acceptable Manufacturers:
1. Omega Industrial Safety
 2. Post guard
 3. Global Industrial
- D. Substitutions: "Or Equal". Under provisions of Section 01 60 00. Material:

- E. Materials.
 - 1. 52-Inch tall bollard guard covers manufactured with High-Density Polyethylene (HDPE)

2.04 BENCHES

- A. Location: Building 'A', Entry Plaza, Specific locations to be determined on site prior to installation. Provide two (2) benches.
- B. Manufacturer: Landscapeforms., basis of design: Bancal Bench, Banked Style 88" without arms. (96 inch x 23 inch x 31 inch seat height)
- C. Substitutions: "Or Equal". Under provisions of Section 01 60 00. Material:
- D. Materials.
 - 1. ¼- inch steel supports, powder coated.
 - 2. Ipe back and seat planks.
 - 3. Attachment Hardware: Provide anchor bolts to mount to face of concrete paving per manufacturers requirements.

2.05 BIKE RACKS

- A. Location: Building 'A', Entry Plaza, Specific locations to be determined on site prior to installation. Provide Four (4) loop style racks.
- B. Manufacturer: Landscapeforms., basis of design: 35 Collection, Loop Style racks
- C. Substitutions: "Or Equal". Under provisions of Section 01 60 00. Material:
- D. Materials.
 - 1. Cast Aluminum, powder coated.
 - 2. Attachment Hardware: Provide anchor bolts to mount to face of concrete paving per manufacturers requirements.

2.06 BOOT WASH STATION

- A. Location: Building 'A', Exterior, Outside Mud Room door 118B.
- B. Manufacturer: Basis of Design: ConQuip Group USA, 13238 Florence Ave. Santa Fe Springs, CA, (562) 758-3861. sales@conquipgroup.com
 - 1. Triple Bay Boot Wash Station, Product code: SS600AC-00003
- C. Substitutions: "Or Equal". Under provisions of Section 01 60 00. Material:

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify installation conditions as satisfactory to receive work of this Section. Do not install until any unsatisfactory conditions are corrected. Beginning work constitutes acceptance of

conditions as satisfactory.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

- A. Install in accordance with specifications and manufacturer's directions. Where these may be in conflict, the more stringent requirements apply.

3.04 PROTECTION

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

END OF SECTION

**SECTION 10 71 10
EXTERIOR SUN CONTROL DEVICES**

PART 1 – GENERAL

1.01 DESCRIPTION

- A. Provide fixed Custom Sunshades as shown on the drawings and as specified for a complete installation.

1.02 REFERENCE

- A. National Association of Architectural Metal Manufacturers (NAAMM)
- B. American Architectural Manufacturers Association (AAMA)

1.03 QUALITY ASSURANCE

- A. Obtain Aluminum-framed entrances, storefront system, curtain wall system and exterior sun control devices with specified finish through one source from a single manufacturer.

1.04 COLORS

- A. Colors are specified on Colors and Materials Schedule on drawings.

1.05 ALTERNATES

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Arcadia, Inc.,
2301 E Vernon, Vernon, CA.
Telephone: 323/269-7300.
Fax: 323/269-7390.
- B. Basis of Design Product:
 - 1. Arcadia Brise Soleil Standard Series.
- C. Substitutions: "Or Equal". Under provisions of Section 01 60 00.

2.02 MATERIALS

- A. Aluminum Extrusion Blades: ASTM B211, Alloy 6063-T6.

- B. Aluminum Plate: ASTM B211, Alloy 6061-T6.
- C. Fasteners: Fasteners shall be stainless steel. Provide types, gauges and lengths to suit unit installation conditions.
- D. Anchors and Inserts: Use non-Ferrous metal anchors and inserts for installation and elsewhere as required for corrosion resistance. Use stainless steel expansion bolt devices for drill-in place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

2.03 FABRICATION

- A. Provide fixed Sunshades and accessories of design, material, sizes, depth, arrangement, and thickness as indicated or as required for optimal performance with respect to strength; durability; and uniform appearance.
 - a. Sunshade (Type S-1): Horizontal mounted sunshades at curtain wall system for Building "A". Provide design, profile and size as indicated on drawings.
- B. Include supports, anchorage, and accessories required for complete assembly, including all attachment clips and necessary hardware for attachment to structure.
- C. Manufacturer shall allow +/- 1/8 inch thermal expansion at each shade to compensate for dissimilar movement between building structure and aluminum sunshade structure. This design shall be incorporated as to not induce self-destructing loads onto either shade or other materials.
- D. No blade fasteners shall be visible after installation of sections. Provide cover plates at each outrigger end to conceal fasteners. Only mounting hardware shall be visible after installation.

2.04 SUNSHADE CONSTRUCTION

- A. Components:
 - 1. All fascia and blades shall be 6063-T6 aluminum-extruded members.
 - a. Blade infill shall be custom designed with integral screw boss that is hidden from view visible after installation. Size and spacing is to be as shown on the architectural details. Blade infill shall be airfoils, rectangle or tubular sections.
 - b. Blades to be miter cut and fitted to outrigger plates at mitered corner conditions.
 - 2. Outrigger components shall be 6061-T6 aluminum plates.
 - a. Outriggers shall be tapered or shaped aluminum flat plates, screwed to aluminum extrusion blades via countersunk fastener holes. Connections of aluminum extrusions to outriggers should be flush with no protruding fasteners visible after installation. Outriggers are pre-drilled for mounting to the structural sunshade clip tab via stainless steel expansion slip connection to compensate for thermal expansion.
 - 3. Clip brackets shall be of stainless steel.
 - a. Connection of sunshade to building shall be friction type with the ability to properly level the shade during installation.
 - 4. Outrigger cover plates shall be furnished of 6061-T6 aluminum plates at each end of sunshade run to cover extrusion fasteners.

- B. Assembly: Components to be shop assembled in large practical sections to allow for immediate installation. Sections indicated on shop drawings to be assembled and shipped as units with cover plates and support arms, if required, shipped loose.
 - 1. Fasteners shall be bagged in groups clearly identifying bolt locations and bag contents for easy installation. Manufacturer to provide anti-seize compound for any field bolted stainless hardware to facilitate proper erection.

2.05 ALUMINUM FINISH FOR EXTERIOR SUB CONTROL DEVICES

- A. Finish all exposed areas of aluminum and components as indicated.
 - 1. Factory Finish: Provide Anodized Finish on all surfaces conforming with; AAMA 611, Architectural Class I, minimum of 0.0007-inch thickness. Coating shall be applied under controlled conditions at factory in manner recommended by manufacturer. Color as indicated in Colors and Materials Schedule.

PART 3 – EXECUTION

3.01 MATERIAL INSPECTION

- A. Examine crates and reconcile to a shipping manifest or packing slip. Verify all required components are present.

3.02 FIELD DIMENSIONS AND SITE INSPECTION

- A. Prior to Clip Installation:
 - 1. Verify conditions: Examine areas where work is to be performed and identify any conditions that could be detrimental to proper or timely completion.
- B. Prior to Shade Installation:
 - 1. Contractor shall field confirm openings widths and elevations as shown on shop drawings prior to fabrication of shade sections. Field dimensions of clip locations shall be verified prior to fabrication of sections.
- C. Installation of sections should not proceed until all conditions are satisfactory.

3.03 INSTALLATION AND ERECTION

- A. Comply with manufacturer's instructions and recommendations for installation of the work.
- B. Verify dimensions of supporting structure at the site by accurate field measurements so that the work will be accurately designed, fabricated, and fitted to the structure.
- C. Anchor Sunshade to substructure as indicated on the sunshade shop drawings and verified by the engineer of record.
- D. Erection Tolerances:
 - 1. Clips or Mounting Brackets:

- a. Elevation clip Variation from level: 1/8" maximum in any column to column space or 20'-0" runs, non-cumulative.
 - b. Offsets in projection of clips front leading edge 1/16"+/-.
 - c. Construction tolerance around clip projection. 1/4"+ outward.
 - d. Clip Plumbness: 1/16" in 6".
 - e. Clip projection level: 1/16" in 12".
2. Shade Sections:
- a. Projection Level: 1/8" in 4'-0".
 - b. Horizontal Level: 1/8" max in any column to column space or in 20'-0" runs, non-cumulative.
 - c. Shade section to section variation 1/32" at adjoining sections.
- E. Do not erect warped, bowed, deformed or otherwise damaged or defaced members. Remove and replace any members damaged in the erection process as directed.
- F. Set units level, plumb and true to line, with uniform joints.
- G. Erect sunshade sections after all adjacent painting, masonry (including chemical treatments), roofing, electrical, glazing, and other similar work is completed above and below the shade sections.

END OF SECTION

SECTION 11 06 00
EQUIPMENT SCHEDULE

PART 1 - GENERAL

- 1.1 The following Equipment Schedule provides information on equipment shown on the Equipment 'IP' drawings.
- 1.2 Equipment is listed numerically by mark number with the following information
- A. Equipment Tag # - The Equipment Tag Number coordinates this schedule with 'IP' drawings and the specifications.
 - B. Item Description.
 - C. Spec Section - Identifies division or section where technical specifications for the equipment item can be found. NIC means "Not in Contract". N/A designates existing equipment
 - D. Procurement Method
 - 1. FCIC = Furnished by Contractor /Contractor Installed.
 - 2. OFOI = Owner Furnished/Owner Installed.
 - 3. OFCI = Owner Furnished/Contractor Installed.
 - E. Spec Section - Identifies division or section where technical specifications for the equipment item can be found. NIC means "Not in Contract"
 - 1. PD = Product Data
 - 2. SD = Shop Drawings
 - 3. OM = Operation and Maintenance Manuals
 - 4. T = Training of Owner's personnel on specific equipment items.

PART 2 - EQUIPMENT LIST

Equipment Tag	Item Description	Size LxWxH	Specification Section	Procurement Method
MAINTENANCE BUILDING – WASH BAY EQUIPMENT (UTILITY) ROOM				
UR-01a	REC3-30A Water Management and Pumping System with Ozone Generator Kit	38"x31"x53"	11 11 26	FCIC
UR-01b	ZCF1-D Automatic Filtration System-Filtration rate <10GPM	46"x34"x81"	11 11 26	FCIC
UR-02	310-GAL Recycled water Holding Tank	Dia. 43"x72"	11 11 26	FCIC
UR-03	All-Electric Hot Water Pressure Washer	34"x25"x52"	11 11 26	FCIC
UR-04	150-Gal Cone Bottom Purge Tank	Dia. 31"x66"	11 11 26	FCIC
UR-05	CLT-600 Universal Clarifier with Coag	55"x55"x104"	11 11 26	FCIC

Equipment Tag	Item Description	Size LxWxH	Specification Section	Procurement Method
WASH BAY EQUIPMENT (UTILITY) ROOM, CONT...				
UR-06	150-Gal cone Bottom In-Feed Tank	Dia. 31"x66"	11 11 26	FCIC
UR-07	65-Gal Intermediary Transfer Tank	Dia. 23"x42"	11 11 26	FCIC
UR-08	159-Gal Fiberglass Catch Basin with sump pump and grating	36'x36'x54"	11 11 26	FCIC
MAINTENANCE BUILDING - WASH BAY				
WB-01	159-Gal Fiberglass Catch Basin with grating	36"x36"x54"	11 11 26	FCIC
WB-02	Hose Cox Reel TMPL4100 Spring Rewind with 75' R-2 HP Hose	Dia ½"x 900" (75')	11 11 26	FCIC
WB-03	Pressure Washer Remote with ON/OFF, Burner ON/OFF and Detergent		11 11 26	FCIC
WB-04	High Pressure Wand with Wand Holder mounted on the Wall		11 11 26	FCIC
WB-05	Undercarriage Manifold wash system	46"x12"x2"	11 11 26	FCIC
WB-06	10 Step Portable Ladder	82"x32"x130"	11 11 26	OFOI
MAINTENANCE BUILDING - TIRE REPAIR/TIRE STORAGE				
TR-01	Tire Rack	18"x60"x72"	10 56 29.16	OFOI
TR-02	Tire Changer	47"x55"x62"	11 11 23	FCIC
TR-03	Tire Wheel Balancer	73.5"x75.8"x80.5"	11 11 23	FCIC
MAINTENANCE BUILDING - FLEET MAINTENANCE BAY				
MB-01	Wall Mounted Exhaust Reel Set with Fan		23 35 16	FCIC
MB-02	Air Hose Reel	18.5"x8"x18.5"	23 35 16	FCIC
MB-03	Mobile Columns (Wheel) Lift	33"x44"x143"	14 45 13	OFOI

Equipment Tag	Item Description	Size LxWxH	Specification Section	Procurement Method
MB-04	Waste Oil-Fluid Drainer			OFOI
MB-05	2 Ton Heavy Duty Work Bench			OFOI
MB-06	Mechanic Computer Station Mobile Computer Cabinet			OFOI
MB-07	5 Ton Bridge Crane	300"x94"x31"	41 22 13.13	FCIC (ALT-01)
MAINTENANCE BUILDING - FABRICATION/WELDING BAY				
FS-01	Mig Welder			OFOI
FS-02	Mig and flux-cored Arc Welder			OFOI
FS-03	Metal Band Saw			OFOI
FS-04	Oxy/Acetylene Cart			OFOI
FS-05	Arc Welder			OFOI
FS-06	Welding/ Fab Table #1			OFOI
FS-07	Mobile Weld Fume Extractor			OFOI
FS-08	Air Hose Reel			FCIC
FS-09	Spill Container			OFOI
FS-10	Metal Chop Saw			OFOI
FS-11	Work Bench #1			OFOI
FS-12	Welding/ Fab Table #2			OFOI
FS-13	Plasma Cutter with Cart			OFOI
FS-14	75 Ton Hydraulic Press			OFOI
FS-15	Manual Battery Charger/ Engine Starter			OFOI
FS-16	Work Bench #2			OFOI
FS-17	Drill Press			OFOI
FS-18	Shop Grinder with Ped. Stand			OFOI

Equipment Tag	Item Description	Size LxWxH	Specification Section	Procurement Method
FS-19	Tig Welder			OFOI
FS-20	Flammable Cabinet			OFOI
MAINTENANCE BUILDING – LUBE OIL				
LR-01	100Gal Chem-Tainer Waste Oil Tank	Dia. 34.5"x42"	11 11 19	FCIC
LR-02a	Electric Drum Pumps for 55Gal Oil Drum		11 11 19	FCIC
LR-02b				
LR-02c				
LR-03	Electric Drum Pumps for 55Gal Antifreez Drum		11 11 19	FCIC
LR-04a	Electric Drum Pumps for 55Gal Versa Trans Fluid Drum		11 11 19	FCIC
LR-04b	Electric Drum Pumps for 55Gal Alison Trans Fluid Drum		11 11 19	FCIC
LR-05a	Oil Lube Trolley Set	38"x28"x41"	11 11 19	FCIC
LR-05b	Grease Lube Trolley Set	38"x28"x41"	11 11 19	FCIC
LR-06	Spill Containment Pallet - 2 Drum	51.5"x26.25"x6.5"	11 11 19	OFCI
MAINTENANCE BUILDING – CARPENTRY SHOP				
CS-01	Table Saw			OFOI
CS-02	Bandsaw with Cast-Iron Trunnion & Foot Brake			OFOI
CS-03	12" Sliding Dual Bevel Compound Mitter Saw			OFOI
CS-04	12" Disc Sander with Open Stand			OFOI
CS-05	15' Floor Standing Drill Press			OFOI

Equipment Tag	Item Description	Size LxWxH	Specification Section	Procurement Method
CS-06	14 Gallon Shop Vacuum Wet/Dry			OFOI
CS-07	Cyclone Dust Collector			OFOI
CS-08	Air Hose Reel			FCIC
CS-09	Work Bench			OFOI
FUEL STATION – FUEL TANKER AND DISPENSING PUMPS (FUEL ISLAND)				
FA-01	20,000 Gal (15K/5K Split) Horizontal Above Ground Fuel Storage Tank, Tank Venting, Tank Gauging, Decals, Tank Monitoring and Turbine Assembly	432"x125"x136.5"	23 13 23.16	FCIC
FA-02	Tank Fill Assembly - Diesel Remote Spill container	24"x22.5"x55"	23 13 23.16	FCIC
FA-03	Tank Fill Assembly - Gasoline Remote Spill container	24"x22.5"x55"	23 13 23.16	FCIC
FA-04	Fuel Dispensing Pumps	32.25"x19.38"x44.75"	23 12 16	FCIC
FA-05	Cardlock System	19"x10"x61"	23 12 16	FCIC
FA-06a	Rolltop DRUM - DEF Spill Containment	67"x41"x74"		OFOI
FA-06b	DEF Transfer Pump System 55 Gallon			OFOI
BRINE SYSTEM – BRINE MAKER AND TANKS				
	Brine Maker			OFCI
	Brine Tanks			OFCI

PART 3 - EXECUTION

A. Not Used

END OF SECTION 11 06 00

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SECTION 11 11 19
VEHICLE LUBRICATION (LUBE ROOM) EQUIPMENT

PART 1 - GENERAL

- 1.1 Furnished by Contractor Installed by Contractor (FCIC)
 - A. Vehicle lubrication (Lube Room) equipment shall be Furnished by Contractor, Installed by Contractor (FCIC)

- 1.2 RELATED DOCUMENTS
 - A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

- 1.3 SUMMARY
 - A. This section describes requirements for providing the equipment, labor and materials necessary to furnish and install a complete motor oil, Transmission fluid and Antifreez dispensing system.
 - B. Requirements include furnishing and installing all equipment and accessories necessary to make basic lube oil dispensing system and compressed air supply for the fleet maintenance building. These includes:
 - 1. 100 Gal. Waste Oil Tank,
Equipment I.D. Tag: LR-01 [Qty: (1)]
 - 2. Lube Oil Electric Drum Pumps - 55Gal. Drum
Equipment I.D Tag: LR-02a, LR-02b and LR-02c [Qty: (3)]
 - 3. Antifreez Electric Drum Pump - 55Gal. Drum
Equipment I.D Tag: LR-03 [Qty: (1)]
 - 4. Transmission Fluid Electric Drum Pumps - 55Gal. Drum
Equipment I.D Tag: LR-04a and LR-04b [Qty: (2)]
 - 5. Oil Lube Trolley Set
Equipment I.D Tag: LR-05a [Qty: (1)]
 - 6. Grease Lube Trolley Set
Equipment I.D Tag: LR-05b [Qty: (1)]
 - C. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

- 1.4 SUBMITTALS
 - A. General
Submit the following according to the general provisions of the contract and Division Specification Section 01 33 00 – “Submittal Procedures”.
 - 1. Product Data for each type of custom industrial furniture specified, including details of construction relative to materials, dimensions of individual components, profiles, and finishes.
 - 2. Submit color samples from manufacturer’s standard colors for selection and approval by the Architect. Finish and color must be lead-free baked enamel.

- 1.5 QUALITY ASSURANCE
 - A. Standards
 - 1. Spill containment for Environmental Protection Agency (EPA) compliance
 - 2. Spill containment for Spill Prevention, Control, and Countermeasure (SPCC) compliance
 - B. Manufacturer’s Qualifications
 - 1. Company specializing in manufacturing Products specified in this Section with minimum ten years documented experience.
 - C. Certifications:

1. Submit manufacturer's certification that products furnished for Project meet or exceed specified requirements.
- D. Manufacturer:
 1. Manufacturer to hold current ISO 9002 certification.
- E. Regulatory Requirements:
 1. In compliance with ANSI MH 14.1 and CS 202 plus applicable OSHA requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

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

PART 2 - PRODUCTS

2.1 100-Gal Waste oil Tank, Equipment Id Tag: LR-01, Qty: (1)

- A. List of required items:

New double wall plastic tank used for waste oil collection and storage.
- B. Standard Design:

The waste oil collection tank shall comply with EPA standards CFR 40-279.22
- C. Product Features parameters:
 1. Double wall structure with the outer tank having a capacity to contain 110%
 2. 12" hinged lockable lid for security.
 3. Vented, whether resistant design
 4. Tank shall be constructed from polyethylene material and a whether resistant design
 5. A 2" top draw quick-connect drain coupling
 6. Automatic overflow shut-off valve
- D. Manufacturer's Reference:
 1. Prime Manufacturer: Specifications are based on equipment identified herein by manufacturer's name and model to establish acceptable standards of quality, performance, features, and construction.
 - a. Chem-Tainer Industries, Inc.
361 Neptune Ave.
N. Babylon, NY 11704
<https://chemtainer.com>
Model: TC3541DC

2.2 Lube Oil and Hydraulic Fluids Electric Drum Pumps - 55Gal. Drum, Equipment Id Tag: LR-02a, LR-02b, LR-02c, LR-03, LR-04a and LR-04b [Qty: Six (6)]

- A. List of Required Items
A new electric powered pump, compatible with 55Gal drums up to 275Gal totes. The pump shall be a heavy-duty dispensing system which is compatible with engine oil, hydraulic fluid, transmission fluid, DEF, and antifreeze liquid. The bill of Materials for the work is to be determined by the Contractor from the enclosed drawings and from the contents of the Specifications. CONTRACTOR TO VERIFY ALL INFORMATION.
- B. Standard Design
Components shall be of standard design and fabrication by the manufacturer so that all may be replaced or purchased at a future date without special charges or extended deliveries.
- C. Product Features parameters:
 1. Pump shall have a digital flow meter
 2. Pump shall have pumping capacity up to 7 GPM

3. Shall include 2 in. NPT to 2 in. buttress adapter
 4. Pump shall be Telescopic to fit 55-gallon drums and totes up to 275 gallons
 5. Shall be powered by 110v AC plug-in electric connection
- D. Manufacturer's Reference:
1. Prime Manufacturer/supplier: Specifications are based on equipment identified herein by manufacturer's name and model to establish acceptable standards of quality, performance, features, and construction.
 - a. Northern Tool Equipment
4365 Merle Hay Rd
Des Moines, IA 50310-1450
Phone: (515) 252-1516
Website: <https://www.northerntool.com/>
Model: TREDRUMT-M, Item# 4889425
 - b. ULINE
12575 Uline Drive
Pleasant Prairie, WI 53158
Phone: (800) 295-5510
Website: <https://www.uline.com>
Model: H-4933 Alternative
 2. Manufacturers:

Contingent upon compliance with these specifications and documentation requirements set forth in SUBMITTALS, equipment produced by other manufacturers, may be considered as equal.
- 2.3 Lube Trolley Set, Oil and Grease- Equipment Tag #LR-05a and LR-05b Qty: one from each (2)
- A. List of Required Items

Lube trolley package shall be complete with all components needed for portably dispensing oil and grease directly from 55-gallon drums. Featuring a pneumatically operated pump, durable hose reel and electronic meter for oil or high-pressure control valve for grease. The bill of Materials for the work is to be determined by the Contractor from the enclosed drawings and from the contents of the Specifications. CONTRACTOR TO VERIFY ALL INFORMATION.
 - B. Standard Design
 1. Components shall be of standard design and fabrication by the manufacturer so that all may be replaced or purchased at a future date without special charges or extended deliveries.
 - C. Product Features parameters:
 1. Shall have designated space for hose reel
 2. Compatible with oil and grease
 3. (1) 3:1 RAM pump with downtube for 55-gallon drum
 4. (1) Heavy-duty reel
 5. Delivery hose and 5ft connecting hose
 6. (1) Electronic meter with flexible extension measures pints, quarts or gallons
 7. (1) Air Control with filter/regulator/gauge
 8. (1) Lube cart
 - D. General
 1. Provide oil dispensing system of type, function, operation, capacity, size and construction indicated, complete with controls, safety devices and accessories required.

2. Spill control: Multi-tier Spill control
- E. Manufacturer's Reference:
 1. Prime Manufacturer: Specifications are based on equipment identified herein by manufacturer's name and model to establish acceptable standards of quality, performance, features, and construction.
 - a. Wiley Equipment Company, Inc.
1070 East Dominguez, Suit J
Carson, CA 90746
Phone: (800) 490-5389
Website: <https://wileyequipment.com>
Model: 343509 – Alemite Oil Lube Trolley
343510 – Alemite Grease Lube Trolley

PART 3 - EXECUTION

3.1 INSPECTION

- A. Coordinate location of rough-in work and utility stub-outs to assure match with equipment to be installed.
- B. Inspect delivered equipment for damage from shipping and exposure to weather.
- C. Compare delivered equipment with packing lists and specifications to assure receipt of all items.

3.2 INSTALLATION

- A. Perform work under direct supervision of Foreman or Construction Superintendent with authority to coordinate installation of scheduled equipment with Architect.
- B. Upon completion of work, finish surfaces shall be free of tool marks, scratches, blemishes, and stains.

3.3 TESTING

- A. After final connections are made and prior to authorizing payment, specified equipment shall be tested for compliance with all specified features in the presence of the Architect using acceptance procedures provided by the manufacturer.

3.4 CLEANUP

- A. Touch-up damage to painted finishes.
- B. Wipe and clean equipment of any oil, grease, and solvents, and make ready for use.
- C. Clean area around equipment installation and remove packing or installation debris from job site.
- D. Notify Architect for acceptance inspection.

3.5 TRAINING

- A. Direct the technical representative to provide specified hours of training to designated Owner's maintenance personnel in operation and maintenance of the following equipment. Coordinate, with Owner, training schedule and list of personnel to be trained.
- B. Obtain, from technical representative, a list of Owner's personnel trained in equipment operations and maintenance.
- C. Provide a Windows compatible movie file format recording on DVD disk of the training session. The DVD training movie can be of a live session or a produced training video.

END OF SECTION

SECTION 11 11 23
TIRE CHANGER AND BALANCER EQUIPMENT

PART 1 - GENERAL

1.1 FURNISHED BY CONTRACTOR INSTALLED BY CONTRACTOR (FCIC)

- A. Tire Changer and Balancer Equipment shall be Furnished by Contractor, Installed by Contractor (FCIC)

1.2 SYSTEM DESCRIPTION

- A. Equipment items are listed below by Equipment I.D. Tag.
1. Tire Changer,
Equipment I.D. Tag: TR-02 [Qty: (1)]
 2. Tire Wheel Balancer,
Equipment I.D. Tag: TR-03 [Qty: (1)]
- B. Tire Changer and Balancing system(s)
This section includes the specifications for the Tire Changer and Balancing system(s) being installed for removal/install and & balancing of tires in various sizes, weights, and areas as noted in the Bid Specifications and Bid Drawing Package.
- C. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.3 DESCRIPTION OF WORK

- A. List of Work
1. The extent of the Work is shown on the drawings and is defined to include (but not by way of limitations) all labor, materials, freight, unloading, equipment, taxes, permits and supervision required for the equipment and installation. The Tire Changing and Balancing Equipment shall include all materials necessary for the desired performance.
- B. Coordination
1. Contractor's Responsibility: It will be the Contractor's responsibility to verify and establish a detailed installation schedule.
 2. Field check: All building and equipment layout dimensions shall be field checked and verified by contractor prior to start of installation. Notify the consultant and owner of any discrepancies or conditions affecting materials and/or installation within ten (10) days. If a condition exists and the consultant or owner is not notified the additional cost to correct the installation in accordance with the requirements of the owner will be that of the contractor.
 3. Delivery and Unloading: The Tire Changing and Balancing Equipment System Contractor shall be responsible for coordinating the delivery and unloading of the equipment to the job-site with the General Contractor to eliminate demurrage charges, unless authorized by the Owner or the Consultant. In order to eliminate disruption to the ongoing operations and prevent interference of dock access by trucks entering and leaving the site, temporary staging of materials will be provided outside of the building at a location designated by the Owner. The Tire Changing and Balancing Equipment System Contractor shall provide storage facilities (i.e. covers, closed containers) to protect equipment from the elements (i.e. dust, dirt, rain, ice, snow, etc.) as necessary. Interior staging of equipment will be kept to a minimum so as not to disrupt ongoing operations.
- C. Quality assurance
1. Standards
 - a. Equipment Standards: The equipment covered by these Specifications shall be designed, assembled, tested and installed in accordance with the latest applicable standards, including:
 - b. American National Standards Institute (ANSI).
 - c. International Building Code (IBC)
 - 1) International Building Code including current Building Code Amendments. (2015 Edition)
 - d. Materials

- 1) All materials furnished shall be new, free from defects, and UL-Approved where such approval is granted to the equipment to be furnished.
 - e. Federal Inspection
 - 1) Latest published applicable Federal Specifications.
 - f. OSHA
 - 1) Applicable OSHA Specifications.
 - g. Building and Safety Codes
 - h. Any applicable local building and safety codes pertaining to the Work.
- D. Workmanship
1. Trade Methods: Use the best trade methods throughout. Work evidencing substandard workmanship shall be corrected or replaced by the Contractor at the Contractor's expense, per the General Conditions.
 2. Touch Up Paint: The method for the touch up of paint shall follow specifications section 3.02 Field Painting.
- E. Guarantees
1. WARRANTY:
 - a. Warranty shall be the manufacturer's standard warranty and shall be specified by the Contractor in the contents of the proposal.
 - b. The contractor shall provide an extended warranty for a period of three (3) years from Date of Acceptance.
 - F. QUALITY OF MATERIALS AND EQUIPMENT: The Contractor guarantees the material and equipment delivered under the Contract to be free from defects in design or workmanship and against damages caused prior to final inspection. Unless otherwise specified, this guarantee extends for a period of three (3) years from the Date of Acceptance for both labor and materials.
 - G. REPAIRING DEFECTS: The Contractor shall promptly repair or replace all defective or damaged items delivered under the Contract. The Tire Changing and Balancing equipment Contractor may elect to have any replaced item returned to his/her plant at his/her expense.

1.4 SUBMITTALS

- A. Product Data: Submit latest edition of Tire Changing and Balancing equipment data sheet and outline drawing with the proposal.
1. Shop Drawings:
 - a. Shop Drawings, as stated in the General Conditions, shall include, but need not be limited to:
 - b. Installation Plan: Proposed installation plan of equipment, including location and dimensions of new equipment clearly identified. It will be the Contractor's responsibility to verify and establish a detailed installation schedule per the General Conditions.
 - c. Dimensions: Plan views showing all equipment dimensions along with any aisle clearance dimensions.
 - d. Bill of Materials: Bill of Materials per the General Conditions.
 - B. Approved Shop Drawings
 1. It will be the Contractor's responsibility to obtain approved shop drawings signed by the Consultant and/or Owner per the General Conditions prior to fabrication.
 - C. Manufacturer's Reference:
 1. Prime Manufacturer: Specifications are based on equipment identified herein by manufacturer's name and model to establish acceptable standards of quality, performance, features, and construction.

Hunter Engineering Company
11250 Hunter Dr.
Bridgeton, MO 63044
Phone: (314) 731-0000
Website: <https://www.hunter.com/>

Tire Changer Model: TCX5xH

Tire Balancer Model: HDE-11

- D. Other manufacturers: Contingent upon compliance with these specifications and documentation requirements set forth in SUBMITTALS, equipment produced by other manufacturers may be considered as equal.

PART 2 - PRODUCTS

2.1 Tire Changer and Wheel Balancing Equipment General,

- A. The Contractor shall provide the following:
1. List of Required Items
 - a. New Tire Changing and Balancing Equipment system as shown on the drawings, including freight, unloading, installation, touch-up painting, cleaning, and other equipment necessary to complete the system.
 - B. Quantity and Capacity
 1. See drawings for equipment location and configuration.
 - C. Standard Designs
 1. Components shall be of standard design and fabrication by the manufacturer so that all may be replaced or purchased at a future date without special charges or extended deliveries.
 2. The Bill of Materials for this Work is to be determined by the Contractor from the bid drawings and contents of the Specifications. Tire Changing and Balancing Equipment Contractor to verify all information.
 - D. Codes
 1. The Tire Changing and Balancing Equipment system shall be designed and installed to the exact standards of the manufacturer and in all cases shall conform to applicable codes.
 - E. Loads and Capacity
 1. The Tire Changing and Balancing Equipment System shall be designed to handle loads under normal, impact loading conditions experienced in a manual tire loading application.
 - F. Install
 1. The shipment of the Tire Changing and Balancing Equipment shall include all components to allow immediate install upon receipt.
 - G. Anchoring
 1. All work must be rigid and anchored securely, use 1/2" through bolts and lock nuts. Method of attachment to be approved prior to installation.
 - H. Anchor Holes
 1. All anchor holes are to be vacuum cleaned at time of drilling.
 - I. Touch Up
 1. The Tire Changing and Balancing Equipment Contractor shall touch up any other Contractor's work damaged during the process per section 3.2 Field Painting.

2.2 Tire Changing and Balancing Equipment

- A. Tire Changer,
Equipment I.D. Tag: TR-02 [Qty: (1)]
1. Description: Tire Changing Equipment unit used in commercial Vehicle Maintenance and Repair Shops.
 - a. Physical Data:
 - 1) Overall Dimensions:
 - a) Width: 55"
 - b) Depth: 47"
 - c) Height: 62"
 2. Rim Diameter Range: 10-26" external / 12-28" Internal
 3. Max. Tire diameter: 46"
 4. Max Tire width: 14"
 5. Power Requirements: 208-230V, 6A, 50/60 Hz 1ph
 6. Plug Type: L6-20P

7. Air Requirements: 110-145 psi (8-10 bar)
 8. Features and Construction:
 - a. Plastic Mount Head (w/protection)
 - b. Manual Swing Arm
 - c. Power Out Side Shovel
 - d. 2-year Manufacturer's warranty
 9. Finish: Manufactures Standard
- B. Tire Balancer
- Equipment I.D. Tag: TR-03 [Qty: (1)]
1. Description: Tire Balancing Equipment unit used in commercial Vehicle Maintenance and Repair Shops.
 - a. Physical Data:
 - 1) Overall Dimensions:
 - 2) Width: 75.75"
 - 3) Depth: 73.5"
 - 4) Height: 80.5"
 - b. Rim Width Range: 1.5" to 19.5"
 - c. Rim Diameter Range: 10" to 30"
 - d. ALU: 7.5" to 38"
 - e. Max. Tire diameter: 52"
 - f. Max Tire width: 25"
 - g. Max Tire weight: 500 lbs.
 - h. Imbalance Resolution: +/- 0.05 oz
 - i. Placement Accuracy: 512 Positions, +/- 0.35 degrees
 - j. Balancing Speed: 100 rpm
 - k. Power Requirements: 196-253V, 10A, 50/60 Hz 1ph
 - l. Plug Type: L6-20P
 - m. Air Requirements: 100-175 psi (7-12 bar)
 - n. Air Consumption: 4 CFM
 2. Features and Construction:
 3. Ink Jet Printer with Storage
 4. Programmable drive system with DC motor
 5. Finish: Manufactures Standard

PART 3 - EXECUTION

3.1 EXAMINATION

A. Coordination

1. Each Contractor must give careful consideration to the ongoing facility operations and the work of other contractors during the entire project and shall organize his/her work so that it will not interfere with ongoing operations or interfere with or delay the work of others. Minimal disruption to ongoing operations is a priority. It is imperative that the schedule be maintained with any changes coordinated promptly with the General Contractor, Owner, and Consultant.

B. General Description

1. The Tire Changing and Balancing Equipment System shall be installed true and properly aligned complete in all details and in accordance with the specifications, manufacturer's recommendations, and the drawings.

C. Installation Routine

1. Installation shall include unloading, checking and security of equipment prior to erection, shimming, complete anchoring, touch up and cleaning. The Contractor shall provide storage facilities (i.e. covers, closed containers) to protect equipment from the elements (i.e. dust, dirt, rain, snow, etc.). Contractor shall use a transfer system to bring materials inside the building that is supplied by the Contractor. Contractor to ensure no damage to the overhead door, floor, facility or equipment.

- D. Tools and Equipment
 - 1. The Contractor shall be responsible to provide all tools and equipment necessary for a complete and satisfactory installation. All wheeled and rolling equipment used in the building during construction (after slab on grade has been poured) must use wheel wraps or similar to protect floor from rubber.
 - E. Permits and Inspection
 - 1. Contractor shall obtain, and pay for, all necessary permit fees and inspections required by the State or local municipalities.
 - F. Damaged Materials
 - 1. Claims, due to freight damage, are the responsibility of Tire Changing and Balancing Equipment System Contractor. This includes any damage that is not evident at the time of the unloading of the equipment (i.e. concealed damage). Should such damage be uncovered, the Contractor must act promptly to repair/replace damaged equipment to minimize any delay to the schedule. Any added cost due to a delay is the responsibility of the Contractor.
 - G. Debris Disposal
 - 1. It shall be the responsibility of the Tire Changing and Balancing Equipment System Contractor to remove any debris resulting from his/her work on each and every workday to a pre-designated disposal area. This shall include all waste generated by the installer or any of his/her personnel, shipping containers, and/or construction materials. The Contractor shall broom clean the area each work day to leave the work area clean and allow the Owner access to scrub the floor. This will include organizing the materials not yet incorporated in the Work. At the completion of the work the Contractor shall remove all of his/her waste materials and rubbish from and about the project, as well as all his/her tools, construction equipment, machinery.
 - H. Clearance
 - 1. The Contractor shall be responsible for maintaining all clearances specified on the drawings.
 - I. Modifications
 - 1. The Contractor shall be responsible for the suitability of any Tire Changing and Balancing Equipment system component modifications required after installation begins. All modifications must be submitted and approved by the Owner and Consultant prior to beginning Work. Modifications done by others must be approved by the Contractor prior to modification. The Contractor shall be responsible for such a modification by others.
 - J. Contractor's Survey of Damage
 - 1. The Contractor shall conduct a survey of his/her work each and every workday morning and note any and all damages observed. Any damages must be reported to the General Contractor and the Owner by 9:00 a.m. Damages not reported within this time frame will be the contractor's responsibility.
 - K. Marking Restrictions
 - 1. Under no circumstances will a magic marker, sharpie or any other permanent marking device, which will absorb into concrete, paint or decking, be used for marking equipment locations. All markings must be water soluble and removable. The contractor is responsible to remove these markings prior to completing the Punch List
 - L. Installation
 - 1. The Owner shall have the option of performing his/her own Tire Changing and Balancing Equipment System installation
- 3.2 FIELD PAINTING
- A. Cleaning
 - 1. All surfaces to be painted must be thoroughly cleansed of rust, scale, oil, grease, dirt, welding flash and all other forms of dirt detrimental to good painting practices.
 - B. Touch-Ups
 - 1. After the installations are complete, the Contractor shall touch-up any components that were damaged but only with owners/representative approval. Finish to match factory finish.

END OF SECTION 11 11 23

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SECTION 11 11 26
VEHICLE MANUAL WASH EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. All Vehicle Wash Equipment shall be **Furnished by Contractor, Installed by Contractor (FCIC)**.
- B. This section describes requirements for providing the equipment, labor and materials necessary to furnish and install a complete vehicle manual wash with water treatment system.
- C. Requirements include furnishing and installing all equipment and accessories necessary to make complete water treatment systems and hot water pressure washer for the facility. These includes:
1. REC3-30A Water Management and Pumping System with Ozone Generator Kit
Equipment I.D. Tag: UR-01a, Qty. One (1)
 2. ZCF1-D Automatic Filtration System-Filtration rate <10GPM
Equipment I.D. Tag: UR-01b, Qty. One (1)
 3. 310-Gal Recycled water Holding Tank
Equipment I.D. Tag: UR-02, Qty. One (1)
 4. All Electric Hot Water Pressure Washer
Equipment I.D. Tag: UR-03, Qty. One (1)
 5. 150-Gal Cone Bottom Purge and In-Feed Tank
Equipment I.D. Tag: UR-04 and UR-06, Qty. One (1) Each
 6. CLT-600 Universal Clarifier with Coag
Equipment I.D. Tag: UR-05, Qty. One (1)
 7. 65-Gal Intermediary Transfer Tank
Equipment I.D. Tag: UR-07, Qty. One (1)
 8. 159-Gal Fiberglass In-Ground Catch Basin 3'x3'x4.5' With Sump Pump and Grating
Equipment I.D. Tag: UR-08, Qty. One (1)
 9. 159-Gal Fiberglass In-Ground Catch Basin 3'x3'x4.5' With Grating
Equipment I.D. Tag: WB-01, Qty. Two (2)
 10. Other Accessories
Hose Cox Reel TMPL4100 Spring Rewind with 75' R-2 HP Hose
Equipment I.D. Tag: WB-02, Qty. Two (2)
Pressure Washer Remote with ON/OFF, Burner ON/OFF and Detergent
Equipment I.D. Tag: WB-03, Qty. Two (2)
High Pressure Wand with wall mounted Wand Holder
Equipment I.D. Tag: WB-04, Qty. Two (2)
 11. Undercarriage Manifold
Equipment I.D Tag: WB-05, Qty. One (1)
- D. Roughing-in, installation of equipment, and final connection of utilities, with labor, services, and incidentals necessary for complete and operational equipment installation.
- E. Provide all piping, wiring, and switching between equipment and utilities necessary for complete and operational equipment installation.

1.3 ALTERNATIVE BIDS

- A. Refer to Division 1 - General Requirements for possible effect on Work of this Section.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with manufacturer's instructions.

1.5 QUALIFICATIONS

- A. Experience: Equipment shall be produced by a manufacturer of established reputation with a minimum of five years-experience supplying specified.
- B. Manufacturer's Representative:
1. **Installation:** Provide a qualified manufacturer's representative at site to supervise work related to equipment installation, check out and start up.
 2. **Training:** Provide qualified manufacturer's technical representative to provide training to Owner's maintenance personnel in operation and maintenance of specified equipment.

1.6 STANDARD AND REGULATORY REQUIREMENTS

- A. National Bureau of Standards: Handbook H28 - Screw-Thread Standards for Federal Services. (Application for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.)
- B. United States of America Standard Institute, Inc.:
1. B36.10: Standard Weights and Dimensions of Welded and Seamless Wrought Steel Pipe.
 2. C1: National Electric Code (Copies of the National Electrical Code may be obtained from the National Board of Fire Underwriters, 85 John Street, New York, New York 10038.
 3. National Electrical Manufacturers Association:
 - a. CI - Circuit Breakers, Low - Voltage Power.
 - b. MGI - Motors and Generators.
 - c. Application for copies should be addressed to the National Electrical Manufacturers Association, 155 East 44th Street, New York, New York 10016.

1.7 SUBMITTALS

- A. Refer to Section 11 06 00 Equipment Schedule for submittal requirements listed in the "Submittals" column of the equipment list. In the event of conflict between Section 11 06 00 Equipment List and the following expanded submittal descriptions, Section 11 06 00 Equipment List is to govern.
- B. Product Data:
1. Submit Product Data in accordance with Division 1 - General Requirements of these specifications.
 2. All Product Data submittals shall identify proposed project specific items marked by arrow, circle, underline, reproducible highlight, or other markings clearly discernable by the reviewer, to show which specific items, parts and accessories are being submitted for the project product data review. Non-marked or generic product data submittals with no marks indicating specific items, parts and accessories will be a cause for rejection.
 3. Restrict submitted material to pertinent data. For instance, do not include manufacturer's complete catalog when pertinent information is contained on a single page.
- C. Operation and Maintenance Manual:

1. Provide a Complete parts list, operating instructions, and maintenance manual covering equipment at time of installation including, but not limited to:
 - a. Description of system and components.
 - b. Schematic diagrams of electrical, plumbing and compressed air systems.
 - c. Manufacturer's printed operating instructions.
 - d. Printed listing of periodic preventive maintenance items and recommended frequency required to validate warranties. Failure to provide maintenance information will indicate that preventive maintenance is not a condition for validation of warranties.
 - e. List of original manufacturer's parts, including suppliers' part numbers and cuts, recommended spare parts stockage quantity and local parts and service source.
 2. Assemble and provide copies of manual in 8-1/2 by 11-inch format. Foldout diagrams and illustrations are acceptable. Manual to be reproducible by dry copy method. Provide copies per provisions of Division 1 - General Requirements.
- D. Shop Drawings: Submit in accordance with Division 1 -General Requirements of these specifications. Refer to Section 11 06 00 Equipment Schedule for the equipment mark numbers requiring shop drawings.
1. Submitted shop drawings shall be project specific and shall include a minimum 1/8-inch to 1 foot scaled (or larger standard architectural imperial scale), dimensioned, graphical representation of the size, orientation, and location for the submitted equipment. The drawings shall further include dimensions from structural elements or architectural grid lines, operational clearances, locations of any utility service connection points, mounting requirements, and structural supports required for the submitted equipment.

1.8 PRODUCT SUBSTITUTIONS

- A. Follow requirements specified in Division 1 - General Requirements.
- B. Additional costs resulting from substitution of products other than those specified, including drawing changes and construction, will be at the expense of the Contractor.
- C. Substitution Approval: Manufacturers listed for each equipment item may bid without submittal for that item. Manufacturers not listed shall submit for approval in accordance with "Instructions to Bidders". Prior to installation, submittals for each equipment item by Mark Number shall be provided in accordance with Division 1 - General Requirements and 01 25 00.

1.9 WARRANTY

- A. Warrant work specified herein for five years from substantial completion or 200,000 vehicle washes, whichever comes first, against defects in materials and workmanship.
- B. Warranty shall include materials and labor necessary to correct defects.
- C. Defects shall include, but not be limited to noisy, rough, or substandard operation; loose, damaged, and missing parts; and abnormal deterioration of finish. Defects shall not include damage due to neglect, misuse, or situations resulting from non-performance of manufacturers recommended preventive maintenance schedule.
- D. Submit warranties in accordance with Division 1 - General Requirements of these specifications.
- E. All parts shall be readily available locally in the United States.

1.10 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver equipment in manufacturer's containers, appropriately packaged and/or crated for protec-

tion during domestic shipment and storage in humid, dusty conditions.

- B. Indelibly label all containers, including those contained in others, on outside with item description(s) per title of this specification.
- C. Provide equipment and materials specified complete in one shipment for each equipment item. Split or partial shipments are not permissible.

1.11 LABELING

- A. Manufacturer shall securely attach in a prominent location on each major item of equipment a non-corrosive nameplate showing manufacturer's name, address, model number, serial number, and pertinent utility or operating data.
- B. Label all piping in vehicle wash and water reclaim systems as to its function and flow direction.
- C. All electrical equipment and materials shall be new and shall be listed by Underwriter's Laboratories, Inc. (U.L.), or other National Recognized Testing Laboratory (NRTL), in categories for which standards have been set by that agency and labeled as such in the manufacturer's plant.

PART 2 - PRODUCTS

2.1 REC3-30A Water Management and Pumping System with Ozone Generator Kit

Equipment I.D. Tag: UR-01a, Qty. One (1)

- A. General Description:
- B. The REC3-30A shall be a versatile water management module that pumps water from upstream pre-treatment tanks or pit system to downstream reuse storage tanks. When combined with the ZCF filtration module, it shall pump influent water through the filters to remove particulate, as well as provides pressurized water for backwashing and for recycling purposes. It provides makeup water, as well as discharges any excess water volume.
- C. Stainless steel skid with skeletal steel frame leaves no place for standing water to cause rusting.
- D. The REC3-30 shall fit through 36" doorways to allow fitting into challenging installation spaces.
- E. Features-Technical Data:
 - 1. Designed to interface with pretreatment & post treatment modules
 - 2. Stainless steel skid with painted carbon steel enclosure with lockable front door
 - 3. 1.5 HP self-priming pump – transfer rate up to 30 GPM and up to 40 PSI
 - 4. Steel components are protected with powder coated finish
 - 5. Easy access to components (pump, piping, and electrical)
 - 6. Certifications – UL73
 - 7. Dimension: 38" x 31" x 53"
- F. Ozone Generator shall also be provided to safely, naturally and economically rid wastewater of odor and bacteria. It disinfects the waste water in the 310 Gal holding tank.
 - 1. Sanitizes 3000 times faster than chlorine
 - 2. Output from 24 to 27 grams per day
 - 3. Unique mixing procedure with 99% efficiency

2.2 ZCF1-D Automatic Filtration System-Filtration rate <10GPM

Equipment I.D. Tag: UR-01b, Qty. One (1)

A. General Description:

ZCF1-D shall be a plug-and-play unit, pre-piped and wired, ready for connection to tanks and wash process filtration system which delivers recycled water with a fully automatic operation.

B. Features-Technical Data:

1. One Media housing, filtration rate up to 10 GPM
2. Electric power requirement 120Volt, single phase and 5 Amp current.

2.3 310-Gal Recycled water Holding Tank

Equipment I.D. Tag: UR-02, Qty. One (1)

A. General Description:

310-Gal Tank shall be a flat bottom tank with a stand. Tank shall provide cushion in holding recycled water and shall be made of polyethylene material. Material must be UV and corrosion resistant.

2.4 All Electric Pressure Washer

Equipment I.D. Tag: UR-03, Qty. One (1)

A. General Description:

1. Electric Hot Pressure washer shall have cleaning power up to 3000 PSI and 3.5 GPM. The unit also includes optional wireless remote control.
2. OSHA requirements: The system shall meet or exceed all applicable OSHA standards.
3. Heater Type: Stationary hot water system, All Electric powered
4. ETL certified

B. Capacities and Dimensions:

1. Pump motor: 460V, 3ph, 59Amps, 6.2 HP motor, belt driven 845 RPM
2. Overall dimensions:
 - a. Length: 34 inches.
 - b. Width: 25 inches.
 - c. Height: 52 inches.
3. Maximum discharge capacity: 3.5 GPM.
4. Operating pressure: 3,000 PSI.
5. Quantity: One each.
6. Power: 40.5 KW
7. Pump shall have wireless remote control working a minimum 300 ft. away from pressure washer.

C. Accessories:

1. Variable pressure wand with trigger gun and wand assembly
2. High Pressure and temperature relief
3. TMPL4100 Cox Reel 75' spring rewind
4. 75' R2 High pressure Hose
5. SS 1/2" Tubing 0.065 wall
6. 55-Gal detergent drum
7. Wired Remote
8. Draft Diverter

D. Finish: Epoxy powder coating in manufacturer's standard color.

2.5 150-Gal Cone Bottom Purge and In-Feed Tank

Equipment I.D. Tag: UR-04 and UR-06, Qty. One (1) Each

A. General Description:

1. A 150-gallon cone-bottom infeed tank with stand which will supply flooded suction in the CoAg system shown on the Drawings.
2. OSHA requirements: The system shall meet or exceed all applicable OSHA standards.

2.6 CLT-600 Universal Clarifier with Coag

Equipment I.D. Tag: UR-05, Qty. One (1)

A. General Description:

1. CLT-600 Universal clarifier tank shall be an above-ground clarifier that incorporate skimming of free-floating oils at flow rates at up to 30 GPM (6.8 cubic meters/hour). CLT-600 utilize cross-linked polyethylene cone-bottom tanks with a steep slope (up to 55 degrees) for maximum solids separation.
2. OSHA requirements: The system shall meet or exceed all applicable OSHA standards.

B. Features-Technical Data:

1. Flow rate up to 30 GPM
2. Coag Mixing Chamber
3. Cone Bottom Above Ground Tank, cradle with Lid.
4. Integrated Compact Coag System.
5. Control Panel Mounting Bracket and Shield
6. 5 Gal Compact Coag Flocculant
7. 5 Gal pH Adjustment Chemical
8. AMC1000D Auto Tank Purge
9. UV Ozone System
10. pH Controller Assembly with Inlet Manifold
11. Sludge Tub with Lid
12. SS Grundfos ½ HP Sump Pump
13. Utility Requirement: 120V, 15A

2.7 65-Gal Intermediary Transfer Tank

Equipment I.D. Tag: UR-07, Qty. One (1)

- A. Intermediary transfer tank shall be made of Polyethylene material
- B. All tanks shall also be UV- and corrosion-resistant.

2.8 159-Gal Fiberglass In-Ground Catch Basin with Sump Pump and Grating

Equipment I.D. Tag: UR-08, Qty. One (1)

- A. In-ground Sump shall be made of reinforced, pre-fabricated fiberglass and chemically resistant to the growth of bacteria.
- B. Grating cover, which is top part of catch basin, shall be a hot rolled steel grating or aluminum diamond plated tread plate (shall meet H-20 truck load rating).
- C. Dimension: 3'x3'x4.5' (LxWxH)

2.9 159-Gal Fiberglass In-Ground Catch Basin with Grating

Equipment I.D. Tag: WB-01, Qty. Two (2)

- A. In-ground catch basin pit shall be made of reinforced, pre-fabricated fiberglass and chemically resistant to the growth of bacteria.
- B. The top grating cover shall also be a hot rolled steel grating or aluminum diamond plated tread

- plate (shall meet H-20 truck load rating).
C. Dimension: 3'x3'x4.5' (LxWxH)

2.10 Other Accessories

- A. Hose Cox Reel TMPL4100 Spring Rewind with 75' R-2 HP Hose
Equipment I.D. Tag: WB-02, Qty. Two (2)
- B. Pressure Washer Remote with ON/OFF, Burner ON/OFF and Detergent
Equipment I.D. Tag: WB-03, Qty. Two (2)
- C. High Pressure Wand with Wand Holder mounted on the Wall
Equipment I.D. Tag: WB-04, Qty. Two (2)

2.11 Manufacturer

- A. Prime manufacturer: All specifications are based on equipment identified herein by manufacturer's name and model to establish acceptable standards of quality, performance, features, and construction.
 - 1. WaterMaze Water Treatment System
4275 NW Pacific Rim Blvd
Camas, WA 98607
Phone: (360) 833-2333, (800) 347-6116
Fax: (360) 833-9164, (800) 535-9164
Website: www.wmaze.com
Model: CLT-600, ZCF1-D and REC3-30A with Accessories
 - 2. LANDA Pressure washers
6398 N. karcher Way
Aurora, CO 80019
Phone: (877) 526-3235
Website: www.landa.com
Model: VHG4-22024H with Accessories
 - 3. Other Suppliers: Contingent upon compliance with these specifications and documentation requirements set forth in SUBMITTALS, equipment produced by other manufacturers, including the following, may be considered as equal.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Coordinate location of rough-in work and utility stub-outs to assure match with equipment to be installed.
- B. Inspect delivered equipment for damage from shipping and exposure to weather. Compare delivered equipment with packing lists and specifications to assure receipt of all items.
- C. Report in writing to the Architect any damaged, missing or incomplete scheduled equipment and improper rough-in work or utility stub-outs.

3.2 INSTALLATION

- A. Manufacturer shall be responsible for complete operational equipment installation.
- B. Perform work under direct supervision of Foreman or Construction Superintendent with authority to coordinate installation of scheduled equipment with Architect.
- C. Install equipment in accordance with plans, shop drawings and manufacturer's instructions:
 - 1. Positioning: Place equipment in accordance with any noted special positioning requirements generally level (or slight slope as required by instructions), plumb and at right angles to adjacent work.

2. Fitting: Where field cutting or trimming is necessary, perform in a neat, accurate, professional manner without damaging equipment or adjacent work.
3. Anchorage: Use fastenings as specified herein. Attach equipment securely to prevent damage resulting from inadequate fastenings. Installation fasteners shall be installed to avoid scratching or damaging adjacent surfaces.
4. Upon completion of work, finish surfaces shall be free of tool marks, scratches, blemishes, and stains.

3.3 TESTING

- A. Specification Compliance: After final connections are made and prior to authorizing payment, specified equipment shall be tested for compliance with all specified features.
- B. Performance Testing: Each washer shall consecutively wash five vehicles of Owner's choosing within 45 minutes.
- C. Equipment shall not damage vehicles, including mirrors, windshield wipers and windows, or equipment itself.
- D. Malfunctions during testing shall be corrected within five days and re-tested. Malfunctions during second testing shall be corrected within five days and retested.
- E. Inadequate Performance: If equipment fails third test, Owner may elect to have all specified Vehicle Wash Equipment removed from site at no cost or obligation to Owner.

3.4 CLEANUP

- A. Touch-up damage to painted finishes.
- B. Wipe and clean equipment of any oil, grease, and solvents, and make ready for use.
- C. Clean area around equipment installation and remove packing or installation debris from job site.
- D. Notify Architect for acceptance inspection.

3.5 TRAINING

- A. Direct the technical representative to provide specified hours of training to designated Owner's maintenance personnel in operation and maintenance of the following equipment. Coordinate, with Owner, training schedule and list of personnel to be trained.
 1. WASHER, HI-PRESSURE/HOT WATER (AND REEL)
Hours Required: 1 Total
 2. WATER RECLAMATION SYSTEM
Hours Required: 2
- B. Obtain, from technical representative, a list of Owner's personnel trained in equipment operations and maintenance.
- C. Provide a Windows compatible movie file format recording on DVD disk of the training session'
- D. The DVD training movie can be of a live session or a produced training video.

END OF SECTION 11 11 26

**SECTION 11 31 13
KITCHEN EQUIPMENT**

PART 1 – GENERAL

1.01 DESCRIPTION OF THE WORK

- A. Furnish all labor, materials, tools, equipment, and services for all and equipment as indicated in accord with these Contract Documents.
- B. Refer to the drawings for location and placement of items.
- C. Complete coordination with work of other trades.
- D. Furnish and install all supplementary of miscellaneous items, appurtenances, and devices incidental for a secure and fully operational installation.

1.02 CODES AND STANDARDS

All work in this Section shall comply with the requirements of the following:

- A. National Electric Code.
- B. National Fire Protection Association requirements.
- C. Occupational Safety and Health Administration requirements.
- D. Underwriters Laboratory requirements.

1.03 SUBMITTALS

- A. Section 01 33 00 - Submittals: Procedures for submittals.
- B. Shop Drawings: For all custom-fabricated items, indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location and schedule of finishes.
- C. Product Data: Include manufacturer's published literature for standard equipment, including accessories, specifications, physical characteristics and performance data.
- D. Provide manufacturer's warranties under provisions of Section 01 78 36.
- E. Provide samples for finish selection and custom fabricated items.

1.04 PROJECT CONDITIONS

- A. Dimensions indicated on the Contract Documents are approximate and space available must be verified at the building site. Submit written notice of any deviations from the Contract Documents that may be required to clearances shown and to permit installation of equipment specified.
- B. Verify accessibility to the areas where equipment is to be installed.

- C. Verify that all mechanical and electrical rough-ins have been installed with sufficient clearance to facilitate a neat and orderly connection to the equipment and that such rough-ins will not interfere with the operation of individual equipment items.

1.05 PRODUCT DELIVERY, HANDLING AND STORAGE

- A. If items of equipment are too large to be moved through permanent openings or hallways in the building, make arrangements for suitable temporary openings or protected access to the final spaces.
- B. Inspect all equipment upon delivery. Provide uncrating and setting in place of all items.
- C. Deliver all plumbing trim, electrical components, and other items required to make the utility connections plainly tagged and indicating the equipment each piece is required for.

PART 2 – PRODUCTS

2.01 GENERAL

- A. For catalog items, provide as indicated on the drawings. For custom fabricated items, provide as fabricated by a qualified Fabricator. Only recognized, established companies will be considered, and all custom fabricated items must be provided by one manufacturer or as noted.
- B. Fittings and fixtures: provide all equipment items that are standard with the equipment or required by code.

PART 3 – EXECUTION

3.01 INSPECTION

- A. Examine substrates and conditions under which equipment is to be installed.
- B. Verify location of all utility connections.
- C. Start of installation constitutes acceptance of responsibility for performance.

3.02 INSTALLATION – GENERAL

- A. Perform all work under direction of experienced installation supervisor.
- B. Do not install equipment until all ceilings, lighting walls and floors have been installed and the room cleaned.
- C. Fasten all non-portable equipment to building and adjacent equipment.
- D. Cut all holes in equipment and in building work necessary to drainage pipes, electrical conduits, refrigeration lines, and any other piping necessary. Install escutcheon plates on all pipes passing through the walls, floors, and ceiling. Caulk spaces between sleeve or hole and pipe with silicone sealant.
- E. Touch up all damaged factory finishes to match original finish.

- F. Provide all work involved in making standards and supports for equipment including any carriers backing plates and sleeves in walls, floors and ceilings.

3.03 FIELD QUALITY CONTROL

- A. After installation, inspect, and test all furniture, fixtures, and equipment under operating conditions.
- B. Correct defects, re-inspect, and retest until furniture, fixtures, and equipment are operating properly.

3.04 ADJUSTMENT AND CLEANING

- A. Remove all debris, crates, and packaging materials resulting from this work.
- B. Provide protective covers and wrappings until facility finishes are completed.
- C. Clean, test, adjust and sanitize all food service equipment items and fixtures.

3.05 FURNITURE, FIXTURES AND EQUIPMENT SCHEDULE

- A. **ITEM E-2 ICE MAKER:** MANITOWOC iF0900 Air-cooled Ice Cube Machine, model no: IYF-0900A, half-dice, with D-570 storage bin. Include standard remote tubing kit, Luminice II Virus and Bacteria Inhibitor, and external scoop holder. Power usage R410A.
- B. **ITEM E-3 WASHER:** Frigidaire 4.1 cubic feet high efficiency top load washer. Model no: FFTW4120SW, color: White.
- C. **ITEM E-4 DRYER:** Frigidaire 6.7 cubic feet free standing electric dryer. Model no: FFRE4120SW, color: White.
- D. **ITEM E-5 BOOT DRYER:** Williams Direct Dryers, model no: W30 Wall Mounted 30 pair boot dryer. 150 pounds, 120 volt, 12 amps, 1550 watts of heat, 490 cfm blower. 60in x 20in x 80in. 7foot, 3 prong cord, 5-year warranty, CSA certified. 3-way energy management switch and 24 hour wall timer.
- E. **ITEM E-6 SIDE BY SIDE REFRIGERATOR:** Frigidaire 25.6 cubic feet 36in standard depth, model no: GRSS2652AF, stainless steel, with FRIGCOMBO7 Frigidaire PurePour, PWF-1, Pure Air Ultra II, and PureAir Produce Keeper Refill Complete Care Bundle.
- F. **ITEM E-7 ELECTRIC RANGE:** Frigidaire 30in front control electric range with total convection. Model no: GCFE3060BF, stainless steel. Frigidaire 30in overhead range hood. Model no: FHC3025MS, stainless steel.
- G. **ITEM E-8 DISHWASHER:** Frigidaire 24in built-in dishwasher, model no: FFBD2420US, stainless steel.
- H. **ITEM E-16 MICROWAVE:** GE Appliances 1.6 cubic feet counter top microwave, model no: JES1657SMSS Stainless Steel, 1150 Watts, 21.75in x 12.875in x 17.75in.

END OF SECTION

**SECTION 12 32 00
MANUFACTURED WOOD CASEWORK**

PART 1 - GENERAL

1.01 REFERENCES

- A. ANSI A135.4 - Basic Hardboard.
- B. ANSI A208.1 - Mat Formed Wood Particleboard.
- C. AWS - Architectural Woodwork Standards. AWI - Architectural Woodwork Institute.
- D. BHMA A156.9 - Cabinet Hardware.
- E. FS MMM-A-130 - Adhesive, Contact.
- F. HPMA (Hardwood Plywood Manufacturer's Association) HP - American Standard for Hardwood and Decorative Plywood.
- G. NEMA (National Electric Manufacturers Association) LD3 - High-Pressure Decorative Laminates.
- H. NHLA (National Hardwood Lumber Association).
- I. PS 1 - Construction and Industrial Plywood.
- J. PS 20 - American Softwood Lumber Standard.

1.02 SUBMITTALS

- A. Section 01 33 00 - Submittals: Procedures for submittals.
- B. Shop Drawings: Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location and schedule of finishes.
- C. Product Data: Include manufacturer's published literature for specified products, including accessories, specifications, physical characteristics and performance data.
- D. Samples: Submit samples of all cabinet materials and hardware including:
 - 1. 5 inch x 7 inch samples of each color/pattern selection of cabinet finishes.
 - 2. Hardware: Locks, hinges, pulls, drawer glides, door catches, coat hooks, shelf supports, grommets, coat rod and hanger, and sliding glass door track assembly components.
- E. Certificates: Submit certification of manufacturer's qualifications.

1.03 QUALITY ASSURANCE

- A. Perform work in accordance with AWS/AWI Premium Grade quality standards.

- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum three (3) years documented experience.
- C. Comply with "Quality Assurance" provisions, "References, Specifications and Manufacturer's Data".
 - 1. Conform to referenced AWS/AWI standards; Section 2 – Care and Storage, for "Premium Grade" quality product.

1.04 DELIVERY, STORAGE, AND PROTECTION

- A. Section 01 60 00 - Product Requirements: Transport, handle, store, and protect products.
- B. Protect units from moisture damage.

1.05 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.
- B. During and after installation of work of this Section, maintain the same temperature and humidity conditions in building spaces as will occur after occupancy.

1.06 COORDINATION

- A. Coordinate with the mechanical and electrical subcontractors for location, number, size, and shape of cutouts for mechanical and electrical fixtures and fittings. Coordinate with Contractor for location of backing between studs in walls required for casework installation and anchorage.
- B. Coordinate with Owner where equipment to be furnished and installed by Owner may affect casework dimensions.

1.07 COLORS

- A. Colors are specified on the Colors and Materials Schedule on drawings.

1.08 ALTERNATES

- A. See Section 01 23 00 for bidding alternatives affecting work in this Section.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. The following manufacturers are approved to produce product in full compliance with this specification. Approval does not relieve manufacturers from strict compliance with materials and details listed herein.
 - 1. Cabinetmakers, Inc., Puyallup, WA (253) 848-3541
 - 2. Genothen Holdings LLC, Tumwater, WA (360) 352-3636
 - 3. Hewitt Cabinets, Tacoma, WA (253) 272-0404
 - 4. Interior Wood Products, LLC, Olympia, WA (360) 352-7273

5. Martin Furniture Manufacturing, Olympia, WA (360) 709-9147

B. Substitutions: Under provisions of Section 01 60 00.

2.02 MATERIALS

A. Comply with "Quality Assurance" provisions, "References, Specifications and Manufacturer's Data".

1. Conform to referenced AWS/AWI standards; Section 3 - Lumber, for "Premium Grade" quality product.
2. Conform to referenced AWS/AWI standards; Section 4 - Sheet Products, for "Premium Grade" quality product.
3. Conform to referenced AWS/AWI standards; Section 5 - Finishing, for "Premium Grade" quality product.
4. Conform to referenced AWS/AWI standards; Section 10 - Casework, for "Premium Grade" quality product.
5. Conform to referenced AWS/AWI standards; Section 11 - Countertops, for "Premium Grade" quality product.

B. High-Pressure Plastic Laminate Materials (PLAM): Colors as indicated on Colors and Materials Schedule.

1. High-Pressure Plastic Laminate (Vertical Surfaces): Material to be 0.028 inch thick and have textured surface.
2. High-Pressure Plastic Laminate (Horizontal Surfaces): Countertops and horizontal surfaces to be 0.048 inch thick and have textured finish. Balancing sheet a minimum 0.020 inch thick required on countertops.
3. Balancing sheet on inside of doors 0.028 inch thick high-pressure plastic laminate, neutral color and shall meet NEMA standards for vertical grade, matte finish.
4. Neutral color melamine or polyester overlay shall be factory bonded with heat and pressure (thermo-fused).
5. Edge banding shall be high-pressure plastic laminate. Edge banding shall match color and appearance of adjacent high-pressure plastic laminate face.

C. Solid Lumber: Graded in accordance with AWS/AWI Premium Grade quality standards. As specified in Section 06 20 23.

D. Plywood shall be five (5) ply solid face laminated with Type 2 water resistant glue. Provide 1/4 inch plywood for laminated multi-layers, used in curved casework installations.

E. Particleboard: Three (3) ply board of balanced construction of 45 pounds per cubic foot density with moisture content of 8% or less. Provide polyester or melamine overlay factory bonded with 200 psi at 300 degrees F for all open casework not requiring plastic laminate. Polyester or melamine overlay color shall match adjacent plastic laminate color. Provide thermo-fused melamine or polyester overlay on both faces of particleboard not required to have plastic laminate overlay. Submit full range of melamine colors for selection by Architect.

- F. Medium Density Fiberboard: As specified in Section 06 20 23.

2.03 COUNTERTOPS AND BACKSPLASH

- A. Plastic Laminate (PLAM) Countertops and Backsplash: 0.048-inch thick high-pressure plastic laminate factory bonded to 3/4-inch thick particleboard (or plywood where specified) with minimum .028 inch thick backing sheet on opposite side. Exposed edges shall be matching high-pressure plastic laminate, self-edged. Countertop edges shall be matching high-pressure plastic laminate, self-edges over (2) layers of 3/4-inch thick particleboard for 1-1/2 inch countertop edges.
1. Provide water-resistant plywood or medium density fiberboard in lieu of particleboard at counters over dishwashers.
 2. Provide plywood or medium density fiberboard in lieu of particleboard for countertops spanning distance of 30 inch or greater with no supporting casework below.
 3. Provide water-resistant plywood or medium density fiberboard in lieu of particleboard for countertops and backsplash at counters with sinks.
 4. Coordinate with other trades for cutouts, including electrical for boxes and other devices.
- B. Natural Stone Material (NSM):
1. Cambria USA. Natural quartz material. Homogeneous mixture containing 93% pure quartz with additions of high performance polyester resin, pigments and special effects.
 - a. Countertops: 3 cm nominal thick material. Jumbo slab; 65-1/2 inch x 132 inch sheets. Edge thickness of 2 cm.
 2. Architectural Surfaces, Pental Quartz Surface. Natural quartz material. Homogeneous mixture containing 93% pure quartz with additions of high performance polyester resin, pigments and special effects.
 - a. Countertops: 3 cm nominal thick material. Standard 3T slab; 55 inch x 119 inch sheets. Edge thickness of 2 cm.
- C. Resinous Panel Material:
1. 3 Form, SimpleSpec, Privacy Screen.
 2. Material: Varia resin panel.
 3. Hardware: Clear Anodized.
 4. Size: Custom size, refer to drawings.

2.04 HARDWARE

- A. Keyed Locks:
1. Hinged Doors and Drawers: Best RIM 5L Series five (5) pin tumbler dead bolt. Provide positive concealed catch or bolt on inactive leaf of pair of doors.
 2. Locks shall be mastered keyed alike in all rooms.

3. Finish: Satin chromium plate finish.
 4. Provide locks at the following locations: As indicated on the drawings.
- B. Hinges:
1. European Style Concealed Hinge: Blum Clip Top # 75T1550.
- C. Pulls for Doors and Drawers: Provide one (1) pull for each door or drawer.
1. Decorative Pull: Berenson, Advantage Plus Series, #9398-1BPN-P, 128 mm (approximately 5 inches) high, brushed nickel finish.
- D. Adjustable Shelf Supports: Nickel-plated steel or injection molded A.B.S. plastic, champagne color friction fit into end panels and vertical dividers. Provide with integral bearing plate to prevent rotation failure. Knappe & Vogt #346.
- E. Positive Door Catches:
1. Provide Sugatsune No. SU 6901 rotary catch at all casework doors throughout the project in lieu of magnetic catches.
- F. Drawer Slides:
1. Drawer Slides: Knappe & Vogt #1284 nylon roller.
 2. Full Extension Drawer Slides (for File Drawers): Knappe & Vogt #8405 ball bearing, 100-pound rated.
- G. Table Legs with Foot Rail:
1. Symmetry Hardware; support@steeltablelegs.com, 971-363-7134, (www.steeltablelegs.com).
 2. Bar/Counter Height Table Legs, Jumbo Chassis.
 3. Material: welded, rigid tube steel.
 4. Hardware; support@steeltablelegs.com, 971-363-7134, (www.steeltablelegs.com).

2.05 ACCESSORIES

- A. Flip up Power Grommet: Mockett.com. #PCG82D-2 power plus USB-A and USB-C charger, Metallic silver/black (23/90).
- B. Knee Brace: 1-1/2 inch square tube steel support brackets, powder-coated.
- C. Grommets:
 1. Wire Grommets: 2-1/2 inch diameter PVC with removable cover.
 - a. Color: Black at plastic laminate material countertops.
 - b. Color: White at natural stone material countertops.

- c. Color: Black at plastic laminate base cabinet side panel surfaces.
- D. Wire Management:
 - 1. Mockett, J-Shaped Under Desk Wire Cable Manager with Flange, Item WM22, Color: Black, cable management mounted to underside of work top. Location: as noted on drawings.
 - 2. Mockett, Spine Wire Manager Kit with Magnets, Item WM39, Color: Black, magnetic links will cling to metal table bases providing cord management from floor to work top. Location: as noted on drawings.

2.06 FINISHES

- A. Hardwood Veneer Plywood and Solid Lumber: As specified in Section 06 20 23. Refer to Colors and Materials Schedule for Stain color specified.

2.07 FABRICATION AND WORKMANSHIP

- A. Fabrication and workmanship of casework and countertops to comply with AWS/AWI "Premium" grade quality standards.
- B. All exposed surfaces to be finished with high-pressure plastic laminate, unless indicated otherwise.
- C. All parts machined for accurate fit and assembled with appropriate fastenings and adhesives to result in true, square, level, rigid, and plumb units.
- D. Bases: Unit bases of 3/4-inch thick particleboard. Provide 3/4 inch recessed toe space at exposed cabinet ends.
 - 1. Fabricate bases supporting precast architectural concrete and natural stone material countertops to support the additional weight of the countertops. Provide proper level support of countertop to prevent cracks in precast architectural concrete slab after installation.
- E. Cabinet Top, Bottom, and Divisions: 3/4-inch thick particleboard. 1-inch thick for bottoms if 42 inches or more in length. Solid subtop for all lower base cabinets. Plastic laminate at exposed edges unless noted otherwise.
- F. Cabinet Ends: Particleboard, 3/4 inch thick with holes drilled for adjustable shelf clips at 2 inch o.c. Plastic laminate edges at exposed edges, unless noted otherwise. Machine ends to accurate configuration for joining to top and bottom.
- G. Support Panels and End Panels Exposed to View (at open knee spaces): Edges to be plastic laminate self-edge to match adjacent plastic laminate color.
- H. Fixed and Adjustable Shelves: Shelves shall support a load of 50 pounds per square foot. Particleboard, unless noted otherwise; plastic laminate edges. Fixed shelves to be 3/4 inch thick for shelving up to 36 inches wide and 1 inch thick if span is over 36 inches wide. Adjustable shelves shall be 3/4 inch thick for shelving up to 36 inches wide, and 1 inch thick if span is over 36 inches wide.
- I. Semi-Exposed Cabinet Interiors and Shelves: Thermo-fused polyester overlay with plastic laminate or PVC shelf edges to match adjacent plastic laminate color.
- J. Cabinet Back: 1/2 inch thick particleboard.

- K. Cabinet Doors, Hinged: High-pressure plastic laminate factory bonded to face of 3/4 inch particleboard with same material as outside face on inside face; plastic laminate edges flush overlay.
- L. Divisions: Particleboard 3/4-inch thick, plastic laminate edges unless noted otherwise.
- M. Drawers: Applied front, particleboard 3/4 inch thick. Plastic laminate edges as specified. Connect front to drawers in accordance with manufacturer's standards. Bottoms shall be 1/4 inch plywood. Sides, subfront, and backs shall be 1/2 inch plywood surfaced with neutral color polyester overlay.
- N. Plastic Laminate (PLAM) Countertops and Backsplash: Provide continuous top for counter-type cabinets fixed in a line. Include returns at ends of counter where abutting walls. Tops of backsplash shall be scribed and sealed to walls. Seal juncture between countertop and backsplash/sidesplash watertight. Provide 4-inch high backsplash and sidesplash at countertops unless noted otherwise on drawings.
- O. Natural Stone Material (NSM) Countertops and Backsplash: 4 inch high backsplash and sidesplash, unless noted otherwise on drawings. Provide backsplash and sidesplash at countertops unless noted otherwise on drawings. Factory fabrication in accordance to manufacturer's specification standards. Install material in accordance to manufacturer's installation instructions. Shop assembly fabricated components to greatest extent practical to sizes and shapes indicated in accordance with approved shop drawings and manufacturer's installation and technical bulletins. Finish components with clean smooth edges.
 - 1. Sink Mounting Condition: Undermount, unless noted otherwise on drawings.. Provide manufacturer's approved bowl clips, brass inserts and fasteners for attachment of undermount sinks/bowls.
 - 2. Edge Treatment: Eased edge, unless noted otherwise on drawings.
- P. Mechanical and Electrical Penetrations: Coordinate locations and provide finished openings to accommodate mechanical and electrical penetrations. Finish openings shall consist of grommets, plastic laminate, or materials approved by Architect.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Obtain dimensions affecting work of this Section from the site.

3.02 EXAMINATION

- A. Section 01 31 00 - Project Management and Coordination: Verification of existing conditions before starting work.
- B. Verify adequacy of backing and support framing.
- C. Verify location and sizes of utility rough-in associated with work of this Section.

3.03 INSTALLATION

- A. Install casework and countertops to AWS/AWI "Premium" grade quality standards.
- B. Set and secure casework and countertops in place: rigid, plumb, and level.
- C. Use fixture attachments in concealed locations for wall-mounted components.
- D. Use concealed joint fasteners to align and secure adjoining cabinet units and countertops.
- E. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
- F. Secure cabinet and counter bases to floor using appropriate angles and anchorages.
- G. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.
- H. No continuous bases permitted, unless specifically shown otherwise.
- I. Where several units are installed in-line, drill through end panels and secure by bolting using "T" nuts, bolts and finishing washers or hex bolts with finishing washers, or approved connection system. Countertops shall be continuous over units below.
- J. Permanently fix cabinet and counter bases to floor using appropriate angles and anchorages, unless specifically shown on drawings or provided otherwise hereinabove.
- K. Install cylinder locks on doors. Install strike trim. Do not cut into edge trim. Furnish four (4) keys for each room with cabinet locks, properly numbered; furnish three (3) master keys.
- L. Install and adjust cabinet hardware to ensure smooth and correct operation.
- M. No splices in continuous countertops over knee spaces, or otherwise not directly over casework, permitted, unless splices occur directly over wall bracket. Joints, where approved, are to be tight, in perfect alignment, with invisible seams, and not allowing of excessive deflections.
- N. Install Natural Stone Material (NSM) countertops and backsplash in accordance to manufacturer's installation instructions. Install structural substrate material and supports in accordance to manufacturer's specification guide and approved shop drawings.
- O. Install Precast Architectural Concrete (PAC) countertops in accordance to manufacturer's installation instructions. Install structural substrate material and supports in accordance to manufacturer's specification guide and approved shop drawings.

3.04 ADJUSTING

- A. Adjust moving or operating parts to function smoothly and correctly.

3.05 CLEANING

- A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

END OF SECTION

**SECTION 12 48 00
ENTRANCE FLOORING SYSTEM**

PART 1 - GENERAL

1.01 REFERENCES

1. Standards listed by reference, including revisions by issuing authority, form a part of this specification section to extent indicated. The Standards listed here are identified with a designation number, title or other designation established by the issuing authority.

1.02 SYSTEM DESCRIPTION

1. Performance Requirements: Provide recessed entrance floor system, which has been manufactured and installed to maintain performance criteria stated by manufacturer without defects, damage or failure.

1.03 SUBMITTALS

1. General: Submit listed submittals in accordance with the Conditions of the Contract and Division 1 Submittal Procedures Section.
2. Product data: Submit product data, including manufacturer's specification sheet and installation instructions for specified products. Include methods of installation and substrate preparation for each type of substrate.
3. Shop drawings: Submit shop drawings showing layout, profiles and product components, including anchorage, accessories, finish colors, patterns and textures.
4. Samples: Submit samples for each type and color of exposed entrance mat, frames and accessories required. Provide sample of mat materials.
5. Quality Assurance Submittals: (1) Certified test reports showing compliance with specified performance characteristics and physical properties, and (2) Manufacturer's Installation Instructions.
6. Closeout Submittals: (1) Cleaning & Maintenance Data (Include methods for maintaining installed products and precautions against cleaning materials and methods detrimental to finishes and performance), and (2) Warranty.

1.04 QUALITY ASSURANCE

1. Installer: Installer should be highly experienced in performing work of this section, having previously done work similar to that required for this project.

1.05 SEQUENCING/SCHEDULING

1. Ordering: Comply with Manufacturer's ordering instructions and lead-time requirements to avoid construction delays.
2. Delivery: Deliver materials in Manufacturer's original, unopened, undamaged packaging.

3. Storage: Store materials at temperature and in humidity conditions recommended by manufacturer and protect from exposure to harmful weather conditions.
4. Installation: Except as otherwise indicated herein, sequencing or scheduling for performance of work of this section in relation with other work is Contractor's option. Delay installation of mats until near time of substantial completion for the project.

1.06 PROJECT CONDITIONS

1. Temperature: Maintain temperature where products will be installed before, during and after installation as recommended by Manufacturer.
2. Field Measurements: Where possible, verify actual measurements by field measuring before fabrication and include measurements in shop drawings. To avoid construction delays, coordinate field measurements and fabrication schedule based upon construction progress.

1.07 COLORS

- A. Colors are specified on Colors and Materials Schedule.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURER

- A. Milliken Floor Company.

2.02 RECESSED ENTRANCE FLOORING SYSTEM MATERIALS

- A. Recessed Flooring System (WOM-1): Milliken Entrance Flooring, OBEX Bar, Style - CUTX.
- B. Recessed Flooring System will have the following characteristics:
 1. Transition Kit including Recessed Mount Kit and Half Profiles as required to complete a recessed installation of OBEX Bar.
 2. Bar material: Extended aluminum profile with high density polyethylene cushion backing.
 3. Plank width: 10.87" x 39.37."
 4. Textile insert: CUTX
 5. Install: Ashlar.

2.03 ENTRANCE FLOORING TILE MATERIALS

- A. Walk Off Mat (WOM-2): Milliken Entrance Flooring, OBEX Tile, Style – CUTX/Contour.
 1. Construction: Tufted, Cut Pile
 2. Tufted Face Weight: 24 oz/sq. yd.
 3. Backing: PVC-Free WellBAC Comfort Plus Cushion
 4. Product Type: Carpet Tile, 50cm x 50cm.
 5. Install: Quarter Turn.

PART 3 – EXECUTION

3.01 **SUBSTRATE PREPARATION**

- A. Examine substrates and conditions where floor system will be installed. Do not proceed with installation until unsatisfactory conditions are corrected. Sub floor shall be clean and dry, and within acceptable tolerances.

3.02 **INSTALLATION**

- A. Site Conditions: The installation of entrance flooring should not begin until the work of all other trades has been completed, especially overhead trades. Areas to receive flooring should be clean, fully enclosed and weather tight. The permanent HVAC must be fully operational, controlled and set at a minimum of 68° F for a minimum of seven days prior to, during, and seven days after the installation. The flooring material should be conditioned in the same manner for at least 48 hours prior to installation. Areas to receive flooring shall be adequately lighted to allow for proper inspection of the substrate, installation and seaming of the flooring, and for final inspection.

3.03 **CLEANING AND PROTECTION**

- A. General Cleaning: Refer to Manufacturer's Cleaning and Maintenance Instructions.
- B. Owner's Personnel: Instruct Owner's personnel in proper maintenance procedures.
- C. Protection: Protect installed product and finish surfaces from damage during construction and until acceptance.

END OF SECTION

**SECTION 12 49 40
ROLLER SHADES**

PART 1 - GENERAL

1.01 REFERENCES

- A. ASTM G 21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
- B. NFPA 701-99 - Fire Tests for Flame-Resistant Textiles and Films.

1.02 SUBMITTALS

- A. Submit under provisions of Section 01 33 00-Submittal Procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Styles, material descriptions, dimensions of individual components, profiles, features, and operating instructions.
 - 3. Storage and handling requirements and recommendations.
 - 4. Mounting details and installation methods.
- C. Shop Drawings: Plans, elevations, sections, product details, installation details, operational clearances, wiring diagrams and relationship to adjacent work.
- D. Prepare shop drawings on Autocad or Microstation format using base sheets provided electronically by the Architect.
- E. Window Treatment Schedule: For all roller shades. Use same room designations as indicated on the Drawings and include opening sizes and key to typical mounting details.
- F. Selection Samples: For each finish product specified, one set of shade cloth options and aluminum finish color samples representing manufacturer's full range of available colors and patterns.
- G. Verification Samples: For each finish product specified, one complete set of shade components, unassembled, demonstrating compliance with specified requirements. Shadecloth sample and aluminum finish sample as selected. Mark face of material to indicate interior faces.
- H. Maintenance Data: Methods for maintaining roller shades, precautions regarding cleaning materials and methods, instructions for operating hardware and controls.

1.03 QUALITY ASSURANCE

- A. Installer Qualifications: Installer trained and certified by the manufacturer with a minimum of ten years' experience in installing products comparable to those specified in this section.

- B. Fire-Test-Response Characteristics: Passes NFPA 701-99 small and large-scale vertical burn. Materials tested shall be identical to products proposed for use.
- C. Anti-Microbial Characteristics: 'No Growth' per ASTM G 21 results for fungi ATCC9642, ATCC 9644, ATCC9645.
- D. Product Standard: Provide roller shades complying with WCMA A 100.1.
- E. Mock-Up: Provide a mock-up (manual shades only) of one roller shade assembly for evaluation of mounting, appearance, and accessories.
 - 1. Locate mock-up in window designated by Architect.
 - 2. Do not proceed with remaining work until, mock-up is accepted by Architect.

1.04 DELIVERY, STORAGE AND HANDLING

Deliver shades in factory-labeled packages, marked with manufacturer and product name, fire-test-response characteristics, and location of installation using same room designations indicated on Drawings and in the Window Treatment Schedule.

1.06 PROJECT CONDITIONS

- A. Environmental Limitations: Install roller shades after finish work including painting is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.07 WARRANTY

- A. Roller Shade Hardware, Chain and Shadecloth (except EcoVeil™): Manufacturer's standard non-depreciating twenty-five year limited warranty.
 - 1. EcoVeil standard non-depreciating 10-year limited warranty.
- B. Roller Shade Installation: One year from date of Substantial Completion, not including scaffolding, lifts or other means to reach inaccessible areas.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURER

- A. MechoShade Systems, Inc.; 42-03 35th Street, Long Island City, NY 11101. ASD. Tel: (718) 729-2020. Fax: (718) 729-2941. Email: info@mechoshade.com, www.mechoshade.com.
- B. Inpro Corporation; S80 W18766 Apollo Drive, Muskego, WI 53150. Tel: (800) 222-5556. Fax: (888) 715-8407. www.inprocorp.com. Solidarity Solar Shade products equivalent to those specified below are acceptable.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00.

2.02 MATERIALS

- A. Shade Cloth: Visually Transparent Single-Fabric, MechoShade Systems, Inc., ThermoVeil group, 3% openness single thickness non-raveling 0.030-inch (0.762 mm) thick vinyl fabric, woven from 0.018-inch (0.457 mm) diameter extruded vinyl yarn comprising of 21 percent polyester and 79 percent reinforced vinyl, in colors selected from manufacturer's available range.
1. Color: as indicated on Colors and Materials Schedule.
- B. Shade Bands: Construction of shade band includes the fabric, the hem weight, hem-pocket, shade roller tube, and the attachment of the shade band to the roller tube. Sewn hems and open hem pockets are not acceptable.
1. Hem Pockets and Hem Weights: Fabric hem pocket with RF-welded seams (including welded ends) and concealed hem weights. Hem weights shall be of appropriate size and weight for shade band. Hem weight shall be continuous inside a sealed hem pocket. Hem pocket construction and hem weights shall be similar, for all shades within one room.
 2. Shade band and Shade Roller Attachment:
 - a. Use extruded aluminum shade roller tube of a diameter and wall thickness required to support shade fabric without excessive deflection. Roller tubes less than 1.55 inch (39.37 mm) in diameter for manual shades, and less than 2.55 inches (64.77 mm) for motorize shades are not acceptable.
 - b. Provide for positive mechanical engagement with drive / brake mechanism.
 - c. Provide for positive mechanical attachment of shade band to roller tube; shade band shall be made removable / replaceable with a "snap-on" snap-off" spline mounting, without having to remove shade roller from shade brackets.
 - d. Mounting spline shall not require use of adhesives, adhesive tapes, staples, and/or rivets.
 - e. Any method of attaching shade band to roller tube that requires the use of: adhesive, adhesive tapes, staples, and/or rivets are not acceptable.
- C. Shade Fabrication: Fabricate units to completely fill existing openings from head to sill and jamb-to-jamb, unless specifically indicated otherwise.
1. Fabricate shadecloth to hang flat without buckling or distortion. Fabricate with heat-sealed trimmed edges to hang straight without curling or raveling. Fabricate unguided shadecloth to roll true and straight without shifting sideways more than 1/8 inch (3.18 mm) in either direction per 8 feet (2438 mm) of shade height due to warp distortion or weave design. Fabricate hem as follows: Bottom hem weights.
 2. Provide battens in standard shades as required to assure proper tracking and uniform rolling of the shadebands. Contractor shall be responsible for assuring the width-to-height (W:H) ratios shall not exceed manufacturer's standards or, in absence of such standards, shall be responsible for establishing appropriate standards to assure proper tracking and rolling of the shadecloth within specified standards. Battens shall be roll-formed stainless steel or tempered steel, as required.

2.03 COMPONENTS

- A. Access and Material Requirements:
1. Provide shade hardware allowing for the removal of shade roller tube from brackets without removing hardware from opening and without requiring end or center supports to be removed.
 2. Provide shade hardware that allows for removal and re-mounting of the shade bands without having to remove the shade tube, drive or operating support brackets.
 3. Use only Delrin engineered plastics by DuPont for all plastic components of shade hardware. Styrene based plastics, and /or polyester, or reinforced polyester will not be acceptable.
- B. Manual Operated Chain Drive Hardware and Brackets:
1. Provide for universal, regular, and offset drive capacity, allowing drive chain to fall at front, rear or non-offset for all shade drive end brackets. Universal offset shall be adjustable for future change.
 2. Provide positive mechanical engagement of drive mechanism to shade roller tube. Friction fit connectors for drive mechanism connection to shade roller tube are not acceptable.
 3. Provide shade hardware constructed of minimum 1/8-inch (3.18 mm) thick plated steel or heavier as required to support 150 percent of the full weight of each shade.
 4. Drive Bracket / Brake Assembly:
 - a. MechoShade Drive Bracket model M5 shall be fully integrated with all MechoShade accessories, including, but not limited to: SnapLoc fascia, room darkening side / sill channels, center supports and connectors for multi-banded shades.
 - b. M5 drive sprocket and brake assembly shall rotate and be supported on a welded 3/8 inch (9.525 mm) steel pin.
 - c. The brake shall be an over-running clutch design which disengages to 90 percent during the raising and lowering of a shade. The brake shall withstand a pull force of 50 lbs. (22 kg) in the stopped position.
 - d. The braking mechanism shall be applied to an oil-impregnated hub on to which the brake system is mounted. The oil impregnated hub design includes an articulated brake assembly, which assures a smooth, non-jerky operation in raising and lowering the shades. The assembly shall be permanently lubricated. Products that require externally applied lubrication and or not permanently lubricated are not acceptable.
 - e. The entire M5 assembly shall be fully mounted on the steel support bracket, and fully independent of the shade tube assembly, which may be removed and reinstalled without effecting the roller shade limit adjustments.
- C. Drive Chain: #10 qualified stainless steel chain rated to 90 lb. (41 kg) minimum breaking strength. Nickel plate chain shall not be accepted.

PART 3 – EXECUTION

3.01 EXAMINATION

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

3.02 ROLLER SHADE INSTALLATION

- A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions, and located so shade band is not closer than 2 inches (50 mm) to interior face of glass. Allow clearances for window operation hardware.

3.02 ADJUSTING

- A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.03 CLEANING AND PROTECTION

- A. Clean roller shade surfaces after installation, according to manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.
- C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

3.04 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain roller shades. Refer to Division 1 Section Demonstration and Training."

END OF SECTION

**SECTION 13 34 19
METAL BUILDING SYSTEMS**

PART 1 - GENERAL

1.01 REFERENCES

- A. AISC - Specification for Structural Steel for Buildings - Allowable Stress Design and Plastic Design.
- B. AISC - Quality Certification Program, Category MB.
- C. AISI - Specifications for light gauge cold-formed steel.
- D. ASTM A36/A36M - Structural Steel.
- E. ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- F. ASTM A153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- G. ASTM A307 - Carbon Steel Bolts and Studs, 60 000 psi Tensile Strength.
- H. ASTM A325/A325M - High Strength Bolts for Structural Steel Joints.
- I. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- J. ASTM A653 - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- K. ASTM A572/A572M - High-Strength Low-Alloy Columbium-Vanadium Steels of Structural Quality.
- L. ASTM A792 - Steel Sheet, 55% Aluminum - Zinc Alloy - Coated by the Hot-Dip Process.
- M. ASTM C665 - Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
- N. AWS A2.0 - Standard Welding Symbols.
- O. AWS D1.1 - Structural Welding Code - Steel.
- P. MBMA (Metal Building Manufacturers Association) - Metal Building Systems Manual.
- Q. SDI-100 - Standard Steel Doors and Frames.

1.02 DESIGN REQUIREMENTS

- A. General:
 - 1. It is the responsibility of the Contractor to provide all information to the Building Department necessary to secure the permit or certificate of occupancy.

- B. Design Criteria:
1. For structural steel members, comply with AISC "Specification for Structural Steel".
 2. For light gauge steel members, comply with AISI "Specification for Light Gauge Cold-Formed Steel".
 3. Design primary and secondary members and covering for applicable loads and combination of loads in accordance with Metal Building Manufacturer's Association (MBMA) "Metal Building Systems Manual".
 4. For welded connections, comply with AWS "Structural Welding Code."
- C. Design Loads:
1. Design to local governing Building Code criteria.
 2. In addition to the building system self-weight, design roof framing for a minimum collateral dead load of 5 psf.
- D. Design each member to withstand stresses resulting from combinations of loads that produce maximum percentage of actual to allowable stress in that member, as prescribed in MBMA "Metal Building Systems Manual".
- E. Fabrication Criteria: Provide prefabricated metal buildings as produced by a manufacturer who is regularly engaged in fabrication and erection of pre-engineered metal structures of type and quality indicated.
- F. Roof must support a human load for access and maintenance of roof top equipment.
- G. Clearly and legibly mark each piece and part of assembly to correspond with previously prepared erection drawings, diagrams, and instruction manuals.
- H. Supports for mechanical, electrical, and equipment items.
1. Provide engineering, design, materials, and labor for the installation of structural members required to support mechanical, electrical, and equipment items.

1.03 SUBMITTALS

- A. Submit in accordance with Section 01 33 00.
- B. Product Data:
1. Submit manufacturer's product information and specifications for building components and accessories.
- C. Shop Drawings:
1. Submit complete erection drawings showing anchor bolts settings, sidewall, endwall, and roof framing, transverse cross-sections, flashing details, covering and trim details, equipment supports, and accessory installation details to clearly indicate proper assembly of building components. Furnish stamp by a registered Professional Engineer, licensed in the State of Washington.
- D. Furnish calculations, stamped by a Registered Professional Engineer, licensed in the State of Washington, showing that the building design meets the requirements of the specifications

and is in accordance with accepted engineering practices and as per local governing building code.

- E. Samples:
1. Submit samples of the following: Architect's review will be for color and texture only. Compliance with other requirements is the responsibility of the Contractor.
 - a. 12 in. long by actual width of roofing and siding panels with required finishes.
 - b. Fasteners for application of roofing and siding panels.
 - c. Sealants and closures.
 2. Submit color samples for selection by Architect. Allow one (1) color.

1.04 QUALITY ASSURANCE

- A. Perform work in accordance with MBMA.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum three (3) years.
- C. Erector Qualifications: Company specializing in performing the work of this Section approved by manufacturer.
- D. Design structural components, develop shop drawings, and perform shop and site work under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of Washington.

1.05 REGULATORY REQUIREMENTS

- A. Conform to local building codes and criteria for submission of design calculations, reviewed shop and erection drawings, as required for acquiring permits.
- B. Cooperate with regulatory agency or authority and provide data as requested.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store prefabricated components, sheets, panels and other manufactured items so they will not be damaged or deformed. Stack materials on platforms or pallets, covered with tarpaulins or other suitable weathertight ventilated covering. Store metal sheets or panels so that water accumulations will drain freely. Do not store sheets or panels in contact with other materials that might cause staining.

1.07 COLORS

- A. Colors are specified on Colors and Materials Schedule on drawings.

1.08 ALTERNATES

- A. See Section 01 23 00 for bidding alternates affecting the work of this Section.

PART 2 - PRODUCTS

2.01 **MANUFACTURERS - BUILDING SYSTEM**

- A. General: This section applies to Structural engineering and construction of Buildings C, D, E, F, G & H.
- B. Manufacturer: The following manufacturers are acceptable provided they supply products meeting the requirements of this specification and specification standard:
 - 1. Butler Manufacturing.
 - 2. American Steel Span
 - 3. Star Building Systems
 - 4. Varco Pruden..
- C. Substitutions:
 - 1. Under provisions of Section 01 60 00.

2.02 **MATERIALS - STRUCTURAL STEEL FRAMING**

- A. Structural Steel Members: ASTM A572/A527M, Grade 50.
- B. Structural Tubing: ASTM A500.
- C. Plate or Bar Stock: ASTM A529.
- D. Anchor Bolts: ASTM A307.
- E. Bolts, Nuts, and Washers: ASTM A325, galvanized to ASTM A153.
- F. Welding Materials: AWS D1.1; type required for materials being welded.
- G. Primer: SSPC 20, Red Oxide.
- H. Grout: ASTM C1107, Non-shrink type, premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents, capable of developing minimum compressive strength of 2400 psi in two (2) days and 7000 psi in twenty-eight (28) days.

2.03 **MATERIALS - WALL AND ROOF SYSTEM**

- A. Standing Seam Metal Roofing: Provide panels, trim, flashing and accessories as specified in Section 07 61 13 Standing Seam Metal Roofing.
- B. Vertical Metal Siding: Provide panels, trim, flashing and accessories as specified in Section 07 46 19 Metal Siding, Metal Soffit and Metal Roofing Panels.
- C. Metal Soffit and Linear Panels: Provide panels, trim, flashing and accessories as noted in this Section and additional requirements specified in Section 07 46 19

2.04 **TRIM AND FLASHING**

- A. Provide metal trim and metal flashing of same material as vertical metal siding, metal soffit

panels and standing seam metal roofing panels and structural supports around all door, window and louver openings, including metal termination trim and end conditions.

- B. Provide metal trim and metal flashings for roof ridge, rake, fascia and eave conditions.
- C. Provide metal trim and metal flashing at wall inside and outside corners.
- D. Provide metal flashing and metal trim at metal soffits forming a box beam profile concealing structural steel framing as shown on drawings.
- E. Provide metal flashing and metal trim of same material as vertical metal siding at heads jambs and sills of all doors, windows and louver openings.

2.05 ROOF AND WALL INSULATION

- A. Coordinate interfacing with work to be done in Section 07 21 00 Building Insulation with General Contractor.
- B. Building Insulation Materials:
 - 1. Roof Assembly: Provide Simple-Saver Insulation System as specified in Section 07 21 00.
 - 2. Wall Assembly (Above Grade – Metal Building): Provide Simple-Saver Insulation System as specified in Section 07 21 00.
 - 3. Wall Assembly (Above Grade - Mass): Provide as specified in Section 07 21 00.

2.06 METAL DOORS AND DOOR FRAMES

- A. General: Provide hollow metal doors and frames of the best commercial quality meeting SDI (Steel Door Institute) recommendations, specifications, and standards
- B. Doors and Frames: As specified in Section 08 11 13.
- C. Finish: Provide paint finish to match adjacent wall panels
- D. Hardware: As specified in Section 08 71 00

2.07 MATERIALS - ROLLING SERVICE DOORS

- A. Rolling Service Doors: Provide as specified in Section 08 33 23 Rolling Service Doors and Security Grille Systems.
 - 1. Frames: Profile Metal fabrications as specified in Section 05 50 00.

2.08 MATERIALS - LOUVERS

- A. Louvers: Provide as specified in Section 08 91 00 Louvers and as shown on drawings.

2.09 ACCESSORIES

- A. Closure Strips: Semi-rigid polyethylene foam.
- B. Tape Sealant: Manufacturer's standard.
- C. Sealant: As specified in Section 07 92 00 Joint Sealants.

2.10 FABRICATION – STRUCTURAL STEEL FRAMING

- A. Fabricate structural steel members in accordance with AISC Specification for plate, bar, tube, or rolled structural shapes.
- B. Anchor Bolts: Formed with bent shank, assembled with template for casting into concrete.
- C. Framed Openings:
 - 1. Provide shapes of proper design and size to reinforce opening and to carry loads and vibrations imposed, including equipment furnished under mechanical or electrical work. Securely attach to building structural frame.
- D. Girts and Purlins: Rolled formed structural steel shapes.

2.11 COORDINATION - WALL, SOFFIT AND ROOF ASSEMBLIES

- A. Cold Former Metal Framing: Provide as specified in Section 05 40 00.
 - 1. Sub-Framing: Provide sub-framing members in Z-shaped, L-shaped, C-shaped and other profiles as required to form rake, ridge, fascia, soffit, parapet, boxed beam and other exterior roof, wall, soffit and eave conditions shown on drawings.
- B. Metal Fabrications: Provide as specified in Section 05 50 00.
- C. Exterior Gypsum Sheathing: Provide as specified in Section 06 16 43.
- D. Weather Resistive Barriers: Provide as specified in Section 07 25 00.

2.12 FABRICATION GUTTERS AND DOWNSPOUTS

- A. Gutters and Downspouts: Provide as specified in Section 07 62 00 Sheet Metal Flashing and Trim.
- B. Fabricate of same material and finish as standing seam metal roofing.
- C. Form gutters and downspouts of profile and size to collect and remove water. Fabricate with connection pieces.
- D. Form sections in maximum possible lengths. Hem exposed edges. Allow for expansion at joints.
- E. Fabricate support straps of same material and finish and color as metal roofing.

2.13 FINISHES

- A. Protective Coatings:
 - 1. Primer Coating: Shop prime structural steel members with primer paint. Do not shop prime steel that is indicated or specified to be galvanized. For steel that is indicated or specified to be field finish painted, coordinate shop primer with the paint system specified in Section 09 91 00.
 - a. Shop prime surfaces to be embedded in concrete or mortar to a depth of 2 inches.

- b. Do not shop prime surfaces to be field welded.
 - c. Do not shop prime surfaces to be high-strength bolted with slip-critical connections.
2. Galvanized Coating: All structural members on building exterior, exposed to outdoor atmosphere or shown on drawings shall be hot-dip galvanized in accordance with ASTM A123; provide minimum 2.0 oz/sq. ft. galvanized coating. Do not apply pre-treatments or passivation to steel members that are indicated to be primed and painted.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Section 01 31 00 – Project Management and Coordination: Verification of existing conditions before starting work.
- B. Verify that foundation, floor slab, mechanical and electrical utilities, and placed anchors are in correct position.

3.02 ERECTION - FRAMING

- A. Erect framing in accordance with AISC Specification.
- B. Provide for erection and wind loads. Provide temporary bracing to maintain structure plumb and in alignment until completion of erection and installation of permanent bracing.
- C. Set column base plates with non-shrink grout to achieve full plate bearing.
- D. Do not field cut or alter structural members without approval of Architect/ Engineer.
- E. After erection, prime welds, abrasions, and surfaces not shop primed.

3.03 INSTALLATION – WALL, SOFFIT AND ROOF MATERIALS

- A. Standing Seam Metal Roofing: Install panels, trim, flashing and accessories as specified in Section 07 61 13 Standing Seam Metal Roofing.
- B. Vertical Metal Siding: Install panels, trim, flashing and accessories as specified in Section 07 46 19 Metal Siding, Metal Soffit and Metal Roofing Panels.
- C. Metal Soffit and Linear Panels (MSP): Install panels, trim, flashing and accessories as specified in Section 07 46 19 Metal Siding, Metal Soffit and Metal Roofing Panels.

3.04 INSTALLATION - INSULATION

- A. Install in accordance with manufacturer's published installation instruction.
- B. Install in accordance to specification Section 07 21 00 Thermal Insulation.

3.04 INSTALLATION - INSULATION

A. Thermal Insulation:

1. Install in accordance with manufacturer's published directions, performed concurrently with installation of roof panels. Install blankets straight and true in one (1) piece lengths and both sets of tabs sealed to provide a complete vapor barrier. Install retainer strips at each longitudinal joint straight and taut, nesting with roof rib to hold insulation in place.

B. System:

1. Free of rattles, noise due to thermal movements and wind whistles.

3.05 ERECTION - GUTTER AND DOWNSPOUTS

- A. Install in accordance to specification Section 07 62 00 Sheet Metal Flashing and Trim
- B. Rigidly support and secure components. Joint lengths with formed seams sealed watertight. Flash and seal gutters to downspouts.
- C. Apply bituminous paint on surfaces in contact with cementitious materials.
- D. Slope gutters to downspouts.

3.06 INSTALLATION – MISCELLANEOUS ITEMS AND ACCESSORIES

A. Miscellaneous Items and Accessories:

1. Install Signs, vents, louvers, and other sheet metal accessories in accordance with manufacturer's recommendations for positive anchorage to building and weather tight mounting. Adjust operating mechanism for precise operation. Provide flashing across top of all openings.

B. Swing Doors and Frames:

1. Provide framing and structural support for door and relite frames.

C. Mechanical, Electrical, and Equipment Items:

1. Coordinate with Specification Divisions 20, 21, 22, 23, 25, 26, 27, 28 and equipment requirements. Provide structural supports.

D. Seal wall and roof accessories watertight and weather tight.

3.07 TOLERANCES

A. Framing Members:

1. 1/4 in. from level; 1/8 in. from plumb.

B. Siding and Roofing:

1. 1/8 in. from true positions.

END OF SECTION