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1750 OX RESIDENCES
EAU CLAIRE, WISCONSIN

RFI NO.___

REQUEST FOR INFORMATION FORM

Date:

To: **OPENING DESIGN**

From:

Spec Sec. Ref: Para: Drawing Ref: Detail:

Signed:

Response:

❑ Attachments

Response From: To: Sent: Rec'd:

Signed:

Copies: ❑ Owner ❑ Consultants ❑ ❑ ❑ ❑ File

SECTION 006325 - SUBSTITUTION REQUEST FORM

TO: **OPENING DESIGN** DATE: _____

ATTN:_____

We hereby submit the following for your consideration in lieu of the specified item(s) for the above project:

Specification Section_____ . Paragraph _____ . Referenced Drawing(s) _____

Specified Item: _____

Proposed Substitution: _____

Reason for Substitution: _____

.....

COMPLETE THE FOLLOWING (Use back or additional sheets if necessary).

1. Does the substitution affect dimensions shown on Drawings? Yes _____. No _____.
   If yes, indicate changes: _____
2. What effect does the substitution have on other trades? _____
   _____
3. What effect do applicable code requirements have on substitution? _____
   _____
4. Describe the differences between the proposed substitution and the specified item(s):
   _____
   _____
5. How do manufacturer guarantees compare between proposed and specified items?
   ☐ Same ☐ Different (Explain on back.)

.....

What is projected lump sum installed cost difference between proposed substitution and least expensive specified item? $_____. [Ø; (decrease); increase]

The undersigned hereby:

- Certifies that the proposed substitute item has been fully investigated and has been determined to be equal or superior to that specified in all respects; that the same or greater warranty will be furnished, that required maintenance service and source for replacement parts are available, and that incorporation of the proposed substitute item will not affect functional clearances.
- Warrants that coordination, installation, and changes to the project as necessary to accommodate the proposed substitution shall be the Contractor's responsibility, that use of the substitute item(s) will not delay project completion, and that claims for additional costs related to its incorporation which may become subsequently apparent will be borne by the Contractor.

Approved For Architect Review: _____
Signature Title

Signature shall be by a person having authority to legally bind the Contractor to the above terms.

☐ Substitution Allowed ☐ Substitution Allowed As Noted ☐ Substitution Not Allowed Date:_____

By: _____
Signature Title

END OF SUBSTITUTION REQUEST FORM

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Special work requirements.
2. Separate work.
3. Owner-furnished Contractor installed products.
4. Coordination.
5. Reference standards.
6. Applicable codes.
7. Field engineering.
8. Request for information

B. This Section applies to all Technical Specification Sections, and supplements the General and Supplementary Conditions.

1.2 SPECIAL WORK REQUIREMENTS

A. Limit use of premises to allow for construction operations, to allow for Owner occupancy and work by other Contractors.

B. Owner Occupancy:
1. Owner will occupy premises during certain stages of construction, for installation of Owner-provided items. Cooperate with Owner to minimize conflict, and to facilitate Owner's operations.
2. Coordinate use of premises under direction of Owner.
3. Perform demolition to minimize interference with adjacent occupied and public spaces.

C. Noise Producing Activities:
1. Comply with City of Seattle Sound Ordinances .
2. Comply with Section 015000 requirements for sound levels and noise control.

D. Select materials, utilize personnel, perform preparatory work, and sequence work in an area as required so that the work may be completed in the least amount of time possible.

E. All work shall be performed in a manner to maintain a normal business environment to the greatest extent possible.

1.3 SEPARATE WORK

A. Items noted "NIC" (Not In Contract) or FOIO (Furnished by Owner Installed by Owner), will be furnished and installed by Owner.

1.4 OWNER-FURNISHED CONTRACTOR INSTALLED PRODUCTS

A. Items noted FOIC (Furnished by Owner Installed by Contractor) will be furnished by the Owner for Installation by the Contractor:

B. Coordinate work to facilitate installation of products furnished by the Owner for Installation by the Contractor, as directed, and as indicated "FOIC," on the Drawings.

C. Owner's Responsibilities:
1. Arrange for and deliver shop drawings, product data, and samples, to Contractor.
2. Arrange and pay for product delivery to site.
3. Upon delivery, inspect products jointly with Contractor.
4. Submit claims for transportation damage.
5. Arrange for replacement of damaged, defective, or missing items.
6. Arrange for manufacturers' warranties, inspections, and service.

D. Contractor's Responsibilities:
1. Review shop drawings, product data, and samples.
2. Receive and unload products at site; inspect for completeness, for damage, jointly with Owner.
3. Handle, store and install products.

4. Repair or replace items damaged by Work of this Contract.

1.5 REFERENCE STANDARDS

A. For products specified by association or trade standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. The date of the standard is that in effect as of the Bid date, or date of Owner-Contractor Agreement when there are no bids, except when a specific date is specified.

C. Obtain copies of standards when required by Contract Documents. Maintain copy at jobsite during progress of the specific work.

1.6 APPLICABLE CODES

A. Conform to the codes listed on the Drawings.

1.7 FIELD ENGINEERING

A. Provide field engineering services; establish grades, lines, and levels, by use of recognized engineering survey practices.

B. Control points are those shown on Drawings. Locate and protect control and reference points. Notify the Architect if reference points cannot be located.

1.8 REQUEST FOR INFORMATION

A. Allot time to resolve questions concerning the Construction Documents with the Architect.

B. Use a "Request for Information" form or another form as approved by the Architect.

C. Allow sufficient time in construction schedule for Architect’s response to the RFIs.

END OF SECTION

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Identification and description of Alternate work.

B. Related Sections:
   1. Owner-Contractor Agreement: Alternates accepted by Owner for incorporation into the Work.
   2. Sections of Specifications identified in each Alternate.

C. This Section supplements the General and Supplementary Conditions.

1.2 PROCEDURES

A. Alternates will be exercised at the option of Owner.

B. Coordinate related work and modify surrounding work as required to complete the Work, including changes under each Alternate, when acceptance is designated in Owner-Contractor Agreement.

1.3 ALTERNATE DESCRIPTIONS

A. ALTERNATE NO. 1 –
   1. **Under Basic Bid**
   2. **Under Alternate**:

B. ALTERNATE NO. 2 –
   1. **Under Basic Bid:**
   2. **Under Alternate**: .

C. ALTERNATE NO. 3 –
   1. **Under Basic Bid:**
   2. **Under Alternate**:

D. ALTERNATE NO. 4 –
   1. **Under Basic Bid:**
   2. **Under Alternate**:

END OF SECTION

SECTION 013113 - PROJECT COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. General coordination provisions.
   2. Requirements for coordination of space.

B. This Section applies to all Technical Specification Sections, and supplements the General and Supplementary Conditions.

1.2 GENERAL COORDINATION PROVISIONS

A. Coordinate work of various specification sections to assure efficient and orderly sequence of installation of construction elements, with provisions for accommodating items installed later.

B. Carefully study and compare Contract Documents before proceeding with fabrication and installation of work. Promptly advise Architect of any error, inconsistency, omission, or apparent discrepancy discovered.

C. Allot time in construction scheduling for liaison with Owner and Architect. Establish procedures for handling queries and clarifications. Use Contractor's standard "Request for Information" form to initiate clarifications. Allow 5 working days in construction schedule for Architect's response to the request.

D. In addition to meetings specified in Section 013119, hold coordination meetings and conferences with personnel and subcontractors to assure coordination of the work.

E. Coordinate scheduling, submittals, and work of various specification sections to ensure efficient and orderly sequence of installation of independent construction elements.

F. Verify that characteristics of operating equipment are compatible with building utilities and services.

G. Verify characteristics of elements of interrelated operating equipment are compatible; coordinate work of various specification sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

H. In finished areas, except as otherwise indicated, conceal pipes, conduit and wiring in the construction. Coordinate locations of fixtures and outlets with finish elements. See Room Finish Schedule for rooms with finishes.

I. Execute cutting and patching to integrate elements of work, uncover ill-timed, defective, and non-conforming work, provide openings for penetrations of existing surfaces, and provide samples for testing. Seal penetrations through floors, walls, and ceilings.

1.3 COORDINATION OF SPACE

A. The Contractor shall be responsible for coordinating the actual layout of plumbing, fire protection, HVAC, electrical, and other similar elements, as necessary to avoid interference and maintain the configurations of architectural elements.

B. Items noted in paragraph 1.3.A as shown on the Drawings are diagrammatic. Follow routings shown for pipes, ducts, and conduit as closely as practical. Where routing changes are required in exposed locations within public spaces, or will affect architectural elements, verify modifications with the Architect prior to proceeding.

C. Develop coordination drawings, and other preinstallation coordination methods as necessary to coordinate layouts prior to installation. Coordination drawings shall be based on the approved structural steel framing shop drawings, and shall consist of overlay drawings, or other similar methods to graphically indicate plumbing, fire protection, HVAC, electrical, and other similar elements in a single location in order to identify conflicts.

D. Where coordination drawings, or other preinstallation coordination methods show that available space is inadequate or that modifications will affect architectural elements, request information from the Architect before proceeding with work. No additional payment will be made for installation conflicts which could have been identified by coordination drawings or other preinstallation coordination methods.

E. Provide clear access to control points, valves, strainers, control devices, and specialty items of every nature to such systems and equipment to obtain maximum head room. Provide adequate clearances as necessary for operation and maintenance.

F. Make runs parallel with lines of building. Utilize space efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

PART 2 - PRODUCTS

A. Not Used.

PART 3 - EXECUTION

A. Not Used.

END OF SECTION

SECTION 013119 - PROJECT MEETINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Contractor participation in pre-construction conferences.
   2. Contractor administration of progress meetings and pre-installation conferences.

B. This Section applies to all Technical Specification Sections, and supplements the General and Supplemental Conditions.

1.2 GENERAL MEETING REQUIREMENTS

A. Make physical arrangements for meetings; notify participants, prepare agenda with copies for each attendee.

B. Take meeting minutes, and distribute copies within 2 days to the Owner, Architect, and all attendees. Distribute copies to other parties as appropriate.

C. All representatives attending meetings shall be authorized to act on behalf of the entity each represents.

D. Architect will attend meetings to ascertain the work is expedited consistent with Contract Documents and construction schedules.

1.3 PRECONSTRUCTION CONFERENCES

A. Architect will administer pre-construction conference for execution of Owner-Contractor Agreement and exchange of preliminary submittals.

B. Architect will administer site mobilization conference at Project site for clarification of Owner and Contractor responsibilities in use of site and for review of administrative procedures.

1.4 PROGRESS MEETINGS

A. Schedule and administer progress meetings throughout the Work at maximum bi-monthly intervals.

B. Attendance: Job superintendent, major subcontractors and suppliers, Owner, Architect, and others as appropriate to the meeting agenda.

C. Suggested Agenda:
   1. Review of Work progress.
   2. Status of progress schedule and adjustments.
   3. Delivery schedules.
   4. Submittals.
   5. Maintenance of quality standards.
   6. Pending changes and substitutions
   7. Other items affecting progress of Work.

1.5 PRE-INSTALLATION CONFERENCES

A. Where required in a specification Section, schedule and administer a pre-installation conference prior to commencing work of the Section.

B. Unless otherwise required, notify the Architect a minimum of 7 calendar days prior to each scheduled meeting.

C. Require the attendance of entities directly affecting, or affected by, the work of the Section.

D. Review conditions of installation, preparation and installation procedures, and coordination with related work.

END OF SECTION

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Submittal form requirements.
   2. Submittal schedule.
   3. General requirements for submittals to the Architect.
   4. Requirements for each type of submittal.

B. Related Sections:
   1. 006323 - Request for Transfer of Documents.
   2. 007200 - General Conditions of the Contract: Additional submittal requirements.
   3. 016000 - Product Requirements: Substitution submittals.
   4. 017700 - Closeout Procedures: Closeout submittals.

C. This Section applies to all Technical Specification Sections, and supplements the General and Supplementary Conditions.

1.2 SUBMITTAL FORM REQUIREMENTS

A. Provide the following, as applicable, on each submittal:
   1. Present and previous submittal dates.
   2. The Project title and number.
   3. Contractor's submittal number.
   4. Subcontract identification.
   5. The names of:
      a. Contractor.
      b. Supplier.
      c. Manufacturer.
   6. Identification of revisions on resubmittals.
   7. For each product, reference corresponding specification section and paragraph number.
   8. A 6 x 4 inch blank space for Contractor and Architect stamps.

B. Deliver submittals to the Architect. Include name of contact person identified at the time of Agreement.

C. Transmit submittals under AIA form G810 or other transmittal form as accepted by the Architect.

D. Submittals in graphic form shall be clear readable copies with Contractor's original stamp. Facsimile submittals will not be accepted.

1.3 SUBMITTAL SCHEDULE

A. Make submittals to the Architect as required to cause no delay in the work.

B. Allow a minimum of 10 working days from receipt, for the Architect to review each submittal. Allow additional time for large and complex submittals representing major portions of the Work, such as fire protection, structural steel, or curtain wall where construction schedule permits.

C. Schedule submittals to allow sufficient time for possible revision and resubmittal of the rejected submittals, without affecting the construction schedule.

D. Make the following submittals to the Owner and Architect prior to starting construction and within 20 working days of the Notice to Proceed:
   1. Certificates of insurance.
   2. List of subcontractors and suppliers.
   3. Construction schedule.
   4. Submittal log.
   5. Products list.

E. Submit Schedule of Values with first application for payment. Submit revised Schedule of Values with nearest payment application following revision.

1.4 GENERAL REQUIREMENTS FOR SUBMITTALS TO THE ARCHITECT

A. Make provisions to allow for electronic submittals, as applicable.

B. Make submittals to the Architect, unless otherwise specified.

C. Review submittals prior to submittal to the Architect.

D. Stamp and sign each submittal as certification that the submittal has been reviewed by the Contractor. Submittals not stamped and signed by the Contractor will be returned by the Architect without review for resubmittal.

E. Notify the Architect in writing, at time of submission, of all deviations in the submittals from requirements of the Contract Documents.

F. Make additional copies of approved submittals as necessary to implement the Work.

G. Review and approval of a submittal by the Architect shall not relieve the Contractor from responsibility for the proper fitting, finishing, quantities, and erection of the work in strict accordance with the Contract requirements.

H. Review and approval of a submittal by the Architect shall not relieve the Contractor from the responsibility for providing work not indicated on the submittal, but otherwise required for the completion of the work.

I. Do not fabricate or erect work prior to approval of the submittals.

J. Should discrepancies become evident, immediately notify Architect for resolution before proceeding with shop work.

K. Incorporation of substitutions into submittals will be considered cause for rejection of the submittal.

L. Submittals will be reviewed by the Architect for conformance to the design concept, only. Architect's review of vendor designed items shall not relieve the Contractor of responsibility for compliance with specified performance requirements.

1.5 CONSTRUCTION SCHEDULE

A. Prepare schedule in the form of a network planning system (CPM) for scheduling and controlling the work. Note the critical path.

B. Show commencement and completion dates proposed for each subdivision of work.

C. Update and submit monthly. Indicate actual start and completion of all completed activities. Graphically indicate changes from previously issued schedule.

D. Incorporate remedial construction into schedule when remedial work is required.

E. Show submittal dates required for shop drawings, product data, and samples, and product delivery dates, including those furnished by Owner.

F. Coordinate with the Owner's schedule, showing all Contract activities to be performed by the Owner including their start, duration, completion, float and critical path.

1.6 SUBMITTAL LOG

A. List each type of submittal, and the date that the submittal will be made. Indicate Architect review time proposed.

1.7 SCHEDULE OF VALUES

A. Submit Schedule of Values prior to first Application for payment.

B. Submit schedule on AIA Form G703. Contractor's standard form or media-driven printout will be considered on request.

C. Format: Table of Contents of this Project Manual. Identify each line item with number and title of the major Specification Sections.

D. Include in each line item amount of Allowances. For unit cost Allowances, give quantities measured from Contract Documents multiplied by the unit cost equal to the total for the item.

E. Include in each line item a directly proportional amount of Contractor's overhead and profit.

F. Revise schedule to list change orders, for each application for payment.

G. Provide a sub-schedule for each separate stage of Work specified in Section 011000.

1.8 SHOP DRAWINGS

A. Submit Shop Drawings required by individual Sections of the Specifications, and as otherwise required for proper performance of the work.

B. Illustrate fully the requirements of the Specifications and the Contract Drawings, and accurately show quantities, kinds of materials, methods of assembly, and all data required for fabrication, erection, and installation.

C. Show the relationship of adjoining work, relevant field conditions and dimensions; coordinate with affected subcontractors and suppliers if in conflict.

D. Number of Copies: Unless otherwise specified, submit 2 legible right-reading copies to the Architect for review or 1 digital copy.

E. The Architect will return one copy to Contractor with corrections, notations and Architect's stamp indicating action to be taken.

F. Electronic data of portions of the Contract Documents may be available for use as a base for preparation of shop drawings. The General Contractor shall be responsible for all subsequent distribution of such information to subcontractors and suppliers. Request documents by submitting an executed copy of the "Request for Transfer of Documents" form, following this Section. Use of such documents implies Contractor's and subcontractors' agreement to the terms described on the form. Fully describe requirements for each request.
   1. Reproducible backgrounds.
      a. Copies of contract drawings, or copies of CADD generated drawings with designated data layers, only.
   2. Database of CADD generated drawings.
      a. Release of CADD information will be restricted to the following categories:
         1) Architectural floor plans.
         2) Site plan.
         3) Reflected ceiling plans.
         4) Exterior elevations.
         5) Stair sections.
         6) Structural framing plans.
      b. The CADD database will be generated on PC hardware with REVIT software. Architect has the capability to format CADD output to meet capabilities of all major platforms and major media types.
      c. When requesting CADD databases, specify the output form required.

1.9 PRODUCT DATA

A. Mark each copy to identify applicable products, models, options, and other data. Include manufacturer's printed installation instructions.

B. Submit the number of copies which Contractor requires, plus 1 copy which will be retained by Architect.

C. Modify product data and installation instructions to delete information which is not applicable to the work.

D. Supplement standard information to provide information specifically applicable to the work.

SECTION 013300 - SUBMITTAL PROCEDURES

1.10 SAMPLES

A. Submit samples as specified in the technical Sections.

B. Include identification on each sample, giving full information.

C. Submit the number of samples specified in the technical Sections. Where quantity is not specified, submit 3 samples. One will be retained by the Architect.

D. Unless specified otherwise, submit full range of manufacturers' standard colors, textures, and patterns for Architect's selection. Submit samples for selection of finishes within 20 days after date of Contract.

E. Submit samples to illustrate functional characteristics of the product, with integral parts and attachment devices. Coordinate submittal of different categories for interfacing work.

END OF SECTION

SECTION 014500 - QUALITY CONTROL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. General requirements.
   2. Workmanship.
   3. Special installation procedures
   4. Manufacturer's instructions.
   5. Manufacturer's certificates.
   6. Mock-ups.
   7. Manufacturers' field services.
   8. Testing laboratory services.
   9. Contractor tests and inspections.

B. Related Sections:
   1. 011000 - Summary: Applicability of specified reference standards.
   2. 013300 - Submittal Procedures: Submittal of manufacturer's instructions.

C. This Section applies to all Technical Specification Sections, and supplements the General and Supplemental Conditions.

1.2 GENERAL QUALITY CONTROL

A. Maintain quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.

1.3 WORKMANSHIP

A. Comply with industry standards, except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.

B. Perform work with persons qualified to produce workmanship of specified quality.

C. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.

1.4 SPECIAL INSTALLATION PROCEDURES

A. Make no attachment to structural concrete or steel members in the building in such a way as to overload or impair the structural integrity of the member.

1.5 MANUFACTURERS' INSTRUCTIONS

A. Unless specified otherwise, comply with instructions in full detail, including each step in sequence. Should instructions conflict with Contract Documents, request clarification from Architect before proceeding.

1.6 MANUFACTURERS' CERTIFICATES

A. When required by individual Specifications Section, submit, in duplicate, manufacturer's certification that products meet or exceed specified requirements.

1.7 MOCK-UPS

A. Provide mock-ups as specified in the individual specification sections. When the initial mock-up does not meet the design intent, provide additional mock-ups until approval is obtained.

B. Unless specified or approved otherwise, schedule mock-ups for completion a minimum of 10 working days prior to actual commencement of the work represented by the mock-up.

C. Notify the Architect and Owner a minimum of 5 working days prior to mock-up.

D. For each mock-up, provide conditions which will replicate the conditions of the actual installation, including lighting, to the greatest reasonable extent.

E. Approved mock-up shall be the standard of workmanship and materials for the remainder of the related work.

F. Contractor may proceed with the work upon Architect's approval of the mock-up

G. Maintain mock-up in approved condition, until directed otherwise.

H. Disposition of Mock-Ups:
   1. Rejected mock-ups shall be selectively demolished to accommodate new mock-ups, or completely removed as appropriate.
   2. Mock-ups constructed as part of the proposed work, and which have been approved by the Architect, may be incorporated into the work.
   3. Unless specified or directed otherwise, approved mock-ups which are not incorporated into the work shall be removed upon project completion.

1.8 MANUFACTURERS' FIELD SERVICES

A. When specified, require product manufacturer to furnish qualified personnel to observe field conditions and quality of workmanship, and to provide recommendations, certifications, and other specified services.

B. Representative shall submit written report to Architect listing observations and recommendations.

1.9 TESTING LABORATORY SERVICES

A. The Owner will arrange for the services of an Independent Testing Laboratory to inspect and test the Work in accordance with regulatory requirements and to verify compliance with the contract documents.

B. Contractor's Responsibilities:
   1. Cooperate with Testing Laboratory personnel, and furnish access, tools, samples, certifications, test reports, design mixes, equipment, storage, and assistance as requested by the Testing Laboratory.
   2. Notify Architect and Testing Laboratory 48 hours prior to expected time for operations requiring inspection and testing. When tests or inspections cannot be performed, through the fault of the Contractor, reimburse the Owner for the additional costs incurred.
   3. Remove and replace all work found not complying with the Contract Documents. Remedies shall be in accordance with the Contract Documents and code requirements.
   4. If initial tests and inspections indicate deficient work, the Contractor shall reimburse the Owner for the costs of all subsequent tests and inspections related to the deficiency.
   5. All damage which may occur to the work as a result of normal testing operations shall be repaired to match surrounding surfaces.
   6. Schedule testing and inspection so that the work of testing and inspection personnel will be as continuous and brief as possible.
   7. Reimburse the Owner for travel and lodging expenses incurred for testing and inspection services performed outside a radius of 100 miles of the site.

C. Tests and inspections shall be in accordance with code requirements and as otherwise required to verify conformance to Contract requirements.

1.10 CONTRACTOR TESTS AND INSPECTIONS

A. Tests and Inspections are specified in the individual specification Sections.

B. Contractor's Convenience Testing: Inspection and testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.

END OF SECTION

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. General requirements.
2. Electricity, lighting.
3. Heat, ventilation, cooling.
4. Telephone service.
5. Water.
6. Sanitary facilities.
7. Barriers.
8. Closures.
9. Protection of installed work.
10. Security.
11. Safety.
12. Water control.
13. Cleaning during construction.
14. Project identification.
15. Field offices and sheds.
16. Removal.

B. Related Sections:
1. 011000 - Summary: Contractor use of premises.
2. 017700 - Closeout Procedures: Final cleaning.

C. This Section applies to all Technical Specification Sections, and supplements the General and Supplemental Conditions.

1.2 GENERAL REQUIREMENTS

A. Temporary facilities and controls shall conform to the requirements of the jurisdictional code authorities.

1.3 ELECTRICITY, LIGHTING

A. Provide service required for construction operations, with branch wiring and distribution boxes located to allow service and lighting by means of construction-type power cords.

B. Provide lighting for construction operations.

C. Existing and permanent lighting may be used during construction. Maintain lighting and make routine repairs.

D. Conserve energy.

1.4 HEAT, VENTILATION

A. Provide temporary heating and cooling as necessary to maintain specified conditions for Construction operations, to protect materials and finishes from damage due to temperature or humidity.

B. Provide temporary ventilation of enclosed areas to cure materials, disperse humidity, and prevent accumulations of dust, fumes, vapors, or gases in accordance with the Construction Indoor Air Quality Management requirements specified in Section 013544.

C. Prior to operation of permanent facilities for temporary purposes, verify that installation is approved for operation, and that filters are in place. Provide minimum Merv 8 filters in accordance with the Construction Indoor Air Quality Management requirements specified in Section 013544

D. Furnish and pay for operation and maintenance of equipment during construction. Owner will pay for utilities.

E. Conserve energy.

1.5 WATER

A. Provide service required for construction operations. Extend branch piping with outlets located so that water is available by use of hoses.

B. The Owner will pay the costs for all water used.

C. Conserve water use whenever possible.

1.6 SANITARY FACILITIES

A. Provide and maintain required portable facilities and enclosures.

1.7 BARRIERS

A. Provide as required to prevent public entry to construction areas, to provide for Owner's use of site, and to protect existing facilities and adjacent properties from damage from construction operations.

B. Provide 6 foot high fence around construction site; equip with vehicular and pedestrian gates with locks. Construction: Commercial grade chain link fence.

C. Provide barricades and covered walkways as required by governing authorities for public rights-of-way and for public access to existing buildings.

D. Provide barriers around trees and plants designated to remain. Protect against vehicular traffic, stored materials, dumping, chemically injurious materials, and puddling or continuous running water.

E. Provide barricades around openings in floors and roof decks.

1.8 CLOSURES

A. Exterior Closures:
   1. Provide temporary weather-tight closures as necessary to create proper interior environmental conditions, protection of materials, and to prevent entry of unauthorized persons. Conform to Construction Indoor Air Quality Management requirements specified in Section 013544.
   2. Where doors are necessary for access by construction personnel, provide self-closing hardware and locks.
   3. Except as necessary for construction access, do not remove exterior closures until permanent construction is ready to be installed and made weathertight.
   4. Enclosures shall be constructed to prevent blow off during inclement weather, and shall be sealed to prevent water penetration and excessive air infiltration.

B. Interior Closures:
   1. Provide temporary closures to prevent penetration of dust and moisture into areas separate from work areas, damage to operating systems and components, and to create environmental conditions necessary for the proper installation of materials and systems.

C. Installed construction which has been damaged due to lack of protection shall be replaced or restored to original or new condition.

1.9 PROTECTION OF INSTALLED WORK

A. Provide temporary protection for installed work, including protection from impact, water, dust contamination, overspray, and similar damage.

B. Secure temporary protections as necessary to prevent blow off during inclement weather.

C. Provide protective coverings at exposed exterior walls and horizontal surfaces, projections, and window and door openings.

D. Protect finished surfaces from damage caused by traffic, movement of heavy objects, and storage of materials. Where necessary, control traffic in immediate area as necessary to minimize the risk of impact damage.

E. Prohibit traffic and storage on waterproofed and roofed surfaces, on lawn and landscaped areas.

F. Installed construction which has been damaged due to lack of protection shall be replaced or restored to original or new condition.

1.10 SECURITY

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

1.11 SAFETY

A. Furnish safety program and facilities to protect the safety of workers and other persons affected by the Work.

1.12 WATER CONTROL

A. Grade site to drain. Maintain excavations free of water. Provide and operate pumping equipment.

1.13 CLEANING DURING CONSTRUCTION

A. Control accumulation of waste materials and rubbish on a daily basis, and dispose of off-site or in a designated container on site.

B. Clean interior areas prior to start of finish work, maintain areas free of dust and other contaminants during finishing operations.

C. Remove excess debris from cavities which are to be concealed in the finished Work.

1.14 PROJECT IDENTIFICATION

A. Provide 8 x 6 foot Project identification sign of wood frame and exterior grade plywood construction, painted, with exhibit lettering by professional sign painter, to Architect's design and colors. List title of Project, names of Owner, Architect, professional consultants, Contractor and major subcontractors. Erect on site at location established by Owner.

1.15 FIELD OFFICES AND SHEDS

A. Field Office:
   1. Office: Weather-tight, with lighting, electrical outlets, heating, cooling, and ventilating equipment, and equipped with furniture. Provide, in addition, space for Project meetings, with table and chairs to accommodate 6 persons.
   2. Equipment:
      a. Copier: Contractor's option; 11 x 17 inch size capability.
      b. Facsimile Machine: Contractor's option. Connect to public phone lines as required for communication with Architect’s office and Contractor's home office.
      c. Communication Service
         1) Minimum one dedicated telephone line with instrument.
         2) Minimum one dedicated telephone line for facsimile machine.
         3) An Internet Service Provider (ISP) account.
         4) Com ISDN LAN modem or Office Connect
         5) Remote Dual Analog Router (analog or ISDN depending on telephone company service), or approved, for use and communication with Internet Service Provider (ISP).
      d. Computer: Minimum one Pentium PC with minimum 128 MB of RAM, including the following.
         1) Windows XP and Microsoft Office 2003, or later; Internet Explorer V6.0 or later.
         2) Bluebeam Revu at least one station for initiating documents.
         3) Adobe Acrobat Reader.
      e. Printer: Minimum 11x17 inch graphics capability.
      f. Sheet-feed or flatbed scanner and related software.

B. Storage Sheds for Tools, Materials, and Equipment: Weather-tight, with heat and ventilation for Products requiring controlled conditions, with adequate space for organized storage and access, and lighting for inspection of stored materials.

1.16 CONTRACTOR DESIGNATED AREAS

A. The Owner will designate exterior areas of the site which will be available to the Contractor for staging and storage of materials. Exterior storage areas shall be enclosed by a construction chain link fence with a vision barrier.

B. The Owner will designate areas of the Site for Contractor and employee parking.

C. Exterior Storage Sheds for Tools, Materials, and Equipment: Weather-tight, with adequate space for organized storage and access, and lighting for inspection of stored materials.

1.17 REMOVAL

A. Completely remove temporary materials and equipment when their use is no longer required. Conform to Construction Waste Management and Disposal requirements specified in Section 017421.

B. Clean and repair damage caused by installation or use of temporary facilities. Remove underground installations to a depth of 2 feet; grade site as indicated. Restore existing facilities used during construction to specified, or to original, condition.

END OF SECTION

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Products.
   2. Transportation and handling.
   3. Storage and protection.
   4. General installation requirements.
   5. Product options.
   6. Substitutions.

B. Related Sections:
   1. 006325 - Substitution Request Form.
   2. 011000 - Summary: Owner-furnished products.
   3. 014500 - Quality Control: Submittal of manufacturers' certificates.
   4. 017421 - Construction Waste Management and Disposal: Construction waste management plan.
   5. 017700 - Closeout Procedures: Systems demonstration, operation and maintenance data, warranties and guarantees, spare parts and maintenance materials.

C. This Section applies to all Technical Specification Sections, and supplements the General and Supplementary Conditions.

1.2 PRODUCTS

A. Products include material, equipment, and systems.

B. Comply with size, make, type, and quality specified, unless otherwise approved in writing by the Architect. Specifications and referenced standards are minimum requirements.

C. All components required to be supplied in quantity shall be identical, whether furnished under one or several Sections of the specifications.

D. Unless specified or indicated otherwise, materials employed for construction purposes, such as formwork, scaffolding, and temporary lighting, shall not be incorporated into the work.

E. Unless indicated or specified otherwise, all products incorporated into the Work shall be of the most suitable grade of their respective kinds for the intended use.

1.3 TRANSPORTATION AND HANDLING

A. Transport by methods to avoid product damage.

B. Deliver products in manufacturer's original containers or packaging, with identifying labels intact and legible. Where options exist, select container or packaging systems that can be recycled or reused. Coordinate packaging waste removal and recycling with the Construction Waste and Demolition Management Plan

C. Furnish equipment and personnel to handle products by methods to prevent soiling or damage.

D. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.

E. Immediately replace non-conforming products with new conforming products, at no additional cost to the Owner.

1.4 STORAGE AND PROTECTION

A. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible.

B. Store sensitive products in weather-tight enclosures. Maintain within temperature and humidity ranges required by manufacturer's instructions, and as otherwise required to prevent damage.

C. For exterior storage of fabricated products, place on sloped supports above ground. Protect from soiling or staining through ground contact. Cover products subject to deterioration with impervious sheet covering; provide ventilation to avoid condensation.

D. Store loose granular materials on solid surfaces in a well-drained area; prevent mixing with foreign matter.

E. Arrange storage of products to furnish convenient access for inspection and inventory.

1.5 GENERAL INSTALLATION REQUIREMENTS

A. Unless indicated or specified otherwise, install each product in accordance with the product manufacturer's instructions.

B. Distribute copies of manufacturer's instructions to parties involved in the installation.

C. Maintain one set of complete instructions at the job site during installation and until completion.

1.6 PRODUCT OPTIONS

A. Product Specified by Reference Standards or by Description Only: Provide product meeting those standards.

B. Product Specified by Naming One or More Manufacturers with an "or approved" provision: Use specified product or submit a request for substitution in accordance with the specified substitution requirements. When approved a substitute product may be used.

C. Product Specified by Naming One or More Manufacturers, without a provision for Substitution: No substitution will be allowed, except as specified under the Article on Substitutions.

1.7 SUBSTITUTIONS

A. Timing: Substitution requests will be considered only for the following reasons:
   1. A product becomes unavailable due to no fault of the Contractor.
   2. Subsequent information or changes indicate that the specified product will not perform as intended.
   3. A substitute product will be in the Owner's best interest.
   4. A substitute product will improve the likelihood of meeting the LEED credit requirements for the Project.

B. Substitution requests shall be submitted only through the General Contractor.

C. Documentation:
   1. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.
   2. Requests for substitution shall be made on Document 006325 - Substitution Request Form.
   3. Limit each request to one proposed product or system.
   4. For substitutions prior to Agreement, signature and projected cost data are not required.

D. Request for substitution constitutes a representation that the proposer:
   1. Certifies that the proposed substitute item has been fully investigated and has been determined to be equal or superior to that specified in all respects.
   2. Certifies that the same or greater warranty will be furnished
   3. Certifies that required maintenance service and source for replacement parts are available locally.
   4. Certifies that incorporation of the proposed substitute item will not affect functional clearances.
   5. Certifies that product has been used successfully in at least 5 projects of similar scope and application and in similar geographical region. Provide documentation.
   6. Warrants that coordination, installation, and changes to the project as necessary to accommodate the proposed substitution shall be the Contractor's responsibility, that use of the substitute item(s) will not delay project completion
   7. Warrants that claims for additional costs related to its incorporation which may become subsequently apparent will be borne by the Contractor.

E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals.

F. Review: The Architect will be the judge of the acceptability of the proposed substitution; in the judgment of Architect the product shall meet the following criteria:
   1. It is equal or superior in quality and serviceability to the specified product.
   2. Its use will not entail unacceptable changes in details and construction of related work.
   3. Its design and artistic effect complies with design concept.

G. The Architect will review requests for substitutions with reasonable promptness, and request additional information, documentation, or samples, as necessary for evaluation of the request. Within two weeks of receipt of the completed request, the Architect will take one of the following actions.
   1. If the substitution is allowed by the Architect prior to the cutoff date, an Addendum to the Bid Documents will be issued by the Architect.
   2. If the substitution is allowed by the Architect after the cutoff date, the Architect will notify the General Contractor and issue the appropriate Construction Change Authorization, Supplemental Instruction, or Proposal Request.
   3. If the request for substitution is denied, the proposer will be notified of the rejection. If a decision on the substitution request cannot be made or obtained within the time allocated, use the specified product.

END OF SECTION

SECTION 017700 - CLOSEOUT PROCEDURES

1.1 SUMMARY

A. Section Includes:
1. Closeout procedures.
2. Final cleaning.
3. Project record documents.
4. Electronic processes and files
5. Operation and maintenance data.
6. Operation instruction.
7. Manufacturer's warranties.
8. Guaranties.
9. Spare parts and maintenance materials.

B. Related Sections:
1. 011000 - Summary: Partial Owner occupancy.
2. 015000 - Temporary Facilities and Controls: Cleaning during construction.
3. 013544 - Construction Indoor Air Quality Management: Indoor air quality management plan and post construction flush-out.
4. 015000 - Temporary Facilities and Controls: Cleaning during construction.
5. 017421 - Construction Waste Management and Disposal: Construction waste management plan.
6. Division 23 and 26 for special closeout requirements for mechanical and electrical systems.

C. This Section applies to all Technical Specification Sections, and supplements the General and Supplemental Conditions.

1.2 DEFINITIONS

A. As-Built / Redline Drawings: As-built/Redline drawings shall mean a set of Construction Drawings that reflect on-site changes required during the project as directed by ASI/RFI. These drawings can be managed as a hard-copy with mark-ups then scanned to PDF at the end of the project or as PDF files using Bluebeam during the project with ASI/RFI files hyperlinked. At the end of the project, either can be delivered as Final Record Documents.

B. Final Documents: The properties of the project as constructed, defined by final drawings, specifications, maintenance manuals and operating instructions as provided by the Operation & Maintenance Manuals for each discipline and/or trade.

1.3 CLOSEOUT PROCEDURES AND CLOSEOUT SUBMITTALS

A. Comply with procedures stated in General Conditions of the Contract for Substantial and Final Completion.

B. Certain areas will be subject to partial occupancy or use as specified in Section 011000.

C. Submit all certificates of approval issued by the governing authorities, including, without limitation, the following:
1. Certificate of occupancy.

D. Prior to final payment, submit the following affidavits using the forms listed below:
1. Contractor's Affidavit of Payment of Debts and Claims AIA Document G706.
2. Consent of Surety to Final Payment AIA Document G707.
3. Contractor's lien release, and lien releases from each subcontractor; Contractor's Affidavit of Release of Liens AIA Document G706A

E. Submit final Application for Payment identifying total adjusted contract sum, previous payments, and sum remaining due.

F. Submit building permit documents and building inspection signoff sheets to the Owner.

1.4 FINAL CLEANING

A. Execute prior to final inspection.

B. Clean interior and exterior 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.

D. Clean or replace filters of mechanical equipment.

E. Clean roofs, gutters, downspouts, and drainage systems.

F. Clean site; sweep paved areas, rake clean other surfaces.

G. Remove waste and surplus materials, rubbish, and construction facilities from the Project and from the site.

1.5 PROJECT RECORD DOCUMENTS

A. Maintain a complete set of record documents which clearly and neatly indicate all changes from the Contract Documents, and all uncovered existing conditions which will be subsequently concealed.

B. Record documents shall include:
   1. Contract drawings.
   2. Specifications.
   3. Reviewed shop drawings, product data, and samples

C. Record documents shall be used for no other purpose and shall be stored separate from those used for construction.

D. Keep documents current; do not permanently conceal any work until required information has been recorded.

E. Mark specifications legibly and record at each Product section a description of actual products installed. Include the manufacturer's name and product model and number.

F. Drawings shall indicate exact installed locations and dimensions of all concealed work, including, without limitation, conduit, piping, ducts, mechanical and electrical equipment, and foundations. Indicate all changes to details which involve concealed construction.

G. Prior to approving each Payment Request, the Architect reserves the right to inspect the Record Documents. The Payment Request may not be approved until the record documents are current to the Date of the Payment Request.

H. At the end of the project, As-builts are to be printed (or delivered) as one (1) full-size set of drawings for building maintenance staff use along with an electronic (i.e. PDF) version to be published to owner specified medium (i.e. CD/DVD, FTP, or uploaded to a Shared Document site, etc.).

I. Final “Schedules” (Panel Schedules, Sequence of Operations, Points List, Door Hardware/Key Schedule etc.) are to be produced in Microsoft Excel format.

J. At Contract Closeout, submit documents with transmittal letter containing date, Project title, Contractor's name and address, list of documents, and signature of Contractor.

1.6 ELECTRONIC PROCESSES AND FILES

A. AutoCAD, AutoDesk, BIM Modeling, MEPF Coordination
   1. Maintain an electronic set of As-Builts through-out the project instead of the previous, manual, “Redline Set” of drawings. Each ASI, RFI, Change Orders, Substitutions Request, etc. that directs a change in condition or scope shall be reflected in the drawings and/or specifications as they occur.
   2. AutoCAD files are managed in a ¼” scale. As-built drawings need to show dimensions but do not need to be published in the Architectural scale. The Architectural Scale will be maintained in the electronic (AutoCAD) files. Each discipline/trade (i.e. Architectural, Mechanical, Electrical, Plumbing) should produce each floor-plate on a single sheet. If the building is exceptionally long (i.e. a full city block in length), the drawings may be produced in two (2) halves. All drawing details shown on the Construction Drawings are to be included in the As-built Set of documents.

3. 3D Revit Model are to be produced as 2D AutoCAD Files and delivered at the end of the project. Each trade/discipline is to provide a complete set of CAD files including all x-referenced files. Use of the Autodesk Reference Manager software is encouraged to ensure delivery of complete files.

B. Electronic versions of the O&M Manuals if over 50 pages, need to be Bookmarked using Acrobat Bookmark feature which should match the document Index or Table of Content.

C. File names for electronic O&M Documents (no special characters in filename - ! @ # $ % ^ & *):
   1. Manufacturer/Item/Document Type
   2. Example:
      a. Cat Generator O+M Manual (use the "+" instead of the "&")
      b. Cat Generator Parts Manual
      c. Elkay Water Cooler

D. Filenames for other closeout documents:
   1. Item/Trade/Document Type
      a. Example: Post-Tensioned Concrete Warranty
   2. Subcontractor name / Document Type
      a. Example: McClone Retention Release

1.7 OPERATION AND MAINTENANCE DATA

A. Furnish published operation and maintenance information covering all equipment and finish materials installed on the project. Whether specified or not, furnish published information whenever special maintenance procedures are required to assure the proper operation and durability of project material, equipment, and finishes.

B. Coordinate with closeout requirements specified in Section 013546 including LEED EA Prerequisite Education of Homeowner, Tenant, or Building Manager.

C. O&M Manuals are to be delivered as one (1) Hard Copy Binder and one (1) Soft-copy in PDF format.

D. Information shall be submitted by the General Contractor through the Architect.

1.8 OPERATION INSTRUCTION

A. Prior to Final Completion, instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment and systems. Provide instruction at mutually agreed upon times.

B. Use experienced personnel trained and experienced in the operation and maintenance of the building equipment or system involved.

C. Use operation and maintenance manuals for each piece of equipment or system as the basis of instruction. Review contents in detail to explain all aspects of operation and maintenance.

D. Refer to the individual technical Sections for additional requirements for instruction of Owner's personnel.

1.9 MANUFACTURER'S WARRANTIES

A. Furnish original and duplicate copies of each manufacturer warranty executed to the Owner.

B. Execute Contractor's submittals to the manufacturers, and assemble documents executed by the manufacturers.

C. Provide table of contents and assemble in binder with durable plastic cover.

D. Submit material prior to final application for payment in accordance with Section 013300. For equipment put into use with Owner's permission during construction, submit warranty within 10 days after first operation. For items of Work delayed materially beyond Date of Substantial Completion, furnish warranty within ten days after acceptance, listing date of acceptance as start of warranty period.

SECTION 017700 - CLOSEOUT PROCEDURES

1.10 GUARANTIES

A. Furnish written guaranty, executed to the Owner, on work covered by the additional guaranty requirements specified in the technical sections. The guaranty shall commence on the date of Owner acceptance of that portion of the work or Substantial Completion, whichever occurs first.

B. Transmit through the Architect in accordance with Section 013300.

1.11 SPARE PARTS AND MAINTENANCE MATERIALS

A. Furnish products, spare parts, and maintenance materials in quantities specified in each Section, in addition to that used for construction of Work. Coordinate with Owner, deliver to Project site and obtain receipt prior to final payment.

B. Unless specified otherwise, deliver materials in manufacturer’s original factory cartons or containers.

C. Materials shall be clearly labeled, and shall include designations used in the Contract Documents.

1.12 KEYS

A. Deliver properly identified and tagged keys and hardware maintenance tools to the Owner, including those specified in Sections 064000, 083100, 087100 and 102813.

B. Obtain itemized receipt for all keys and tools.

C. Send all master keys by registered mail directly from manufacturer to Owner's representative as later directed.

END OF SECTION

SECTION 030013 - CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Cast-in-place concrete.
2. Concrete accessories.
3. Exterior stairs and other landscape elements.
4. Slab on grade vapor retarder.
5. Formwork, shoring, bracing, and anchorage.
6. Concrete reinforcement.
7. Concrete sealers.

B. Related Sections:
1. 003152 - Testing and Inspection Services: Owner paid testing and inspections.
2. 034100 – Precast Structural Concrete.
3. 079200 - Joint Sealants: Expansion joint fillers.
4. 312000 - Earth Moving: Fill under slabs on grade.

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.

D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

1.2 DEFINITIONS

A. Architectural Concrete: Formed Concrete elements which are exposed to view as an exterior or interior surface in the completed structure. Areas indicated on the Drawings.

1.3 REFERENCES

A. American Concrete Institute (ACI):
1. 117 - Standard Specification for Tolerances for Concrete Construction and Materials.
2. 301-05 - Specifications for Structural Concrete.
3. 315 - Details and Detailing of Concrete Reinforcement.

B. American Society for Testing and Materials (ASTM):
1. A185 - Welded Steel Wire Fabric for Concrete Reinforcement.
2. A615 - Deformed and Plain Billet-Steel for Concrete Reinforcement.
3. C33 - Specifications for Concrete Aggregates.
4. C94 - Specifications for Ready Mixed Concrete.
5. C143 - Test for Slump of Portland Cement Concrete.
6. C150 - Specification for Portland Cement.
7. C171 - Specification for Sheet Materials for Curing Concrete.
8. C260 - Specifications for Air-Entraining Admixtures for Concrete.
9. C494 - Specifications for Chemical Admixtures for Concrete.
10. C618 - Specification for Fly Ash and Raw or Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete.
11. C939 - Test Method for Flow of Grout for Preplaced-Aggregate Concrete
12. C1107 - Specification for Packaged Dry, Hydraulic-Cement Grout (Non-shrink)
13. D1751 - Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction.
14. E1155 - Standard Test Method for Determining Floor Flatness and Levelness Using the "F Number" System.

1.4 SUBMITTALS

A. Make submittals in accordance with Section 013300.

B. Product Data: Submit data for each accessory, admixture, and curing material proposed for the work.

C. Shop Drawings:
   1. Reinforcing:
      a. Detail reinforcing in accordance with ACI 315. Indicate reinforcement sizes, spacings, locations and quantities of reinforcing, bending and cutting schedules, splicing, and supporting and spacing devices.
      b. Indicate embedded items.
   2. Slab Layouts: Dimension locations of control, expansion, and construction joints. Relate to building grid lines.
   3. Architectural Concrete: Show arrangement and fitting of form joints; note materials and finishes of forming surfaces; indicate locations of all openings and locations of form ties.

D. Quality Control Submittals:
   1. Mix Designs: Prior to concrete work, submit mix designs for approval.
   2. Test Results: Submit test results per ASTM C311 performed less than 6 months prior to use for approval by Architect.
   3. Certifications: Submit mill certificates for cement, aggregates, and reinforcing.

1.5 QUALITY ASSURANCE

A. Perform work in accordance with ACI 301.

B. Concrete work is subject to special testing and inspection as specified in 014500. Notify Architect at least 48 hours before concrete is poured.

C. Coordination:
   1. Coordinate vertical work of this Section with all horizontal concrete work.
   2. Special attention shall be given to the butt joint where forms meet columns to seal the joint so that slurry wash-down doesn't stain the columns during the floor plate pour.

D. Pre-Installation Conference:
   1. At least 35 days prior to start of concrete work the Contractor shall hold, in accordance with Section 013119, a meeting to review the detailed requirements of the concrete design mixes and to determine the procedures for producing proper concrete construction.
   2. Required in attendance:
      a. Contractor's superintendent.
      b. Testing Laboratory representative.
      c. Concrete subcontractor.
      d. Ready-mix producer.
      e. Admixtures manufacturer's representative.
      f. Architect/Engineer
      g. All subcontractors with work to be installed in, or affected by concrete work.
      h. Representative from the Authority Having Jurisdiction
   3. Notify Architect 10 days prior to the scheduled date of the meeting.
   4. Agenda: Include the following.
      a. Installation scheduling and coordination; scheduling of mock-up construction and review.
      b. Classes of concrete required; mix designs; applicable references.
      c. Formwork and requirements for Architectural concrete.
      d. Reinforcement and placement.
      e. Climatic conditions; hot and/or cold weather concreting procedures (as appropriate); unusual placing conditions.
      f. Substrate preparation; placement methods; construction joints.
      g. Flatwork; flatness and levelness requirements; finishing; criteria for acceptance; remedies.
      h. Curing and protection procedures
      i. Site quality control; inspection and testing requirements.
      j. Sealers; locations and coverage rates

PART 2 - PRODUCTS

2.1 FORM MATERIALS

A. Unless specified otherwise, conform to ACI 301.

B. Form Facing Materials:
   1. Standard: Phenolic surface film overlay panels; “Finnform,” “Betofilm,” “Olympic Panel,” or other approved.
   2. Plywood; APA B-B Plyform Class 1, EXT.

C. Form Ties: Taper ties.

D. Chamfers and Rustication Strips: Wood or plastic; fabricate to the shapes indicated.

2.2 REINFORCING

A. Reinforcing Steel: Types as indicated on the structural drawings.

B. Chairs, Bolsters, Bar Supports, and Spacers: Sized and shaped for strength and support of reinforcement during installation and placement of concrete.

2.3 CONCRETE MATERIALS

A. Cement: ASTM C150, normal - Type 1 Portland, grey color.

B. Fly Ash: ASTM C618, Class C or F; loss on ignition (LOI) not to exceed 1 percent. Use fly ash from one single source for the whole Project.

C. Normal Weight Fine and Coarse Aggregates: ASTM C33; severe weather exposure.

D. Water: ASTM C94, para. 5.1.3

2.4 ADMIXTURES

A. Air-Entrainment: ASTM C 260; Master Builders Inc. "Micro-Air" or "MBVR", Euclid Chemical Co. "Air Mix," or approved.

B. Water Reducer Normal: ASTM C 494, Type A; Master Builders Inc. "Pozzolith/Polyheed," Euclid Chemical Co. "Eucon WR 75," or approved.

C. High Range Water Reducer (Superplasticizer): ASTM C 494, Type F or G and shall be of the second or third generation type. Shall be batch plant added, extend plasticity time, reduce water 20 to 30 percent. Master Builders Inc. "Rheobuild," Euclid Chemical "Eucon 37," or approved.

D. Accelerator: ASTM C 494, Type C or E, non-corrosive, non-chloride; Master Builders "Pozzutech 20," Euclid Chemical Co. "Accelgard 90," or approved.

E. Set Retarder: ASTM C494, Type B.

F. Shrinkage Reducing Admixture: Eclipse by W.R. Grace Company.

G. Self-Consolidating Concrete (SCC) Admixtures: Polycarboxolate based admixture; “ADVA Cast 530” or “ADVA Cast 100” by Grace Construction Products, or “Rheodynamic” by Master Builders.

H. Colorant: Davis Colors. L.M. Scofield "Chromix," or approved; colors as scheduled on the Drawings.

2.5 ACCESSORIES

A. Underslab Vapor Retarder: ASTM E1745, Class A; one of the following:
   1. "Stego Wrap 15 Mil Class A" by Stego Industries, LLC (877-464-7834).
   2. “Perminator 15 mil Underslab Vapor Mat” by WR Meadows, Inc. (847-214-2100).
   3. “Moiststop Ultra” by Fortifiber Systems (800-7734777).

B. Bonding Agent: Acrylic type; Sonneborn "Sonnocrete", W.R. Grace "Duraweld C", Euclid Chemical Co. "Flex-con", or approved.

C. Non-Shrink Grouts: ASTM C1107, Grade B; non-shrink non-catalyzed natural aggregate grout; minimum compressive strength of 7000 PSI at 28 days; 25 to 30 second flow when tested in

accordance with ASTM C939 at 45 to 90 degrees F; cement gray in color; Master Builders Inc. "Masterflow 928," Euclid Chemical Co. "HiFlow Grout," or approved.

D. Form Coatings:
   1. Provide commercial formulation form-coating compounds that will not bond with, stain, or adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces when applied to forms or form liners.
   2. At concrete scheduled for waterproofing, confirm acceptability of form coatings with waterproofing manufacturer.
   3. Water based type; VOC <150g/l; Nox-Crete "Utility Release," Cresset Chemical Company "Crete-Lease 20-VOC," or approved; non staining.

E. Curing Materials:
   1. Waterproof Sheet Material: Waterproof paper in accordance with ASTM C171; reinforced waterproof kraft paper; white color at exterior applications; Burke Kraft Curing Paper Type I-SK-30, or approved.
   2. Mats and Burlap: Fabric covering composed of quilted polyethylene sheeting laminated to outer covering of burlap, cotton, or other approved fabric; outer covering shall weigh not less than 6 ounces per square yard.
   3. Curing/Sealing Compound:
      a. ASTM C309; water based curing compound; Euclid Chemical Company "Aqua-Cure," Sonneborn "Kur-N-Seal WB," Burke by Edoco "Spartan-Cote WB II," or approved.
      b. Products shall meet South Coast Air Quality Management District (SCAQMD) Rule #1168, effective date July 1, 2005 and rule amendment date January, 2005.

F. Prefabricated Slab Construction Joints: Burke by Edoco "Keyed Kold Joint," with splice plates, stakes, and driving accessories, or approved; depth 1/2 inch less than slab thickness, galvanized sheet metal tongue and groove joint form, with knockouts for passing reinforcing bars through.

G. Preformed Joint Fillers:
   1. Non-extruding type; ASTM D1751; Sonneborn "Expansion Joint Filler," WR Meadows “Sealtight Fiber”, " Burke by Edoco "Fiber expansion Joint," or approved.
   2. Joint Cap: Strippable plastic type; W.R. Meadows "SealTight Snap-Cap", Burke by Edoco "Joint Cap", or approved; width to match expansion joint filler material.

H. Waterstop Tape (for non-movement joints): Bentonite waterstop; one of the following:
   1. Basis of Design: Cetco Building Materials Group (Hoffman Estates, IL; 800-527-9948); “Volclay RX Waterstop”.
   2. Tremco Inc;Sealant/Waterproofing Division (Beachwood, OH; 800.321.7906); "Parastop"
   3. Carlisle Coatings & Waterproofing (Wylie, TX; 800-527-7092); “Mirastop”.
   4. Size as recommended by the manufacturer for the application.
   5. Provide waterproofing manufacturer’s recommended primer or adhesive sealant for waterstop installation. Basis of Design: Cetco “Cetseal Adhesive Sealant”.

I. Finishing Aid: Evaporation retardant for preventing rapid drying during hot windy weather, Master Builders "Confilm" or approved equal.

2.6 CONCRETE MIX

A. Mix concrete in accordance with ASTM C94, and in accordance with the requirements indicated on the structural drawings.

B. Concrete at slabs on grade and elevated slabs shall have a maximum water/cement ratios of 0.45

C. Admixtures:
   1. All concrete shall contain the specified water reducing or high range water reducing admixture, except concrete with a required water/cement ratio of 0.45 or lower shall contain a high range water reducing admixture.
   2. All concrete required to be air entrained shall contain air entraining admixture to produce 4% to 6% air.

3. All concrete placed in ambient temperatures from 40 degrees F to 20 degrees F, and all slab concrete placed in ambient temperatures below 50 degrees F, shall contain an accelerator at the manufacturer's required dosage.
4. All concrete placed in ambient temperatures of 90 degrees F or above, shall contain a set retarder at the manufacturer's required dosage.
5. Add colorants as necessary to obtain the concrete colors to match the approved samples.

D. Provide 28 day compressive strengths as indicated on the Structural Drawings. Where not indicated on the Structural Drawings, provide minimum 4000 psi compressive strength unless indicated otherwise.

E. Provide fly ash in the following proportions:
1. 15 to 20 percent by weight of cementitious materials in post-tensioned concrete, footings, walls, columns and slabs on grade.

2.7 REINFORCEMENT FABRICATION

A. Fabricate as indicated and in accordance with ACI 315.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.

B. Do not begin installation until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

3.2 VAPOR RETARDER AND CAPILLARY BREAK

A. Sequence installation of vapor retarder with earthwork, as appropriate.

B. Surfaces to Receive Interior Floor Slabs:
1. Install gravel fill to depths indicated on the Structural Drawings; compact to 95 percent of maximum dry density as determined by ASTM D1557.
2. Place vapor retarder. Lap joints a minimum of 6 inches and seal with tape. Seal around penetrations; repair all damage to vapor retarder prior to covering.
3. Where isolated slab is indicated, place rigid insulation as indicated on the Drawings. Use largest single pieces of insulation board possible. Tape joints.

3.3 FORMWORK ERECTION

A. Verify lines, levels, and measurement before proceeding with formwork. Align form joints.

B. Use plywood forms, unless other systems are approved by the Architect.

C. Use form coating on forms in accordance with the manufacturer's recommendations. Verify that form coatings will not affect the bond of subsequent concrete surface treatments.

D. Coordinate with work of other Sections in forming and setting openings, slots, recesses, chases, sleeves, bolts, anchors, and other inserts.

E. Tolerances: Comply with ACI 117.

F. Concrete Forms:
1. Construct forms of approved form panel materials.
2. Use coned form ties at an even spacing as approved by the Architect.
3. Additional Tolerance Requirements: In accordance with ACI 301. Form surfaces at the joints between each panel shall be flush within a tolerance of plus or minus 1/16 inch.
4. Forms for self consolidating concrete shall be watertight.
5. Rustication Strips: Glue or nail to form surfaces; set and fill nail holes; seal to surface of forms.

6. Form Reuse: Clean forms and repair all holes and damage; formwork with patches and repairs affecting the appearance of concrete surfaces will not be accepted.

G. Where earth forms are used, hand trim sides and bottoms of earth forms. Remove loose dirt.

H. Waterstop Tape:
1. Ensure that all surfaces to receive waterstop tape are formed, troweled, or ground smooth.
2. Remove all debris and other materials which would impair bond.
3. Install in locations indicated in accordance with the manufacturer's recommendations. Install to maintain a minimum of 3 inch of concrete coverage over the tape.

3.4 REINFORCEMENT

A. Place, support, and secure reinforcement against displacement.

B. Locate reinforcing splices not indicated on the drawings at points of minimum stress.

C. Provide laps and concrete cover as indicated in the Drawings.

3.5 PLACING CONCRETE

A. In accordance with ACI 301.

B. Bonding Agent: Mix thoroughly and apply strictly in accord with the manufacturer's instructions; do not use when ambient temperature is below 45 degrees F. Place concrete in contact immediately while bonding agent is still tacky.

3.6 SUBSEQUENT TREATMENT FOR FORMED SURFACES

A. Unless otherwise indicated, provide smooth form finish for concrete to remain exposed in the finished work; rough form finish for concrete to remain concealed in the finished work.

B. Where dry-sacked surfaces are indicated, dampen concrete surface and coat with a mortar mix made of same ingredients as concrete minus aggregate. Before the mortar dries, rub the surface with a wad of clean, dry burlap to remove surplus mortar and to fill voids. The completed surface shall be moist cured by keeping the entire area damp the day following the sacking.

C. Where sandblasted surfaces are indicated, lightly sandblast to remove surface mortar only. Exact degree of bite shall be determined by the Architect upon review of mock-ups.

D. Where waterproofing or dampproofing is scheduled or indicated, grout fill all rock pockets, tie holes, and other surface imperfections to create a smooth surface ready to receive the membrane. Grind concrete fins and other surface projections flat with adjacent surfaces. Provide substrate finish as recommended by waterproofing or dampproofing manufacturer.

E. Pock marks 3/8" or smaller are acceptable to the architect to be unpatched, as long as the quantity of pock marks on the surface is limited. Pock mark allowance to be 1% of the surface area of any given face.

F. Finishes at Concrete (Non-Slab):
1. Rough-form finish – (where indicated): Patch tie holes and defects. Chip or rub off fins exceeding 1/2 in in height. Leave surfaces with the texture imparted by the forms.
2. Smooth-form finishes – as required to match mock-up.
   a. Patch tie holes and defects larger than 3/8”. Color match all patching.
   b. Remove fins exceeding 1/8” in height.
   c. Corners to receive 1/2” chamfer.
   d. Typical finish for concrete exposed to view.
3. Abrasive-Blast Finish: Perform abrasive blasting after compressive strength of concrete exceeds 2000 psi. Coordinate with formwork removal to ensure that surfaces to be abrasive blasted are treated at same age for uniform results. Provide at landscape elements.
   a. Depth of Cut: Use an abrasive grit of proper type and gradation to expose aggregate and surrounding matrix surfaces to match design reference sample, as follows:
   b. Brush: Remove cement matrix to dull surface sheen and expose face of fine aggregate; with no significant reveal.

3.7 SLABS

A. Expansion Joints for Slabs on Grade:
   1. Place expansion joints at locations indicated and where exterior slabs abut concrete walls, the building perimeter, and other fixed objects abutting or within the slab area.
   2. At exterior sidewalks, place expansion joints at maximum [20]foot intervals unless otherwise indicated.
   3. Form joints 1/2 inch wide x full depth of slab.
   4. Form expansion joints with preformed joint filler. Install strippable joint at joints to receive sealant specified in Section 079200.
   5. Tool expansion joints to 1/4 inch radius.
   6. Discontinue reinforcing at the expansion joint. Use 16 inch long sleeved 3/4 inch diameter smooth dowels at 12 inches on center for expansion joints in the field of the slab.
   7. Place perpendicular to longitudinal axis of wall and curbs. Where possible, make joints of curbs coincide with joints in walks.

B. Control Joints for Slabs on Grade:
   1. Make joints straight; perpendicular or parallel to building lines and slab edges, as appropriate.
   2. Control joints shall be saw cut or tooled, unless indicated otherwise.
   3. Radius tooled control joints to match expansion joints.
   4. Control joints shall penetrate the slab a minimum of 1/4 the thickness of the slab and shall be 3/16 inch in width minimum.
   5. Space control joints at the locations indicated, except when not indicated locate in at 32 times the slab thickness.
   6. At exterior sidewalks, place control joints at maximum 5 foot intervals
   7. Align joints with column lines when ever possible. Joints shall form rectangular panels with the long side less than 1-1/2 times the length of the short side. Provide circular or diamond shaped joint lines around columns. Locate control joints at reentrant corners. Coordinate with placement of joints in tile surfaces.

C. Tooled Joints for Slabs on Grade: Provide tooled joints to match control joints. Tooled joints do not need to penetrate the slab 1/4 the depth of the slab.

D. Construction Joints: Place at either expansion or control joint locations for slab on grade construction.

E. Curing:
   1. Moisture cure all concrete for a minimum of 7 days, unless approved or specified otherwise. A curing compound may be used on surfaces to receive subsequent bonded finish materials, provided the curing compound is approved in writing by the manufacturer of the adhesive or the bonding finish material. Curing compound may also be used on surfaces to receive subsequent bonded finish materials, provided the curing compound is removed with shot blasting or other approved method prior to installation of bonded materials.
   2. A curing compound may be used on all exterior slabs, sidewalks, and curbs.
   3. Use curing/sealing compound on concrete slabs scheduled to receive sealer as a finish.
   4. Use waterproof sheet material at surfaces to receive subsequent bonded finish materials. A curing compound may be used on surfaces to receive subsequent bonded finish materials, provided the curing compound is approved in writing by the manufacturer of the adhesive or the bonding finish material. Curing compound may also be used on surfaces to receive subsequent bonded finish materials, provided the curing compound is removed with shot blasting or other approved method prior to installation of bonded materials.
   5. Apply curing/sealing compounds in accordance with the manufacturer's recommendations.
   6. Maintain concrete temperatures above 50 degrees F.

F. Finishes:
   1. Full Trowel finish interior floor slab surfaces, unless specified otherwise.
   2. Light steel trowel finish interior floor slab surfaces scheduled to receive tile, terrazzo, or other similar bonded materials.
   3. Light broom finish at garage slabs and exterior walkways and stairs.
   4. Heavy broom finish at garage ramps.

G. Curing/Sealing Compound:

1. Apply a second coat of curing/sealing compound to concrete slabs scheduled to receive sealer. Clean floor and apply just prior to substantial completion. Apply in accordance with the manufacturer's recommendations.
2. Do not use curing/sealing compound at slabs scheduled to receive floor finish including paint and traffic coatings.

H. Tolerances: Provide Random Traffic floor tolerances as follows, when measured in accordance with ASTM E1155, including those floors to receive subsequent finishes.
1. Slabs on Grade to receive thinset flooring and resilient floor covering : F_F 35, F_L 25, over test area; F_F 24, F_L 17, minimum local value.
2. Slabs on Grade to receive carpet : F_F 25, F_L 20, over test area; F_F 17, F_L 15, minimum local value.
3. Slabs on Grade at non-public areas, parking structure slabs, subfloors under concrete topping, thickset tile and raised computer floors: F_F 20, F_L 15, over test area; F_F 15, F_L 10, minimum local value.
4. Slopes And Pitches To Drain: F_F 15, minimum local value at each discreet plane as indicated on the Drawings; free from areas subject to puddling.
5. Elevated Slabs: Provide floor flatness testing to achieve final values that are within 80% of slab-on-grade requirements for similar floor finish or use but in no case less than F_F 20. Testing shall be performed before shoring is removed and within 72 hours of concrete placement.
6. Post-Tensioned Slabs: Provide floor flatness testing to achieve final values that are within 80% of slab-on-grade measurements for similar floor finish or use but in no case less than F_F 20. Testing shall be performed before shoring is removed, within 72 hours of concrete placement and prior to tension being applied.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Floor planks.
   2. Structural columns and beams.
   3. Precast proprietary footings.
   4. Connection plates and brackets.

B. Related Sections
   1. 030013 - Concrete: Adjacent concrete; topping slab.

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.

1.2 REFERENCES

A. American Concrete Institute (ACI): 318 - Building Code Requirements for Reinforced Concrete.

B. American Welding Society (AWS) D1.1 - Structural Welding Code.

C. Precast/Prestressed Concrete Institute (PCI):
   1. Design Handbook - Precast and Prestressed Concrete.
   2. MNL-116 - Manual for Quality Control for Plants and Production of Precast Prestressed Concrete Products.
   3. MNL-119 - Connection Details for Precast-Prestressed Concrete Buildings.

1.3 SYSTEM DESCRIPTION

A. Conform to requirements of PCI Design Handbook - Precast and Prestressed Concrete.

B. Design members to withstand their own weight, erection forces, and live and dead loads.

C. Design component connections to provide adjustment to accommodate misalignment of structure.

D. Floor Members Maximum Deflection: 1/360 of span.

1.4 SUBMITTALS

A. Make submittals in accordance with Section 013300.

B. Shop Drawings: Indicate plank locations, unit identification marks, connection details, dimensions, and relationship to adjacent materials.

1.5 QUALITY ASSURANCE

A. Fabrication: PCI MNL-116.

B. Fabricator Qualifications: A firm that assumes responsibility for engineering precast structural concrete units to comply with performance requirements. Responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

C. Welding Qualifications: Qualify procedures and personnel according to the following:
   1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
   2. AWS D1.4/D1.4M, "Structural Welding Code - Reinforcing Steel."

D. Erector: Acceptable to precast fabricator.

E. Use only qualified workers trained to handle and erect structural concrete members.

F. Prepare design drawings under seal of a Professional Engineer registered in the State of Wisconsin and fully experienced in the design of precast concrete structural units.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site under provisions of Section 016000.

B. Lift and support planks from support points.

C. Lifting or Handling Devices: Capable of supporting plank in positions anticipated during manufacture, storage, transportation, and erection. Lifting devices shall be capable of resisting a force of 2-1/2 times weight of member.

D. Protect edges of members from chipping, or spalling.

E. Mark units with date of production and final position in structure.

1.7 SUBCONTRACTOR GUARANTEE

A. Furnish Subcontractor Guarantees in accordance with Section 017700.

PART 2 - PRODUCTS

2.1 MANUFACTURED PRODUCTS

A. Proprietary Footings: Diamond Pier Foundation Systems (Gig Harbor, WA; 708-406-5005).

2.2 MATERIALS

A. Concrete Materials:
1. Portland Cement: ASTM C 150, Type I or Type III, gray, unless otherwise indicated.
2. Supplementary Cementitious Materials:
3. Fly Ash: ASTM C 618, Class C or F, with maximum loss on ignition of 3 percent.
4. Metakaolin: ASTM C 618, Class N.
5. Silica Fume: ASTM C 1240, with optional chemical and physical requirement.
6. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
7. Normal-Weight Aggregates: Except as modified by PCI MNL 116, ASTM C 33, with coarse aggregates complying with Class 5 M or S. Stockpile fine and coarse aggregates for each type of exposed finish from a single source (pit or quarry) for Project.
8. Water: Potable; free from deleterious material that may affect color stability, setting, or strength of concrete and complying with chemical limits of PCI MNL 116.
9. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.
10. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and to not contain calcium chloride, or more than 0.15 percent chloride ions or other salts by weight of admixture.

B. Reinforcing Materials:
1. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 deformed.
2. Low-Alloy-Steel Reinforcing Bars: ASTM A 706, deformed.
3. Steel Bar Mats: ASTM A 184/A 184M, fabricated from ASTM A 615, Grade 60 deformed bars, unless indicated otherwise on the Structural Drawings; assembled with clips.
4. Plain-Steel Welded Wire Reinforcement: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.
5. Deformed-Steel Welded Wire Reinforcement: ASTM A 497or ASTM A 1064, flat sheet.

C. Supports: Suspend reinforcement from back of mold or use bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place according to PCI MNL 116.

D. Connecting and Supporting Devices: Plates, angles, inserts, bolts, and accessories; steel, hot dip galvanized.
1. Carbon-Steel Shapes and Plates: ASTM A 36.
2. Carbon-Steel-Headed Studs: ASTM A 108, Grade 1010 through 1020, cold finished, AWS D1.1/D1.1M, Type A or B, with arc shields and with minimum mechanical properties of PCI MNL 116.
3. Carbon-Steel Plate: ASTM A 283/A 283M, Grade C.
4. Malleable-Iron Castings: ASTM A 47/A 47M, Grade 32510 or Grade 35028.
5. Carbon-Steel Castings: ASTM A 27/A 27M, Grade 60-30.

6. High-Strength, Low-Alloy Structural Steel: ASTM A 572.
7. Carbon-Steel Structural Tubing: ASTM A 500, Grade B or Grade C.
8. Wrought Carbon-Steel Bars: ASTM A 675, Grade 65.
9. Deformed-Steel Wire or Bar Anchors: ASTM A 496or ASTM A 706.
10. Carbon-Steel Bolts and Studs: ASTM A 307, Grade A; carbon-steel, hex-head bolts and studs; carbon-steel nuts, ASTM A 563; and flat, unhardened steel washers, ASTM F 844.
11. Zinc-Coated Finish: For exterior steel items, steel in exterior walls, and items indicated for galvanizing, apply zinc coating by hot-dip process according to ASTM A 123
12. Galvanizing Repair Paint: High-zinc-dust-content paint with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21035B or SSPC-Paint 20.
13. Shop-Primed Finish: Prepare surfaces of nongalvanized-steel items, except those surfaces to be embedded in concrete, according to requirements in SSPC-SP 3, and shop apply lead- and chromate-free, rust-inhibitive primer, complying with performance requirements in SSPC-Paint 25 according to SSPC-PA 1.

2.3 GROUT MATERIALS

A. Sand-Cement Grout: Portland cement, ASTM C 150, Type I, and clean, natural sand, ASTM C 144 or ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 to 3 parts sand, by volume, with minimum water required for placement and hydration. Water-soluble chloride ion content less than 0.06 percent by weight of cement when tested according to ASTM C 1218.

B. Nonmetallic, Nonshrink Grout: Packaged, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, plasticizing and water-reducing agents, complying with ASTM C 1107, Grade A for drypack and Grades B and C for flowable grout and of consistency suitable for application within a 30-minute working time. Water-soluble chloride ion content less than 0.06 percent by weight of cement when tested according to ASTM C 1218.

2.4 ACCESSORIES

A. Core Hole End Plugs: Cardboard insert and concrete fill.

B. Provide bearing pads for precast structural concrete units as recommended by precast fabricator for application.

2.5 CONCRETE MIXTURES

A. Prepare design mixtures for each type of precast concrete required.

B. Design mixtures may be prepared by a qualified independent testing agency or by qualified precast plant personnel at precast structural concrete fabricator's option.

C. Limit water-soluble chloride ions to maximum percentage by weight of cement permitted by ACI 318 or PCI MNL 116 when tested according to ASTM C 1218.

D. Normal-Weight Concrete Mixtures: Proportion face and backup mixtures or full-depth mixtures, at fabricator's option by either laboratory trial batch or field test data methods according to ACI 211.1, with materials to be used on Project, to provide normal-weight concrete with the following properties:
   1. Compressive Strength (28 Days): 5000 psi.
   2. Maximum Water-Cementitious Materials Ratio: 0.45.

E. Water Absorption: Limit water absorption to 6 percent by weight or 14 percent by volume, tested according to ASTM C 642, except for boiling requirement.

F. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content complying with PCI MNL 116.

G. When included in design mixtures, add other admixtures to concrete mixtures according to manufacturer's written instructions.

H. Concrete Mix Adjustments: Concrete mix design adjustments may be proposed if characteristics of materials, Project conditions, weather, test results, or other circumstances warrant.

2.6 FABRICATION

A. Verify reinforcing steel, anchors, inserts, plates, angles, and other cast-in items are embedded and located as indicated on shop drawings.

B. Mark each precast unit to corresponding code on erection drawings.

C. Reinforcement: Comply with recommendations in PCI MNL 116 for fabricating, placing, and supporting reinforcement.

D. Reinforce precast structural concrete units to resist handling, transportation, and erection stresses and specified in-place loads.

E. Comply with requirements in PCI MNL 116 and in this Section for measuring, mixing, transporting, and placing concrete. After concrete batching, no additional water may be added.

F. Place concrete in a continuous operation to prevent cold joints or planes of weakness from forming in precast concrete units.

G. Thoroughly consolidate placed concrete by vibration without dislocating or damaging reinforcement and built-in items, and minimize pour lines, honeycombing, or entrapped air voids on surfaces. Use equipment and procedures complying with PCI MNL 116.

H. Comply with PCI MNL 116 procedures for hot- and cold-weather concrete placement.

I. Identify pickup points of precast structural concrete units and orientation in structure with permanent markings, complying with markings indicated on Shop Drawings. Imprint or permanently mark casting date on each precast structural concrete unit on a surface that does not show in finished structure.

J. Cure concrete, according to requirements in PCI MNL 116, by moisture retention without heat or by accelerated heat curing using live steam or radiant heat and moisture. Cure units until compressive strength is high enough to ensure that stripping does not have an effect on performance or appearance of final product.

K. Discard and replace precast structural concrete units that do not comply with requirements, including structural, manufacturing tolerance, and appearance, unless repairs meet requirements in PCI MNL 116 and meet Architect's approval.

2.7 FINISHES

A. Commercial Grade:
   1. Remove fins and protrusions larger than 1/8 inch and fill holes larger than 1/2 inch. Rub or grind ragged edges. Faces must have true, well-defined surfaces. Air holes, water marks, and color variations are permitted. Limit form joint offsets to 3/16 inch.
   2. Provide Commercial Grade finish at precast planks.
   3. Apply roughened surface finish according to ACI 318 to precast concrete units that receive concrete topping after installation

B. Grade B Finish:
   1. Fill air pockets and holes larger than 1/4 inch in diameter with sand-cement paste matching color of adjacent surfaces. Fill air holes greater than 1/8 inch in width that occur more than once per 2 sq. in. Grind smooth form offsets or fins larger than 1/8 inch. Repair surface blemishes due to holes or dents in molds. Discoloration at form joints is permitted.
   2. Provide Grade B Finish at precast columns and beams.

2.8 SOURCE QUALITY CONTROL

A. Test concrete in accordance with manufacturer's procedure.

B. Maintain plant records and quality control program during production of precast members. Make records available to Architect upon request.

PART 3 - EXECUTION

3.1 ERECTION - PLANKS

A. Provide for erection procedure, temporary bracing, and induced loads during erection. Maintain temporary bracing in place until final support is provided.

B. Erect members without damage to shape or dimension.

C. Align and maintain uniform horizontal and vertical joints as erection progresses.

D. Adjust differential camber between planks to tolerance before final attachment.

E. Perform welding in accordance with AWS D1.1.

F. Level differential elevation of adjoining planks with grout to maximum slope of 1:12.

G. Grouting or Dry-Packing Connections and Joints: Grout connections and joints and open spaces at keyways, connections, and joints where required or indicated on Shop Drawings. Retain flowable grout in place until hard enough to support itself. Alternatively, pack spaces with stiff dry-pack grout material, tamping until voids are completely filled.

3.2 ERECTION – STRUCTURAL MEMBERS

A. Install clips, hangers, bearing pads, and other accessories required for connecting precast structural concrete units to supporting members and backup materials.

B. Erect precast structural concrete level, plumb, and square within specified allowable tolerances. Provide temporary structural framing, shoring, and bracing as required to maintain position, stability, and alignment of units until permanent connections are complete.
   1. Maintain horizontal and vertical joint alignment and uniform joint width as erection progresses.
   2. Remove projecting lifting devices and use plastic patch caps or sand-cement grout to fill voids within recessed lifting devices flush with surface of adjacent precast surfaces when recess is exposed.

C. Connect precast structural concrete units in position by bolting, welding, grouting, or as otherwise indicated on Shop Drawings. Remove temporary shims, wedges, and spacers as soon as practical after connecting and grouting are completed.

D. Field cutting of precast units is not permitted without approval of Architect.

E. Fasteners: Do not use drilled or powder-actuated fasteners for attaching accessory items to precast, prestressed concrete units.

F. Welding: Comply with applicable requirements in AWS D1.1/D1.1M and AWS D1.4/D1.4M for welding, welding electrodes, appearance, quality of welds, and methods used in correcting welding work.

G. At bolted connections, use lock washers, tack welding, or other approved means to prevent loosening of nuts after final adjustment.

3.3 INSTALLATION - PIER FOOTINGS

A. Install in strict compliance with manufacturers instructions.

3.4 TOLERANCES

A. Maximum Variation From Plane or Location: 1/4 inch in 10 ft and 3/8 inch in 100 ft, noncumulative.

B. Maximum Out of Square: 1/8 inch in 10 ft.

C. Maximum Offset From True Alignment Between Two Adjacent Members: 1/4 inch.

D. Maximum Variation From Dimensions Indicated on Shop Drawings: Plus or minus 1/8 inch.

E. Maximum Misalignment of Anchors, Inserts, Openings: 1/8.

END OF SECTION

SECTION 035300 – CONCRETE TOPPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Interior concrete topping to receive concrete stain.

B. Related Sections:
1. 033013 - Concrete: New floor slabs.
2. 035416 – Hydraulic Cement Underlayment: Concealed underlayments.
3. 099743 – Concrete Floor Stain.

C. Drawings, the provisions of the Agreement, and Division 1 specification sections apply to all work of this Section.

D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

1.2 SUBMITTALS

A. Make submittals in accordance with Section 013300.

B. Product Data: Submit manufacturer's complete product literature.

C. Quality Control Submittals:
1. Simultaneous with Subcontract Bid, submit certification that the applicator is approved by the insulating concrete aggregate manufacturer.
2. Prior to commencement of installation, submit certification from the aggregate manufacturer that the substrate is ready to receive the concrete roof insulation system.
3. Prior to commencement of roofing installation, the insulating concrete manufacturer's representative shall submit a letter stating that the insulating concrete was installed in accordance with the manufacturer's recommendations, and is ready to receive roofing.
4. Submit copies of manufacturer’s reports on laboratory tests of field samples.

1.3 QUALITY ASSURANCE

A. Work of this Section is subject to testing and inspection as specified in Section 014500.

B. Installer Qualifications: Factory trained; minimum of two years experience on comparable complete projects; approved by the materials manufacturer.

C. Mock-up: In accordance with Section 014500.
1. Provide minimum 25 square foot mock-up in location as directed, and as required under Section 099743.
2. Include substrate preparation, field and edge screeds, control joint, overlay colors, and proposed finish. Coordinate with Section 099316 for application of stain.
3. Indicate methods of curing and protection.
4. Remove mock-up as directed upon completion of the work.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in their original unopened packages and protect from freezing, direct sun exposure, and exposure to moisture.

1.5 PROJECT/SITE CONDITIONS

A. Maintain surface and ambient temperature of between 50 and 90 degrees F for 24 hours before, during, and 24 hours after overlay installation.

B. Provide uniform and sufficient lighting in areas of installation.

C. Keep traffic out of area in which overlay is being applied or cured.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Basis of Design: L.M. Scofield Company

B. Ardex Inc.

C. Laticrete International, Inc.

2.2 MATERIALS

A. Overlay Material: "Scofield Overlay™"; self-leveling, pourable, cement based topping material, minimum 28 day compressive strength 6,000 psi.

B. Primer: Scofield "Bondaid™" interior primer.

C. Aggregate (when required): Washed "pea gravel"; 3/8 inch minus, in accordance with overlay materials recommendations.

D. Metal Screed: Schlüter Systems, Inc. (800-472-4588) "Schlüter -SCHIENE-AE" clear anodized aluminum tile edging trim; sizes as required for installation of top of screed flush with top of overlay.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.

B. Do not begin installation until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

C. Ensure that subfloor is clean, dry, hard, sound, and free of oils, or any other substance which would affect proper bonding and curing. All existing slabs and new slabs which have been trowelled or which have been contaminated shall be shot blasted as necessary to roughen surface and remove loose particles.

3.2 PREPARATION

A. Accurately lay out locations of tile. Determine and indicate borders, patterns, screed locations, and starting points. Do not commence overlay installation, until all conflicts with patterns indicated on the drawings have been resolved with Architect.

B. Metal Screed Installation:
   1. Install screeds at control joint locations as indicated, and at overlay field edges except at thresholds and where otherwise indicated.
   2. Verify that substrate is clean, dry, and in proper condition for adhesive attachment.
   3. Accurately cut to length for flush butt joints; miter at angle joints; do not bend; remove burrs.
   4. Install in longest practical lengths, except that no section of screed shall be shorter than 4 feet in length for continuous runs greater than 4 feet.
   5. Install screeds in accurate locations, free from waves, and variations in height.
   6. Shim screeds as necessary for level installation; securely anchor to floor with concrete anchors or epoxy adhesive.
   7. Make butt joints in accurate alignment with moderate contact; do not force.
   8. Obtain Architect's approval, prior to grinding screeds. Grind screed joints as necessary to correct minor misalignment, and to ease sharp outside corners. Maintain tops of screeds flat and in accurate alignment.

C. Install primer by brush or spray; brush primer thoroughly into the surface using a brush with polystyrene bristles.

3.3 APPLICATION

A. Mixing: Measure components and mechanically mix, as recommended by the manufacturer. Extend mix with aggregate only for locations where installation thickness will exceed 1 inch.

B. Apply primer and overlay in full accordance with manufacturer's instructions.

C. Finish to a smooth level surface; do not overwork.

D. Cut or tool control joints into partially cured topping.

E. Installation Tolerance: In accordance with ACI 302.1R; "Very flat"; level to within 1/8" in 10 feet.

3.4 CLEANING

A. As work proceeds, clean up excess materials, rubbish, and splash.

3.5 PROTECTION

A. Mask and protect adjacent surfaces and materials from damage. Repair damage to satisfaction of Architect.

B. Protect overlay material until fully cured and dry, and until finish treatment is applied.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Concrete unit masonry.
   2. Mortar and grout.
   3. Steel reinforcement and accessories.

B. Related Sections:
   1. 030013 - Concrete - Requirements for steel reinforcement.
   2. 078400 - Firestopping
   3. 078500 - Fire Rated Joints
   4. 079201 - Joint Sealants - Shell: Expansion joint fillers.
   5. 081113 - Hollow Metal Doors and Frames: Metal frames to be built in.
   6. 099000 – Painting and Coating: Finish coatings.
   7. Division 22 and 26 - Plumbing and Electrical: sleeves for pipe and conduit penetrations, recessed lighting fixtures.

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.

D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. A153 - Specification for Zinc Coating (Hot Dipped) on Iron and Steel Hardware.
   2. C90 - Loadbearing Concrete Masonry Units.
   3. C270 - Mortar for Unit Masonry.
   4. C476 - Grout for Reinforced and Non-Reinforced Masonry.

1.3 SUBMITTALS

A. Make submittals in accordance with Section 013300.

B. Product Literature:
   1. Concrete masonry units.
   2. Proposed mortar and grout additives.
   3. All accessory components.

C. Quality Control Submittals:
   1. Submit manufacturer's certificate that masonry, and reinforcing, meet or exceed specified requirements.
   2. Mix design: Indicate mortar and grout components, proportions, and 28 day compressive strengths.

1.4 QUALITY ASSURANCE

A. Work of this Section is subject to testing and inspection as specified in Section 014500.

B. Regulatory Requirements: Conform to the requirements of the International Building Code, 2009.

1.5 DELIVERY, STORAGE, AND HANDLING

A. In accordance with Section 016000.

B. Store masonry units off ground to prevent contamination by mud, dust, or materials likely to cause staining or other defects.

1.6 ENVIRONMENTAL CONDITIONS

A. Wet Weather: Provide suitable cover over work exposed to weather, protect materials. Maintain cover over finished work for 48 hours after completion.

B. Cold Weather: When outside temperature is below 40 degrees F, or is expected to fall below freezing within 48 hours (Weather Bureau forecast), heat materials and provide suitable enclosures to maintain temperatures above 40 degrees F in masonry work in place for 48 hours after completion. Obtain approval of methods of protection before proceeding.

PART 2 - PRODUCTS

2.1 CONCRETE MASONRY UNITS (CMU)

A. Hollow Core Units: ASTM C90; normal or medium weight with a minimum compressive strength as noted on Structural Drawings.

B. Nominal face dimensions, 8" x 16" x depth shown on drawings; furnish special shapes, including corner units and bond beams, for locations indicated.

C. Color and Texture:
   1. Type 1:
      a. Ground face; integral color as scheduled.
      b. For use at exposed applications at stairwells and elsewhere as indicated.
   2. Type 2:
      a. Manufacturer’s standard texture and color; furnish fine textured units for locations indicated to receive paint finish.
      b. For use at garage locations.

2.2 MORTAR AND GROUT

A. Mortar:
   1. ASTM C270, As indicated on the Structural Drawings; color subject to Architect’s approval.
   2. Water Repellant Admixture: "Dry-Block Mortar Admixture" by Grace Construction Products at locations exposed to weather.

B. Grout: ASTM C476: 2000 psi compressive strength minimum unless noted otherwise on structural drawings.

2.3 ACCESSORIES

A. Steel Reinforcing: Types as specified in Section 030013 and indicated on the structural drawings.

B. Control Joint Material: One of the following.
   1. Preformed rubber or neoprene material; Dur-O-Wall Movement Control Products "Rapid" Control Joint, shapes as required to span full depth of wall.
   2. #30 asphalt saturated building paper.

PART 3 - EXECUTION

3.1 PREPARATION

A. Verify adjacent work is ready to accept the work of this Section; verify that items provided by other Sections are properly sized and located. Commencement of masonry work constitutes acceptance of adjacent and underlying construction. Immediately notify Architect of all deficiencies.

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.

3.2 MORTAR AND GROUT

A. Thoroughly mix mortar and grout ingredients in quantities required for immediate use in accordance with referenced standards.

B. Add approved admixtures in accordance with manufacturer's instructions. Provide uniformity of mix.

C. Do not use anti-freeze compounds to lower the freezing point of mortar or grout.

D. If water is lost by evaporation, retemper mortar within two hours of mixing. Do not retemper mortar after this interval.

E. Do not use lime in grout.

3.3 INSTALLATION

A. Coursing:
   1. Place masonry to lines and levels indicated.
   2. Maintain masonry courses to uniform height.
   3. Lay masonry units in running bond.

B. Placing and Bonding:
   1. 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.
   2. Fully bond intersections, and external and internal corners.
   3. Do not use chipped or broken units.
   4. Do not shift or tap masonry units after mortar has taken initial set. Where adjustment must be made, remove mortar and replace.
   5. Remove excess mortar.
   6. Bonding fresh masonry to set, or partially set, masonry:
      a. Remove loose mortar.
      b. Clean and lightly wet exposed surface of set masonry prior to laying fresh masonry.
   7. Form 3/8 inch nominal tooled concave mortar joints where exposed in the finished work; cut flush at concealed locations, including joints concealed in cavities.

C. Cutting and Fitting:
   1. Cut and fit masonry units to form the configurations indicated, and as required to fit the work of other sections. Saw masonry units requiring cutting with a masonry saw. Coordinate fully with other sections of work to ensure correct size, shape and location.
   2. Cut or block out chases for other trades as directed by other trades at time of masonry work.
   3. Obtain Architect's review prior to cutting or fitting any area which is not indicated on Drawings, or which may impair appearance or strength of masonry work.

D. Expansion Joints:
   1. Provide expansion joints as indicated.
   2. Keep joints clear of mortar.
   3. Do not continue masonry reinforcing across expansion joints.

E. Control Joints:
   1. Provide as indicated. Where not indicated, locate continuous vertical joints at maximum 40 feet o.c.
   2. Install preformed joint material or strips of building paper asphalt felt as bond breaker, at head joints; hold edge back approximately 1/2 inch from face of block. Fill joint with mortar as specified.
   3. Cut joint material as necessary to facilitate extension of horizontal reinforcing through joints.
   4. Joints to be exposed in the finished work shall be kept free of mortar to a depth of 3/8 inch, or as necessary for installation of sealants.

F. Anchorage and Reinforcing:
   1. Provide as indicated, and as specified on the Structural Drawings. Maintain at least 1/2 inch clearance between reinforcement and interior faces of units. Place vertical reinforcement central in cores, unless otherwise indicated.

G. Install bond beams where indicated on the Drawings, using bond beam units. Reinforce as indicated, with reinforcement laps and extensions as indicated on the Structural Drawings. Provide shoring as necessary to support bond beam lintels until grout is cured.

H. Build-in Work:
   1. As work progresses, build-in hollow metal frames, window frames, steel lintels, shelf angles, nailing strips, anchor bolts, plates, and other similar items furnished by other trades.
   2. Build-in items plumb and true.

3. Bed anchors of hollow metal frames in mortar joints. Fill frame voids solid with mortar. Fill masonry cores with grout minimum 12 inches from framed openings.

I. Grouting:
   1. Fill cells with grout, as indicated on the Drawings, and as specified.
   2. Delay grouting for a minimum of 4 hours after completion of laying.
   3. Place grout in lifts not exceeding 48 inches.
   4. Machine vibrate grout.
   5. When grouting is stopped for one hour or longer, horizontal construction joints shall be formed by stopping the pour of grout not less than 1/2 inch below the top of the uppermost unit grouted.

J. Construct wall head and sill to floor terminations in compliance with Section 0785000.

K. At the end of each days work, stop off horizontal runs by stepping back each course; toothing is not permitted.

L. Tolerances:
   1. Maximum Variation From Plumb:
      a. In lines and surfaces of walls and arrises:
         1) 1/4 in. in 10 ft.
         2) 3/8 in. in any story or 20 ft. maximum.
         3) 1/2 in. in 40 ft.
      b. For external corners, expansion joints and other conspicuous lines:
         1) 1/4 in. in any story or 20 ft. maximum.
         2) 1/2 in. in 40 ft.
   2. Maximum variation from level or grades for exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines: 1/4 in. in any bay or 20 ft.
   3. Maximum variation of linear building line from an established position in plan and related portions of columns, walls and partitions:
      a. 1/2 in. in any bay or 20 ft. maximum.
      b. 3/4 inch in 40 ft.

3.4 CLEANING

A. Cut out defective joints and holes in exposed masonry and repoint with mortar.

B. Dry brush masonry surface after mortar has set at end of each day's work and after final pointing.

C. Leave work area and surrounding surfaces clean and free of mortar spots, droppings, and broken masonry.

3.5 PROTECTION

A. Protect finished installation under provisions of Section 015000.

B. Protect face materials, sills, ledges, and offsets from mortar drippings or other damage during construction.

C. Maintain protective boards at exposed external corners which may be damaged by construction activities.

D. At day's end, cover unfinished walls to prevent moisture infiltration.

END OF SECTION

SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Fabricated metal items indicated on the Architectural Drawings and scheduled at the end of this Section.

B. Related Sections:
   1. 030013 - Concrete: Embedment of metal fabrications; foundations and fill at pipe bollards.
   2. 074213 - Metal Wall Panels: Coordination of custom sheet metal cladding.
   3. 099000 – Painting and Coating: Field painting of metal fabrications shop primed in this section.

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.

D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

1.2 REFERENCES

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

B. American Society for Testing and Materials (ASTM):
   1. A36 - Specification for Structural Steel.
   2. A53 - Specification for Welded and Seamless Steel Pipe.
   3. A123 - Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
   4. A143 - Safeguarding Against Embrittlement of Hot Dipped Galvanized Structural Steel Products and Procedures for Detecting Embrittlement.
   5. A153 - Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware.
   6. A307 - Specification for Carbon Steel Externally Threaded Standard Fasteners.
   7. A366 - Specification for Carbon Steel Cold Rolled Sheet.
   8. A384 - Safeguarding Against Warpage and Distortion During Hot Dip Galvanizing of Steel Assemblies.
   9. A385 - Providing High Quality Zinc Coatings (Hot Dip).
   10. A500 - Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
   11. A501 - Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
   12. A569 - Specification for Commercial Quality Hot Rolled Sheet and Strip Carbon (0.15 Maximum Percent) Steel.
   13. A570 - Specification for Hot-Rolled Carbon Steel Sheet and Strip, Structural Quality.

1.3 SUBMITTALS

A. Make submittals in accordance with Section 013300.

B. Product Literature: Submit product literature for all prefabricated products.

C. Shop Drawings:
   1. Show details of fabrication and installation; indicate materials, thicknesses, dimensions, methods of reinforcement and embedment, attachments, shop finishes, provisions for work of other trades, and other pertinent information as requested by Architect.
   2. Indicate sizes and locations of holes or lifting lugs and air vent holes required for hot dip galvanizing.

D. Quality Control Submittals:
   1. Certification: Submit written certification that railings have been designed to meet the specified requirements.

E. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 QUALITY ASSURANCE

A. Fabricator Qualifications: Experienced and regularly engaged in producing metal fabrications of the type specified; must employ only skilled personnel using proper equipment to produce work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Carbon Steel:
   1. Structural Shapes, Plates, and Bars: ASTM A36.
   2. Sheet: ASTM A366.
   3. Pipe: ASTM A53, seamless, Type S, plain end; schedule 40 unless indicated otherwise.
   4. Tubing: ASTM A500 or A501, seamless.

B. Aluminum:
   1. Extruded Aluminum: 6063-T5 alloy and temper conforming to the requirements of ASTM B221.
   2. Aluminum Sheet: 5005-H32 alloy and temper conforming to the requirements ASTM B209.

C. Stainless Steel:
   1. ASTM A167 Type 302 or 304.
   2. Diamond Plate: Standard raised pattern stainless steel checker plate, 3/16 inch thick, unless otherwise noted or specified.

D. Fasteners: Types as indicated, specified, or required for the assembly and installation of fabricated items.
   1. Bolts: ASTM A307, unless indicated otherwise; include nuts and plain harden washers.
   2. Drilled-In Concrete Anchors: Ramset "Trubolt Stud Anchor," Hilti Fastening Systems "Kwikbolt," or approved.

E. Interior Primer:
   1. Manufacturer: Tnemec Company Inc. (Kansas City, MO; 816-483-3400).
   2. Acrylic Primer: Tnemec Series 1029 “Enduratone”.
   3. Conform to Green Seal Standard GS-11 limitations for VOC and chemical emissions; rust resistant; compatible with subsequent coatings.

F. Special Shop Primers:
   1. Manufacturer: Tnemec Company Inc. (Kansas City, MO; 816-483-3400).
   2. Epoxy Primer: Tnemec Series 69 Epoxoline.”

G. Cold Galvanizing Compound: "Galv-Weld," "Galvican," "ZRC Cold Galvanizing Compound," or equivalent zinc-rich primer.

H. Miscellaneous Materials: Furnish incidental accessory materials, tools, and equipment as necessary for fabrication and installation of miscellaneous metal items as indicated on the Drawings.
   1. Non-Shrink Grout: Master Builder's "Master Flow 713," Sonneborn "Sonogrout," or approved.

2.2 PREFABRICATED COMPONENTS

A. Steel Bar Grating Treads: Fabricate from materials as specified for steel gratings, in accordance with NAAMM recommendations and tolerances. Carrier plate design; checkered nosing; number and size of bearing bars in accordance with tread widths and spans indicated.

B. Woven Wire Mesh:
   1. Pre-Galvanized, 2" Square Opening, 0.2500" Wire Diameter, Lockcrimp Weave, 79% Open Area;
   2. McNichols Item #3293920148.

2.3 METAL FABRICATIONS

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

B. Steel Ladders:
   1. Space siderails of elevator pit ladders 16 inches apart.
   2. Siderails: Continuous, 1/2-by-2-1/2 inch steel flat bars, with eased edges.
   3. Rungs: 3/4-inch diameter steel bars.
   4. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
   5. Provide nonslip abrasive surfaces on top of each rung.
   6. Galvanize ladders, including brackets and fasteners.

C. Steel Gratings: In accordance with Section 055300.

2.4 FABRICATION

A. General Fabrication Requirements: Fabricate as follows, unless specified or indicated otherwise.
   1. Verify all dimensions and fabricate to detail with accurate sizes and shapes, straight lines, smooth curves, and sharp angles.
   2. Welds shall have sufficient strength to withstand the loads applied.
   3. For items exposed to view or subject to contact, grind welds smooth and level with adjacent surfaces; remove all burrs from cut edges. Fill imperfections with body putty as necessary for a smooth even finish.
   4. Bend curved sections to a smooth radius free from buckles and twists.
   5. Fabrications in exterior locations shall be fabricated to shed water.

B. Fabrication of Elements to Receive Galvanized Coatings:
   1. Fabricate in accordance with the applicable requirements of ASTM A143, A384, and A385.
   2. Remove welding slag and burrs prior to galvanizing.
   3. Avoid fabrication techniques which could cause distortion or embrittlement of the steel.

2.5 FABRICATION - ALUMINUM FABRICATIONS

A. Verify all dimensions, and fabricate to detail with accurate sizes and shapes, straight lines, smooth curves, and sharp angles. Flat surfaces shall be smooth with no dents, or waves. Mechanical fasteners in contact with aluminum shall be stainless steel or aluminum. Weld marks shall be without visible weld marks or deformations. Grind and polish all weld marks smooth before finishing.

B. Finish shall be shop-applied organic coating containing minimum 50% Kynar resin, as manufactured by PPG or Valspar, color as scheduled. Apply in accordance with manufacturer’s instructions.

2.6 SHOP FINISHES - FERROUS FABRICATIONS

A. Hot Dip Galvanizing:
   1. Steel fabrications shall be galvanized in accordance with ASTM A123. Bolts, nuts, washers, and other hardware shall be galvanized in accordance with A153.
   2. Surface Finish: The galvanized coatings shall be continuous, firmly adhered, smooth, and free from defects.
   3. Locations: Provide hot dip galvanizing for all metal fabrications in exterior or moist conditions, and as otherwise indicated. Unless otherwise approved by the Architect, plug and cold galvanize ventilation and lifting holes which will be exposed to moisture penetration in the finished work.

B. Interior Primed finish:
   1. Preparation: Solvent clean in accordance with SSPC-SP1. Remove rust and scale by wire brushing, scraping, and sanding down to bare metal in accordance with SSPC-SP2 and SP3. Where SP2 and SP3 measures are insufficient, provide commercial blast cleaning in accordance with SSPC-SP6. Immediately apply specified prime coat.
   2. Apply interior primer in accordance with manufacturer's recommendations.
   3. Locations: Provide at all interior metal fabrication exposed to view, unless otherwise indicated. Do not prime surfaces to be embedded in concrete, surfaces to be galvanized, and surfaces to be field welded.

C. Clear Steel Finish (Hot Rolled Steel):
   1. Use handling methods to preserve hot rolled mill scale texture and blue-gray patina.
   2. Do not cut steel with a torch; cut steel with a blade.
   3. If the metal is scratched or has a poor patina do the following:

a. Heat metal to 150° F to eliminate any water.
b. Allow to cool. Remove any surface rust with a Scotch Brite pad or steel wool.

4. Apply two coats of clear urethane.

D. Stainless Steel: #4 finish in accordance with the NAAMM "Metal Finishes Manual."

E. Special Primer at Galvanized Surfaces:
1. Prepare surfaces in accordance with the finish coat manufacturer's recommendations, and as specified below.
2. Solvent clean in accordance with SSPC SP-1; commercial blast ungalvanized ferrous metal surfaces in accordance with SSPC SP10. Abrade galvanized surfaces with a metal preparation pad.
3. At galvanized steel, spray apply epoxy primer in accordance with the manufacturer's recommendations. Apply primer to receive field application of finish coats as specified in Section 099000.
4. Except for surfaces indicated to be field welded, coat all surfaces of fabrication, whether or not exposed to view in installed position.
5. Maintain at least one coat of primer at all times during installation. Immediately patch damaged coatings.
6. Finish coat shall be free of dirt, flow lines, sags, blisters, pinholes, and other surface imperfections.
7. Locations: Provide at all galvanized metals and other fabrications as scheduled. Do not prime surfaces to be field welded.

2.7 PROTECTION

A. For metal in contact with concrete, masonry, and other dissimilar materials, coat contact surfaces with zinc-rich primer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.

B. Do not begin installation until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of conditions as satisfactory.

3.2 INSTALLATION

A. Install metal fabrications in accurate locations shown. Unless indicated otherwise, fabrications shall be installed plumb and level.

B. Provide all anchorage devices as indicated and required for a secure installation.

C. Touch-up all surfaces damaged during installation. Patch all welds and damage marks with matching primer.

D. Coordinate with Section 030013 for foundations, installation, and concrete fill at pipe bollards.

3.3 SCHEDULE

A. The following list includes, without limitation, the principal metal fabrications and finishes in the Work.
1. Steel bollards: Galvanized with special exterior primer for field finishing under Section 099000.
2. Elevator pit ladder: Galvanized finish only.
3. Elevator pit sump grate and frame: Galvanized finish only.
4. Steel Base:

END OF SECTION

SECTION 055913 - PREFABRICATED ALUMINUM BALCONIES AND RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Premanufactured aluminum balconies
   2. Handrails, guardrails, balusters, and fittings.
   3. Structural design of balconies and railings

B. Related Sections:
   1. 055000 – Metal Fabrications:
   2. 061000 – Rough Carpentry: Blocking; installation of anchors.

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.

D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

1.2 SYSTEM DESCRIPTION

A. Unless specified otherwise, balcony system shall be fabricated from aluminum. Design details indicated may be modified by the fabricator subject to the specified requirements.

B. Balcony systems shall include balcony deck, handrails, guardrails, floor edge channels or angles, and all supports and anchors to adjacent construction. Where handrails are attached to walls, metal backing within walls shall be included.

C. Wall construction, as indicated on the Drawings, includes bearing capacity to support aluminum balcony systems and design live loading. Balcony system shall accommodate the surrounding construction indicated. All modifications to structure as required to support or otherwise accommodate the design/build balcony system shall be the responsibility of the Contractor. Changes in dimension or location of finish surfaces indicated are subject to prior approval by the Architect. The Contractor shall reimburse the Owner for the Architect's charges for redesign necessitated by changes in building structure to accommodate stairs.

D. Deck and stringer deflections shall be limited to 1/360 span under design live loading indicated in the Structural Notes.

E. Railings:
   1. Railing assembly, wall rails, and attachments shall be capable of resisting a force of 200 lbs at any point in any direction without damage or permanent set.
   2. Railing assembly, wall rails, and attachments shall be capable of resisting a force of 50 plf in any direction without damage or permanent set.

F. Balcony deck surfaces shall have non-slip finish.

1.3 SUBMITTALS

A. Make submittals in accordance with 013300.

B. Shop Drawings:
   1. Show materials, finishes, fastening systems, blocking requirements, and connections to surrounding construction.
   2. Shop drawings shall bear the stamp of the designing structural engineer.

C. Submit samples of a typical welded connection.

D. Submit manufacturer's installation instructions.

E. Quality Control Submittals:
   1. Certification: Submit written certification that the stair system has been designed to meet the specified requirements.

F. Closeout Submittal:
   1. In accordance with Section 017700.
   2. Submit designing engineer's certification that products and installation comply with design requirements.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Balcony system shall meet the requirements of jurisdictional code authorities.
   2. Furnish all calculations, engineer's stamps, drawings, and other items required by the code authorities to obtain approval of the installation.

B. Fabricator Qualifications: Minimum of 5 years experience in the fabrication of exit stairs of the type specified.

C. Structural Design: Structural design of the balcony system shall be by a Structural Engineer Licensed to practice in the State where the Project is located.

D. The work of this Section is subject to tests and inspections as specified in Section 014500.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Endurable Building Products (Minneapolis, MN; 800-933-2060).

B. Innotech Manufacturing LLC (Mt Vernon, IL; 618-244-6261).

C. Modern Materials, Inc (Denver, CO; 303-779-0321)

2.2 PREMANUFACTURED ALUMINUM BALCONY SYSTEM

A. Balcony Decks: TBD

B. Rails and posts: 1-1/2 inches diameter, extruded tubing.

C. Fittings: Flush weld fittings; aluminum.

D. Handrail Brackets: Extruded aluminum; round base with round top. Provide with prepared backing plate for mounting in wall construction.

E. Flush End Caps: Wagner type D; weld on flat plate type.

F. Splice Connectors: Welding connectors; aluminum.

G. Finish: Mill finish

2.3 FABRICATION

A. Verify dimensions on site prior to shop fabrication.

B. Fit and shop assemble sections in largest practical sizes, for delivery to site and installation.

C. Supply components required for secure anchorage of handrails and railings.

D. All tube railing joints shall be welded. Grind exposed welds smooth and flush with adjacent surfaces.

E. Accurately form components required for anchorage of railings to each other and to building structure.

PART 3 - EXECUTION

3.1 PREPARATION

A. Supply items to be cast into concrete, placed in partitions with setting templates and erection drawings to appropriate the appropriate trade.

3.2 INSTALLATION

A. Install in accordance with shop drawings and manufacturer's instructions.

B. Erect work square and level, free from distortion or defects detrimental to appearance or performance.

C. Anchor hand rails to supports.

D. Weld field connections and grind smooth to complete assembly.

END OF SECTION

SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Sheathing.
   2. Dimensional wood framing.
   3. Blocking, nailers, and curbing.
   4. Plywood terminal back boards.

B. Related Sections:
   1. 054000 - Cold-Formed Metal Framing: Structural lightgage metal framing.
   2. 061733 - Wood I-Joists
   3. 075429 - Mechanically Anchored Single Ply Thermoplastic Roofing.
   4. 076200 - Sheet Metal Flashing and Trim.
   5. 092200 – Lightgage Metal Support Framing: Support framing At Type 2 occupancies; metal backing.
   6. 092900 - Gypsum Board:

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.

D. Substitutions: Substitutions will be considered only under the terms and conditions of Section 016000.

1.2 REFERENCES

A. American Institute of Timber Construction (AITC)

B. American National Standards Institute (ANSI): 190.1 - Structural Glued Laminated Timber.

C. American Plywood Association (APA)

D. American Society for Testing and Materials (ASTM):
   1. D2898 - Test Method for Accelerated Weathering of Fire-Retardant Treated Wood for Fire Testing.
   2. E84 - Test Method for Surface Burning Characteristics of Building Materials.

E. American Wood Preservers' Association: Book of Standards (AWPA).

F. National Lumber Grading Authority of Canada (NLGA).

G. Product Standard (PS): PS-20 - American Softwood Lumber Standard.

H. Southern Pine Inspection Bureau (SPIB).

I. West Coast Lumber Inspection Bureau (WCLB): Standard Grading Rules for West Coast Lumber.

J. Western Wood Products Association (WWPA).

1.3 SYSTEM DESCRIPTION

A. Structural Requirements for Fabricated Wood Structural Members: Design for dead loads and live loads as indicated on the structural drawings, with deflection limited to 1/360 the span for floor loads and 1/240 the span for roof loads.

1.4 SUBMITTALS

A. Make submittals in accordance with Section 013300.

B. Product Data: Submit complete technical and product data on the following:
   1. Preservative and fire retardant wood treatments.
   2. Framing and sheathing accessories.
   3. Fabricated structural wood members.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements: Work shall conform to the requirements of the currently enforced Seattle Building Code as adopted by the jurisdiction.

B. Trusses shall bear a quality control stamp by the Washington Wood Truss Fabricators Council or other group acceptable to the jurisdictional code authorities. Furnish all calculations and other data as required for acceptance by the jurisdictional code authorities.

C. Fabricated Wood Structural Member Manufacturers Qualifications:
   1. For each type of fabricated structural wood member, use company specializing in the manufacture of the type of structural wood member with a minimum of three years experience.
   2. Glued Laminated Wood Structural Member Manufacturer: Certified by the AITC or APA-EWS (American Wood Systems), in accordance with ANSI A190.1.

D. Glued laminated structural units shall conform to Voluntary Product Standards PS 56 "Structural Glue Laminated Timber" and AITC 117 "Standard Specifications for Structural Glue-Laminated Timber of Softwood Species".

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store and protect products under provisions of Section 016000.

B. Glued Laminated Wood Members:
   1. Protective Wrapping: Industrial grade members may be shipped unwrapped. Individually wrap architectural and premium grade members. Maintain protection until immediately prior to installation.
   2. Use padded, non-marring slings when handling architectural grade members.
   3. Prevent glued laminated members from becoming wet.

PART 2 - PRODUCTS

2.1 DIMENSION LUMBER

A. Lumber shall be manufactured in accordance with PS 20, and shall be stamped and graded in accordance with WWPA, WCLB, NLGA, or SPIB grading rules.

B. Moisture Content: Kiln dried to 19% maximum moisture content, except for material whose least dimension is 4 inches thick or greater.

C. Species: Hem-Fir, Spruce-Pine-Fir (SPF), or Douglas Fir Larch, unless indicated or specified otherwise.

D. Structural Framing (2" to 4" thick, 2" to 4" wide): "No 2 - Structural Light Framing," or better; "Stud" grade may be used at stud applications]

E. Structural Joists Rafters and Beams (2" to 4" thick, 5" and wider): "No. 2 - Structural Joists and Planks," or better.

F. Architectural Lumber Grades: Unexposed non-structural wood framing and blocking indicated on the Architectural Drawings shall be graded as follows:
   1. Non-Structural Framing (2" to 4" thick, 2" to 6" wide): "Construction - Light Framing," "Stud," or better.
   2. Blocking and Nailers: "Utility - Light Framing," or better.
   3. Structural Framing : As indicated on the Structural Drawings

2.2 PANEL MATERIALS

A. Wall and Roof Sheathing: APA Rated Sheathing; Structural I; CD grade; Exterior; plywood, unless approved otherwise; thicknesses as indicated.

B. Floor Sheathing: APA Span Rated Sturd-I-Floor; Exterior; plywood or oriented strand board, unless approved otherwise; thicknesses as indicated.

C. Floor Underlayment: APA AC or BC plywood meeting the requirements for Underlayment Grade; sanded face; underlayment grade.

D. Terminal Backboards: APA AC grade exterior; fire retardant treated.

2.3 FABRICATED WOOD STRUCTURAL MEMBERS

A. Glued Laminated Wood Members: As indicated on the Structural Drawings.

B. Laminated Veneer Lumber: ICC listed.

C. General Fabrication Requirements for Fabricated Wood Structural Members:
   1. Verify dimensions and site conditions prior to fabrication.
   2. Fabricate to meet the structural requirements specified.

2.4 ACCESSORIES

A. Fasteners:
   1. Hot-dipped galvanized steel for exterior, high humidity, and fire treated wood locations.
   2. For Use With Preservative Treated Wood: 300 Series stainless steel.
   3. Use ring shank nails at floor sheathing.
   4. Screws: Self tapping; countersunk or low profile head.

B. Metal Connectors: Simpson Company, Silver Metal Products, Inc, USP Structural Connectors, or approved; types as indicated on the Drawings; [minimum G-185 galvanized coating.

C. Sill Gasket: Closed cell polyethylene foam, glass fiber strips, or approved; continuous rolls; width of sill plate.

D. Strip Flashing: "Vycor Ultra" by WR Grace., 800-444-6459, or "Moistop E-Z Seal" by Fortifiber Corporation 800-343-3972. Coordinate with work of Section 072700.

2.5 WOOD TREATMENT

A. Wood Preservative (Pressure Treatment):
   1. Preservative treat all exterior lumber, including roofing nailers, curbs and other wood in contact with concrete, masonry, and moist conditions.
   2. For above ground use, use AWPA certified Ammonium Copper Quaternium (ACQ) or Copper Hydroxide Sodium Dimethyldithiocarbamate (CDDC) waterborne preservative with 0.25 pounds per cubic foot of wood retention.
   3. For ground contract use, use AWPA Treatment C-22 using CCA waterborne preservative with 0.40 pounds per cubic foot of wood retention.
   4. Treated lumber shall be kiln dried to a maximum moisture content of 19%; treated plywood shall be kiln dried to a maximum moisture content of 15%.
   5. Treated lumber shall bear the quality stamp of an inspection agency approved by the jurisdictional code authorities.

B. Fire Retardant Treatment:
   1. Fire retardant treat all interior concealed lumber and plywood, and other wood as indicated or specified. Provide exterior fireproofing at rooftop blocking, nailers, curbs, sheathing, and other locations subject to wetting during construction operations.
   2. All fire retardant treated wood materials shall bear a UL "FR-S" label, or a label from an approved inspection agency certifying that the material meets the requirements of AWPA C-20 Type A for lumber and AWPA C-27 Type A for plywood.
   3. Treated lumber shall be kiln dried to a maximum moisture content of 19%; treated plywood shall be kiln dried to a maximum moisture content of 15%.
   4. Exterior fire retardant treated wood shall be treated by means of a system which has been demonstrated to exhibit no increase in fire hazard classification in accordance with ASTM E84 test after having been subjected to accelerated weather conditioning in accordance with ASTM D2898.

5. Approved Products:
   a. Interior Fireproofing: Clear finish product, Hickson Corporation "Dricon", Hoover Treated Wood Products "Pyro-guard," or Osmose Wood Preserving Co. of America, Inc. "Flame Proof LHC."
   b. Exterior Fireproofing: Hoover Treated Wood Products "Exterior Fire-X."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.

B. Do not begin installation until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

3.2 FRAMING

A. Erect as indicated.

B. Erect wood framing members level and plumb unless indicated otherwise.

C. Place horizontal members crown side up.

D. Nailing shall be in accordance with IBC table unless indicated otherwise on the Structural Drawings. Use screws when fastening into metal framing and supports.

E. Use framing members full length without splices.

F. Tolerances:
   1. Maximum 1/4 inch from true position.
   2. Maximum 1/4 inch in 10 feet from true plumb or level.

G. Site treat cut ends of field cut pressure preservative treated lumber with compatible material as recommended by the treatment materials manufacturer.

H. After end trimming glued laminated beams, seal with penetrating sealer in accordance with AITC requirements. Do not apply sealer to surfaces to receive stains or other finish treatments.

I. Place sill gasket directly on concrete foundation. Puncture gasket clean and fit tight to protruding foundation anchor bolts.

3.3 SHEATHING

A. Install sheathing as indicated. When not indicated, install as follows:
   1. Secure sheathing with edges on firm bearing. Provide solid edge blocking between sheets.
   2. Secure roof sheathing perpendicular to framing members with ends staggered.

B. Fastening shall be in accordance with code requirements. Use screws in lieu of nails when fastening into metal lightgage metal framing. Use screws at all floor and deck sheathing.

C. Allow 1/8 inch spacing at ends and edges between panels, unless otherwise recommended by panel manufacturer.

D. Floor sheathing shall be glued to framing members in accordance with panel manufacturer's recommendations.

E. Additional Requirements for Underlayment:
   1. Place 15 lb felt building paper between underlayment and subflooring.
   2. Secure flooring underlayment after dust and dirt generating activities have ceased and prior to application of finished flooring. Apply perpendicular to subflooring. Stagger end joints of underlayment. Secure with ring shank nail type fasteners.

3.4 BLOCKING, NAILERS, AND CURBS

A. Provide blocking, nailers, and curbs for sheathing, roof construction, metal flashing, and other construction as indicated, and as necessary for firm support. Unless otherwise indicated, solid wood backing shall be minimum 2 inch nominal thickness; plywood shall be minimum 3/4 inch thick, except that sloped parapet caps may be 1/2 inch thick.

B. Blocking:
   1. Install wood blocking to receive mechanical fasteners for support of plumbing and electrical fixtures and equipment, cabinets, door stop plates, wood base, wainscots, coat hooks, toilet and bath accessories, kitchen equipment, and all other wall and ceiling mounted components.
   2. Special Blocking Requirements: For grab bar reinforcement, provide the following:
      a. Use 2x10 fire-treated lumber.
      b. Vertical Position – Provide reinforcement height at 30" maximum AFF to 38" minimum AFF.
      c. Horizontal Position - Rear Wall: 4” from wall inside corner (0" where toilet is next to tub) and extending minimum 40" horizontally;
      d. Side Wall: 10" from inside wall corner extending minimum 46" horizontally (if wall length not available in Type B, then maximize, but minimum 24") between 32" & 38" AFF (30" preferred and recommended).
      e. Where drop down or swing up grab bars are used, additional floor or wall mounted reinforcement may be necessary.
      f. Per FHADM, when walls adjacent toilets are a min. 24" deep, side wall reinforcement is required the full depth of the wall up to 46" min.

C. Screw fasten wood components to metal framing and support elements.

D. For attachment of plywood backing, kerf plywood 1/4" (3/8", maximum if required for heavy gage studs) to receive flange return (or crimp the return closed); provide supplementary sheet metal angle attached to back of stud where necessary to support backing. Screws into edge of plywood are unacceptable.

3.5 PLYWOOD TERMINAL BACKBOARDS

A. Provide a fire retardant treated plywood terminal backboard for telephone systems where indicated on the drawings.

B. Mechanically apply directly over gypsum backing board.

END OF SECTION

SECTION 061534 – EXTERIOR DECK CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes design, fabrication and erection of composite wood decking and railings using composite wood lumber over pressure-preservative treated wood lumber framing.

B. Section Includes:
   1. Plastic decking.
   2. Railings for elevated decks.
   3. Support framing for elevated decks.

1.2 SUBMITTALS

A. Evaluation Reports: For the following, from ICC-ES:
   1. Preservative-treated wood products.
   2. Plastic decking.
   3. Expansion anchors.
   4. Metal framing anchors.
   5. Decking fasteners.

PART 2 - PRODUCTS

2.1 DIMENSION LUMBER FRAMING

A. Deck and Stair Framing: Select Structural, No. 1, No. 2, or Construction or No. 2 grade and any of the following species:
   1. Hem-fir (North); NLGA.
   2. Southern pine; SPIB.
   3. Spruce-pine-fir; NLGA.
   4. Hem-fir; WCLIB or WWPA.
   5. Douglas fir-larch (North); NLGA.
   6. Spruce-pine-fir (South); NeLMA, WCLIB, or WWPA.

B. Maximum Moisture Content:
   1. Boards: 15 percent.
   2. Dimension Lumber: 19 percent.
   3. Timber. 19 percent.

2.2 POSTS

A. Dimension Lumber Posts: No. 2 or Construction or No. 2 grade and any of the following species:
   1. Hem-fir or hem-fir (North); NLGA, WCLIB, or WWPA.
   2. Douglas fir-larch, Douglas fir-larch (North), or Douglas fir-south; NLGA, WCLIB, or WWPA.
   3. Mixed southern pine; SPIB.
   4. Spruce-pine-fir or spruce-pine-fir (South); NeLMA, NLGA, WCLIB, or WWPA.
   5. Northern species; NLGA.

B. Timber Posts: Balsam fir, Douglas fir-larch, Douglas fir-larch (North), eastern hemlock tamarack (North), hem-fir, southern pine, western hemlock, or western hemlock (North); No. 2 or better; NeLMA, NLGA, SPIB, WCLIB, or WWPA.

2.3 PRESERVATIVE TREATMENT

A. Pressure treat boards and dimension lumber with waterborne preservative according to AWPA U1; Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground].

B. Pressure treat timber with waterborne preservative according to AWPA U1; Use Category UC4a.

C. Preservative Chemicals: Acceptable to authorities having jurisdiction.
   1. Do not use chemicals containing arsenic or chromium, except for timber posts.

D. Use process that includes water-repellent treatment.

E. After treatment, redry dimension lumber and timber to 19 percent maximum moisture content.

F. Mark treated wood with treatment quality mark of an inspection agency approved by ALSC's Board of Review.

G. Application: Treat items indicated on Drawings and the following:
   1. Framing members less than 18 inches above grade.
   2. Joists.
   3. Sills and ledgers.
   4. Members in contact with masonry or concrete.
   5. Posts.

2.4 COMPOSITE PLASTIC LUMBER

A. Plastic Lumber, General: Products acceptable to authorities having jurisdiction with current model code evaluation reports that show compliance with building code in effect for Project for indicated type of construction.
   1. Allowable loads and spans, as documented in evaluation reports or in information referenced in evaluation reports, shall not be less than design loads and spans indicated.

B. Composite Plastic Lumber: Solid shapes made from a mixture of cellulose fiber and polyethylene or polypropylene.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Fiberon, LLC.
      b. CertainTeed Corporation.
      c. GAF Decking Systems, LLC.
      d. GAF Materials Corporation.
      e. Universal Forest Products, Inc.
      f. Weyerhaeuser Company.
   2. Decking Standard: ICC-ES AC109 or ICC-ES AC174.
   3. Surface Texture: Woodgrain.
   4. Color: As selected by Architect from manufacturer's full range.

2.5 COMPOSITE PLASTIC RAILINGS

A. Basis of Design: Fiberon LLC “Symmetry Signature Series;” color as selected by Architect.

B. Provide rail and mounting brackets as standard with the manufacturer.

2.6 FASTENERS

A. General: Provide fasteners of size and type indicated, acceptable to authorities having jurisdiction, and that comply with requirements specified in this article for material and manufacture. Provide nails or screws, in sufficient length, to penetrate not less than 1-1/2 inches into wood substrate.
   1. For pressure-preservative-treated wood, use stainless-steel fasteners.
   2. For plastic decking, use stainless-steel fasteners.
   3. Use stainless steel or fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M or ASTM F 2329 at all other exterior locations.

B. Postinstalled Anchors: Stainless-steel, torque-controlled expansion anchors with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing according to ASTM E 488 conducted by a qualified independent testing and inspecting agency.
   1. Stainless-steel bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 .

2.7 METAL FRAMING ANCHORS

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

B. Basis-of-Design Products: Subject to compliance with requirements, provide products indicated on Drawings or comparable products by one of the following:
   1. Cleveland Steel Specialty Co.
   2. KC Metals Products, Inc.
   3. Phoenix Metal Products, Inc.
   4. R. H. Tamlyn & Sons LP.
   5. Simpson Strong-Tie Co., Inc.
   6. USP Structural Connectors.

C. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those indicated on Drawings. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

D. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653, G90 coating designation except use G185 at pressure-preservative treated wood.

E. Stainless-Steel Sheet: ASTM A 666, Type 304 or Type 316.

2.8 CONCEALED DECKING FASTENERS

A. Deck Splines: Corrosion-resistant metal or plastic splines that fit in grooves routed into the sides of decking material and are fastened to deck framing with screws. Splines provide uniform spacing of decking material.
   1. Use concealed decking fasteners as furnished by manufacturer of decking material.
   2. Use counter-sink and plug method at exposed fasteners.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set work to required levels and lines, with members plumb, true to line, cut, and fitted. Fit work to other construction; scribe and cope as needed for accurate fit.

B. Framing Standard: Comply with AF&PA WCD1 unless otherwise indicated.

C. Install plastic lumber to comply with manufacturer's written instructions.

D. Secure decking to framing with deck splines or screws.

E. Install metal framing anchors to comply with manufacturer's written instructions.

F. Do not splice structural members between supports unless otherwise indicated.

G. Apply copper naphthenate field treatment to comply with AWPA M4, to cut surfaces of preservative-treated lumber.

H. Securely attach exterior rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
   1. ICC-ES AC70 for power-driven fasteners.
   2. "Fastening Schedule" in ICC's International Building Code.
   3. "Fastener Schedule for Structural Members" and "Alternate Attachments" in ICC's International Residential Code for One- and Two-Family Dwellings.

3.2 ELEVATED DECK JOIST FRAMING INSTALLATION

A. General: Install joists with crown edge up and support ends of each member with not less than 1-1/2 inches of bearing on wood or metal, or 3 inches on masonry. Attach floor joists where framed into

wood supporting members by using wood ledgers as indicated or, if not indicated, by using metal joist hangers. Do not notch joists.

B. Lap members framing from opposite sides of beams or girders not less than 4 inches (102 mm,) or securely tie opposing members together.

3.3 RAILING INSTALLATION

A. Install railing system in strict compliance with manufacturer's instructions.

B. Balusters: Fit to railings, and fasten in place.

C. Newel Posts: Secure to stringers and risers with brackets and fasteners as furnished by manufacturer.

D. Railings: Secure wall rails with metal brackets. Fasten freestanding railings to newel posts and to trim at walls with brackets and fasteners as furnished by manufacturer.

END OF SECTION

SECTION 061613 - INSULATED WOOD SHEATHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Structural sheathing panels combining wall sheathing, air barrier, and insulation.
   2. Self-adhering flexible flashing.
   3. Liquid-applied flashing membrane.

B. Related Requirements:
   1. Section 061000 – Rough Carpentry: Standard plywood sheathing.
   2. Section 072700 – Air Barriers: Air and weather-resistive barrier applied over standard wall sheathing.

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

1.2 PERFORMANCE REQUIREMENTS

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 UL's "Fire Resistance Directory.", or GA-600, "Fire Resistance Design Manual."

1.3 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
   1. Include data on air-/moisture-infiltration protection based on testing according to referenced standards.
   2. Include product data on insulation.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Capable of demonstrating that all wood procurement operations are conducted in accordance with procedures and policies of the Sustainable Forestry Initiative (SFI) Program.

B. Code Compliance: Comply with requirements of the following:
   1. International Code Council (ICC), ICC-ESR1474.
   2. International Code Council (ICC), ICC-ESR2227.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Outdoor Storage: Comply with manufacturer’s recommendations.
   1. Set panel bundles on supports to keep off ground.
   2. Cover panels loosely with waterproof protective material.
   3. Anchor covers on top of stack, but keep away from sides and bottom to assure adequate air circulation.
   4. When high moisture conditions exist, cut banding on panel stack to prevent edge damage.

1.6 WARRANTY

A. Special Warranty: Manufacturer’s standard form in which manufacturer agrees to repair or replace components of sheathing system that fail due to manufacturing defects within specified warranty period.
   1. Construction Period Warranty: Manufacturer shall warrant the panels and tape for weather exposure for a period of 180 days from installation.

2. System Limited Warranty Period: 30 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Oriented Strand Board:
   1. DOC PS 2-10.
   2. Thickness: As needed to comply with requirements specified, but not less than thickness indicated. Thickness shall satisfy minimum and maximum requirements for referenced performance category.
   3. Factory mark panels to indicate compliance with applicable standard.

B. Air Barrier: Medium-density, phenolic-impregnated, moisture barrier overlay

C. Insulation: TBD

2.2 COMBINATION WALL SHEATHING, AIR BARRIER, AND RIGID INSULATION

A. Oriented-Strand-Board Wall Sheathing: With integral water-resistive barrier, Exposure 1 sheathing.
   1. Basis-of-Design Product: Subject to compliance with requirements, provide Huber Engineered Woods LLC; ZIP System Wall Sheathing or a comparable product by one of the following:
   2. Span Rating, Panel Grade and Performance Category: Not less than 7/16 Performance Category.
   3. Edge Profile: Square edge.
   4. Provide fastening guide on top panel surface with pre-spaced fastening symbols for 16-inches and 24-inches on centers spacings.
   5. Performance Standard: DOC PS2-10 and ICC-ES ESR-1474.
   6. Factory laminated rigid insulation.
   7. Factory laminated integral water-resistive barrier facer.
   8. Perm Rating of Integral Water-Resistive Barrier: 12-16 perms.
   9. Assembly maximum air leakage of 0.0072 cfm/sq. ft. infiltration and 0.0023 cfm/ sq. ft. exfiltration at a pressure differential of 1.57 psf.
   10. Exposure Time: Designed to resist weather exposure for 180 days.

2.3 FASTENERS

A. General: Provide fasteners of size and type that comply with requirements specified in this article by the authority having jurisdiction, International Building Code, International Residential Code, Wood Frame Construction manual, and National Design Specification.
   1. For wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153 or Type 304 stainless steel.
   2. Nails, Brads, and Staples: ASTM F 1667.

B. Power-Driven Fasteners: NES NER-272.

C. Wood Screws: ASME B18.6.1.

2.4 MISCELLANEOUS MATERIALS

A. Self-Adhering Seam and Flashing Tape: Pressure-sensitive, self-adhering, cold-applied, proprietary seam tape consisting of polyolefin film with acrylic adhesive.
   1. Basis-of-Design Product: Huber Engineered Woods; ZIP System Tape or a comparable approved product.
   2. Thickness: 0.012 inch (0.3 mm).
   3. Width: 6 inch.
   4. Code Compliance: Comply with requirements of authorities having jurisdiction and ICC Evaluation Service, Inc. "AC148 - Acceptance Criteria for Flexible Flashing Materials."
   5. International Code Council (ICC), ICC-ES2227 (ZIP System Tape).

6. American Architectural Manufacturer's Association; AAMA 711.

B. Liquid-Applied Flashing Membrane: Gun-grade, cold-applied, silyl-terminated polyether (STPE) liquid flashing membrane compatible with sheathing/weather barrier and self-adhering seam and flashing tape, and tested as part of an assembly meeting performance requirements. Follow manufacturer's recommendation for integration with ZIP System Tape.
   1. Basis-of-Design Product: Huber Engineered Woods; ZIP System Liquid Flash or a comparable approved product
   2. Hardness, Shore A, ASTM C 661: 40 to 45
   3. Total Solids: 99 percent
   4. Tensile Strength, ASTM D412: 75 psi (517 kPa)

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.

C. Securely attach to substrate by fastening as indicated, complying with the following:
   1. ICC-ES ESR-1539 or NES NER-272 for power-driven fasteners.
   2. Chapter 23 in ICC's "International Building Code."
   3. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's "International Residential Code for One- and Two-Family Dwellings."

D. Use common wire nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.

E. Coordinate wall sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

G. Only mechanically attached and drainable EIFS and exterior insulation should be used with ZIP System wall sheathing.

3.2 WOOD STRUCTURAL PANEL INSTALLATION

A. General: Comply with applicable recommendations in American Wood Council, "ASD/LRFD Manual for Engineered Wood Construction," 2012 edition for types of structural-use panels and applications indicated.

B. Fastening Methods: Fasten panels as indicated below:
   1. Wall Sheathing:
      a. Nail or staple to wood framing.
      b. Space panels 1/8 inch (3 mm) apart at edges and ends.
      c. Install fasteners 3/8 inch to 1/2 inch from panel edges.
      d. Space fasteners in compliance with requirements of authority having jurisdiction.

3.3 SHEATHING JOINT TREATMENT

A. Seal sheathing joints according to sheathing manufacturer's written instructions.
   1. Apply seam tape to joints between sheathing panels.

2. Utilize tape gun or hard rubber roller provided by manufacturer to ensure tape is completely adhered to substrates.
3. When using liquid flashing to seal sheathing joints, follow manufacturer’s recommendations for sealing panel seams.

3.4 FLEXIBLE OR LIQUID APPLIED FLASHING INSTALLATION

A. Apply flexible flashing or liquid applied flashing membrane where indicated to comply with manufacturer's written instructions.
   1. After flexible flashing tape has been applied, roll surfaces with a hard rubber to ensure that flashing is completely adhered to substrates.
   2. Width of Flexible Flashing: 6 inch .
   3. Apply liquid-applied flashing membrane at penetrations, gaps, and cracks to form continuous weathertight surface. Apply liquid membrane according to manufacturer’s written instructions.

END OF SECTION

SECTION 061733 – WOOD I-JOISTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Wood chord and plywood web joists for roof and floor framing.
   2. Bridging, bracing, and anchorage.
   3. Framing for openings.

B. Related Sections:
   1. 061000 - Rough Carpentry
   2. 061739 - Open Wood Chord Trusses

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.

D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

1.2 REFERENCES

A. APA - American Plywood Association.

1.3 SYSTEM DESCRIPTION

A. Design Floor Live Load: As indicated on the Drawings.

B. Design Roof Live Load: As indicated on the Drawings.

1.4 SUBMITTALS

A. Make submittals under provisions of Section 013300.

B. Product Data.

C. Shop Drawings.
   1. Include seal and signature of designing engineer.
   2. Indicate framing system, sizes and spacing of joists, loads and joist cambers, bearing and anchor details, bridging and bracing, and framed openings.

D. Submit manufacturer's installation instructions under provisions of Section 013300.

E. Closeout Submittal:
   1. In accordance with Section 017700.
   2. Submit designing engineer's certification that products and installation comply with design requirements.

1.5 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacture of plywood web joists with three years minimum experience.

B. Design joists under direct supervision of Professional Engineer experienced in structural framing design registered in State of Wisconsin.

1.6 REGULATORY REQUIREMENTS

A. Conform to applicable code for loads, seismic zoning, and other governing criteria.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site under provisions of Section 016000.

B. Store and protect products under provisions of Section 016000.

C. Transport and store joists in vertical position resting on bearing ends.

D. Protect joists from moisture, warpage, and distortion during transit and when site stored.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Wood Chord Members: As indicated on the Structural Drawings

B. Web: As indicated on the Structural Drawings

C. Joist Bridging: Type, size and spacing required by joist manufacturer.

2.2 ACCESSORIES

A. Wood Blocking, Plating, Support Members, Framing for Openings: Softwood lumber, spruce-pine-fir species, construction grade, maximum moisture content of 19 percent.

B. Fasteners: Galvanized steel, type to suit application.

2.3 FABRICATION

A. Verify dimensions and site conditions prior to fabrication.

B. Tolerances:
   1. Depth: ±1/16 inch.
   2. Flange Width: ±1/16 inch.

PART 3 - EXECUTION

3.1 INSPECTION

A. Verify that supports and openings are ready to receive joists.

B. Verify sufficient end bearing area.

C. Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION

A. Coordinate placement of bearing items.

3.3 INSTALLATION

A. Install joists in accordance with manufacturer's instructions.

B. Place joists true to line and level.

C. Provide temporary bracing to position joists in place until permanently secured.

D. Place permanent bridging, bracing, and anchors to maintain joists straight and in correct position before installation of decking or inducing loads.

E. Do not field cut joists.

F. Place headers and supports to frame openings required.

G. Frame openings between joists with lumber.

H. Coordinate placement of decking with work of this Section.

3.4 TOLERANCES

A. Framing Members: 1/2 inch maximum from true position.

3.5 FIELD QUALITY CONTROL

A. The plywood web joist manufacturer's design engineer or his authorized representative shall visit the site to inspect the work. Verity and certify that joist sizes and materials are as required, that connections are properly executed, and that structural integrity of materials has been maintained.

END OF SECTION

SECTION 064000 - ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Wood standing and running trim.
   2. Custom casework and millwork.
   3. Countertop construction.
   4. Solid surfacing associated with custom casework.
   5. Shop applied finishing.

B. Related Sections:
   1. 061000 - Rough Carpentry: Blocking for finish carpentry.
   2. 081400 - Wood Doors: Flush doors.
   3. 087100 - Door Hardware.
   4. 123200 - Manufactured Wood Casework
   5. 123661 –Solid Surfacing Countertops: Solid surfacing not associated with custom casework.

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.

D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

1.2 REFERENCES

A. American National Standards (ANSI)
   1. ANSI A208.1 - Standard for Particleboard
   2. ANSI A208.2 - Standard for Medium Density Fiberboard (MDF)

B. American Society for Testing and Materials (ASTM)
   1. C1036 Standard Specification for Flat Glass
   2. E84 Test Method for Surface Burning Characteristics of Building Materials

C. American Plywood Association (APA)

D. Architectural Woodwork Institute (AWI): Architectural Woodwork Quality Standards, Guide Specifications and Quality Certification Program (Current Edition).

E. Business Institutional Furniture Manufacturer's Association (BIFMA)

F. West Coast Lumber Inspection Bureau (WCLB): Standard Grading Rules No. 16.

G. U.S. Product Standard (PS) PS 1 Product Standard for Construction and Industrial Plywood.

H. Tile Council of America (TCA): Handbook for Ceramic Tile Installation (current edition).

1.3 DEFINITIONS

A. Exposed Portions of Casework: Those surfaces visible when doors and drawers are closed, including edges of doors and drawers, edges of cabinet boxes visible between doors and drawers, backs of hinged doors, interiors behind glass doors, and interiors in open cabinets.

B. Semi-Exposed Portions of Casework: Those areas not defined as exposed, but visible when solid (not glazed) doors and drawers are opened.

C. Concealed Portions of Casework: All remaining areas not defined as exposed or semi-exposed.

D. Check: Lengthwise separation of the wood that usually extends across the rings of annual growth.

E. Split: A separation of the wood along the grain.

1.4 SUBMITTALS

A. Make submittals in accordance with Section 013300.

B. Shop Drawings. Indicate materials, components, profiles and configurations, dimensions, fastening methods, jointing details, colors and finishes, and accessories. Details shall be at a minimum scale of 1-1/2 inch per foot.

C. Samples:
   1. Solid Wood with Transparent Finish: Submit a minimum of 3 - 12 inch long samples representative of the maximum range of color and graining to be expected for each species, cut, and finish combination specified. [Include samples of transparent finish with putty filled holes and specified field applied top coat.]
   2. Opaque Finish Wood: Submit a minimum of 3 - 12 inch long samples representative of the maximum range of graining and surface imperfections to be expected.
   3. Veneer Paneling: Submit a minimum of 3 - 8" x 11" samples of each species, cut, and finish combination for each veneer; include core material.
   4. Prefinished Board: Submit a minimum 8 x 11 sample of each color and pattern specified.
   5. Casework Hardware: Submit sample or product literature for each type.
   6. Plastic Laminate: Submit a minimum 8 x 11 sample of each color and pattern specified.
   7. Fiberboard Component: Submit 6 inch corner of a fiberboard cube; show jointing and finishing techniques; include paint finish.

D. Product Literature:
   1. Submit literature for a sample of each hardware component proposed.
   2. Particle Board and MDF Materials: Literature verifying materials are formaldehyde free.
   3. Paint and Adhesive Systems: Submit product literature and Material Safety Data sheets stating VOC limits and chemical component limits for each product.

E. Quality Control Submittals:
   1. Certifications:
      a. Submit certification that the fire retardant treatments used comply with the specified requirements.

1.5 QUALITY ASSURANCE

A. Fabricator: A minimum of 5 years experience in the fabrication of custom architectural woodwork of the type specified.

B. All Architectural Woodwork shall be under the responsibility of a single fabricator.

C. Qualifications of Installers: Use only journeyman finish carpenters who are thoroughly trained and skilled in the work, and who are completely familiar with the materials and quality standards specified. No allowance will be made for lack of skill on the part of workmen.

D. Solid Surfacing Fabricator Qualifications: Certified by the solid surfacing materials manufacturer.

E. Conform to AWI Custom grade standards unless specified or indicated otherwise.

F. Mock-Ups:
   1. Provide mock-up in accordance with Section 014500.
   2. Components approved by Architect may be incorporated into the Work.

1.6 DELIVERY, STORAGE AND HANDLING

A. In accordance with 016000, and as follows:
   1. Do not deliver wood materials to the building until "wet" work such as gypsum wallboard work has been completed.
   2. Store materials indoors in ventilated area with a minimum temperature of 60 degrees F., and a maximum humidity of 55%.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Lumber:
   1. Transparent Finish Lumber: AWI Grade I; species and cut as scheduled on the Drawings.

2. Opaque Finish Lumber: AWI Grade II Poplar.
3. Concealed Framing Lumber: AWI Grade II pine, fir, hemlock, or other species as approved.
4. Moisture Content: Optimum moisture content per AWI recommendations.

B. Plywood:
1. Typical Plywood: APA rated in accordance with PS 1; 3/4 inch thick AC exterior grade unless indicated or specified otherwise; touch sanded where plastic laminate veneers are to be applied.
2. Hardwood Veneer Plywood: States Industries (Eugene, OR 800-843-2753) "Apple Ply"; Grade A, 1/16 inch alder veneer core; (9 ply for 1/2 inch thickness, 13 ply for 3/4 inch thickness); face species and cut as scheduled on the Drawings.

C. Particle Board: ANSI A208.1; grade M-2 (medium density); formaldehyde free.

D. Medium Density Fiberboard (MDF):
1. ANSI A208.2 Class MR10; formaldehyde free; moisture resistant.
a. “Arreis” by Sierra Pine Ltd. (800-676-3339); ANSI A208.2 Class MD; formaldehyde free.
b. Extira by CMI (Chicago, IL; 312-382-8701); formaldehyde free.
c. Finish: As scheduled on the Drawings.

E. Plastic Laminate:
1. Brands and colors as scheduled on Drawings.
2. Exposed: NEMA LD-3; general and vertical grade,
3. Backing Sheets: NEMA LD-3; backing grade; undecorated.

F. Solid Surfacing:
1. Product as listed in the Finish Legend
2. Fabricate solid surface elements to the configurations indicated in accordance with the manufacturer’s recommendations.

2.2 ACCESSORY MATERIALS

A. Cabinet Hardware:
1. Pulls: 12 inch bar pulls; brushed chrome finish.
2. Drawer Slides: Full extension ball bearing; clear zinc finish; rail mount; Accuride, or approved; load rating as required for the application.
a. Light Duty Rating (drawers 12 inches wide or less): Accuride 2632; 65 lb BIFMA load rating
b. Medium Duty Rating(drawers 32 inches wide or less): Accuride 7432; 100 lb BIFMA load rating.
c. Heavy Duty Rating (drawers 42 inches wide or less): Accuride 3640; 200 lb BIFMA load rating.
3. Drawer Locks: Olympus Lock or approved; 5 pin tumbler cylinder locks; ANSI Grade 1; configuration to suit condition; keyed alike as directed, and masterkeyed. Furnish two keys for keyed alike group, and four masterkeys; [finish to match pulls].
4. Hinges: 5 knuckle hinges; brushed chrome finish.
5. Concealed Hinges: European style; concealed[(except at touch latches]; self-closing; 176 degree of opening, Blum, Grass or Hafele.
6. Catch: Ives 327 A92 magnetic catch.
7. Touch Latches: Epco 507PWS.
8. Cabinet Shelf Brackets: Metal pin style support; chrome finish.

B. Closet Hardware:
1. Closet Rod: Knape & Vogt # 770 5; 1-5/16 inch diameter; chrome finish.
2. End Flanges: Knape & Vogt # 764/766; chrome finish.

C. Wall Shelf Hardware:
1. Brackets: Knape & Vogt # 185 Anochrome finish; length as appropriate for shelving indicated.
2. Standards: Knape & Vogt # 85 Anochrome finish.

D. Counter Support Brackets:
1. Manufacturer/Source
a. Oodles of Parts Plus (Patchogue, NY; 800-286-5471)
b. A&M Hardware Inc. (Manheim PA; 888-647-0200)

c. Steelcase
d. Herman Miller

2. Bracket: "Work Station Bracket"; 1/8" steel; 24" x 24" size unless otherwise indicated; prime paint finish.]

E. Hanging Hardware: Brooklyn Hardware LLC (Portland OR; 888-232-1151) "Panelclip," Doug Mockett and Company (Manhattan Beach CA.; 800-523-1269) ZC3 "Z-Clips," or approved; interlocking aluminum clip.]

F. Contact Bond Adhesive: Water based low VOC.

G. Low VOC Polyurethane: Polyureseal BP by American Formulating and Manufacturing, San Diego, CA 619-239-0321.

2.3 STANDING AND RUNNING TRIM FABRICATION

A. Shop fabricate all trim to the shapes indicated.

B. Assemble built-up sections. All glue lines shall be free of squeeze-out where transparent finishes are to be applied.

C. Tolerances for overall assembly dimensions shall be within 1/32 of an inch.

D. Shop fit and assemble to the greatest extent possible.

E. Back or kerf cut all trim greater than 2 inch in width, except terminate before exposed ends.

F. Fabricate trim from solid lumber or wood veneer over particle board or MDF core.

G. Veneer Clad Trim:
1. Provide minimum 1/4 inch thick solid wood edging at veneer clad trim.
2. Veneer shall be placed without joints at each continuous surface.
3. Veneer clad trim shall match solid lumber trim in appearance.

2.4 WOOD DOOR FRAME FABRICATION

A. Fabricate door frames to the shapes indicated.

B. Fabricate to provide the following door installation clearances:
1. 1/8 inch at top, and edges.
2. 1/2 inch from door bottom to the floor finish.

C. Machine frames to receive hardware specified in Section 087100. Request templates from the hardware supplier.

D. Fabricate to receive glazing with proper clearances for expansion and contraction.

E. Fabricate frames from single length pieces, without joints, for each straight length.

F. Fabricate each section from solid wood or composite construction consisting of fabricator selected solid wood or laminated core clad with specified transparent finish veneer. Exposed edges and corners shall have minimum 1/8 inch thick solid wood to match the veneer. Provide minimum 1/8 inch thick veneer.

2.5 CASEWORK FABRICATION

A. General Fabrication Requirements:
1. Fabricate to the configurations indicated, unless approved otherwise on the shop drawings.
2. Provide openings in casework for the incorporation of all electrical and mechanical components. Openings for all plumbing equipment shall be cut from templates obtained from the plumbing equipment installer.
3. Provide concealed access to casework electrical fixtures and wiring.
4. Unless indicated or approved otherwise, provide adjustable base to provide level installation which accommodates variations in floor levelness.
5. Shop assemble casework to the greatest practical extent
6. Adjustable Shelves: All casework shelves shall be adjustable, unless otherwise noted. Provisions for shelf adjustment shall be by drillings at 2 inches on center in the cabinet body for

the placement of shelf support brackets. Provide 4 supports for each shelf. Drillings shall be in straight even lines.
7. Provide all hardware, fasteners, and exposed trim.
8. Provide openings with wiring grommets at locations indicated. When not indicated, provide openings with wiring grommets along countertops with knee spaces underneath. Space at 36 inches maximum, with a minimum of one opening per knee space.

B. Plastic Laminate Casework Construction:
1. Fabricate casework in accordance with AWI standard section 400; custom grade.
2. Design: AWI Flush Overlay design, unless indicated otherwise. Joint between exposed doors, drawer faces, and countertop edges shall be 1/8 inch plus or minus 1/16.
3. Exposed Surfaces: Plastic laminate clad with [matching PVC edging][Plastic T-edging][self edging], unless otherwise indicated; provide hardwood trim at locations indicated.
4. "Inside" Exposed Surfaces of Shelving Units and Cabinets Without Doors: Plastic laminate finished board, with exposed edges banded with plastic laminate self edging or PVC tape to match face color.
5. Semi-Exposed Surfaces: Prefinished board, unless indicated otherwise.
6. Provide vertical grade plastic laminate, except use general purpose grade at countertops.
7. Backs of Doors and Drawers: Prefinished board.
8. Particle board shall be minimum 3/4" thick unless indicated otherwise. Shelves shall be 1" thick, minimum.

C. Transparent Finish Wood Casework Construction:
1. Fabricate transparent finish wood casework in accordance with AWI standard section 400; "Premium" grade.
2. Fabricate wood casework with wood veneer over medium density particle board. Provide solid wood edging at veneer panels.
3. Veneers shall be as follows:
   a. Fabricate each panel from sequential flitches.
   b. Book match veneers.
   c. Provide no veneer end joints within each panel.
   d. Provide grain direction as indicated.
4. Where veneers are indicated to be single piece or slip matched leaves for each panel, adjoining panels shall be end matched and/or slip matched as appropriate.

D. Plastic Laminate Faced Countertops:
1. Fabricate to AWI Custom grade.
2. Fabricate countertops from particle board and general purpose grade plastic laminate in the shapes indicated.
3. Where countertops are indicated with sinks, use moisture resistant MDF in lieu of particle board.

E. Stainless Steel Countertops and Backsplashes:
1. Fabricate from minimum 16 gage type 304 or 316 stainless steel to the configurations indicated.
2. Fabricate each countertop in one piece to the greatest extent possible.
3. Provide welded seamless corners and joints; grind all welds smooth to match adjacent surfaces.
4. Provide turned down fronts and exposed sides; integral back splashes with 3/8 inch radius.
5. Fabricate countertops with three formed stainless steel channels welded underneath for support.
6. Spray on sound deadening to the underside of the countertops.
7. Finish: #4 finish.

F. Wall and Closet Shelf Fabrication:
1. Fabricate from plastic laminate finished particle board; edge banded with matching plastic laminate edging unless indicated otherwise.
2. Fabricate from prefinished board; edge banded with matching PVC edging unless indicated otherwise.
3. Provide minimum 3/4 inch thick shelves, except provide thicker shelves as required to support the loads and spans indicated without significant deflection.

G. Hardware:
   1. Unless otherwise shown or specified, all drawers shall be equipped with standard full extension slides.
   2. Install hardware straight and true and in perfect alignment horizontally and vertically with adjacent casework and hardware.
   3. Carefully fit and securely attach cabinet hardware in accordance with manufacturers' printed instructions, and exercise caution not to mar or injure finish surfaces.

2.6 SOLID SURFACING - CUSTOM

A. Fabricate solid surfacing countertops and other elements to detail in accordance with the manufacturer's recommendations. Include back and side splashes.

B. Seal joints with Dupont SCS 1752 silicone sealant.

C. Solid surface countertops associated with manufactured wood casework is specified in Section 123661.

2.7 COUNTERTOP CONSTRUCTION

A. Plastic Laminate Faced Countertops:
   1. Fabricate to AWI Custom grade.
   2. Fabricate countertops from particle board and general purpose grade plastic laminate in the shapes indicated.
   3. Where countertops are indicated with sinks, use moisture resistant MDF in lieu of particle board.

2.8 SHOP FINISHING

A. Shop finish all architectural woodwork wood surfaces.

B. Sand all exposed and semi-exposed wood surfaces smooth, always sanding in the direction of the wood grain.

C. Sand all exposed transparent finish wood surfaces to AWI "Premium " grade standards. Sand all semi-exposed transparent or opaque finish wood surfaces to AWI "Custom" grade standards.

D. Fill all depressions and imperfections with color matched putty, except imperfections shall not exceed AWI Premium grade standards.

E. Transparent Finish Coating: Spray apply in accordance with AWI finishing system, Premium Grade Waterborne Conversion Varnish; satin sheen.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.

B. Do not begin installation until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

3.2 PREPARATION

A. Coordinate the installation of blocking and other supports required for the installation of architectural woodwork elements.

3.3 STANDING AND RUNNING TRIM INSTALLATION

A. Jointing: Make all joints to conceal shrinkage; miter all exterior corners; cope all interior corners, miter or scarf all end-to-end joints; install all trim pieces as long as possible, jointing only where solid support is obtained. Make no joints closer than 4 feet to corners.

B. Lengths of Material: Use random lengths and show typical joint locations on shop drawings. The minimum length shall be 8 feet, except where short lengths are required by installation conditions.

C. Fastening:
   1. Install all items straight, true, level, plumb, and firmly anchored in place; where blocking or backing is required, coordinate as necessary with other trades to ensure placement of all required backing and blocking in a timely manner.
   2. Fasten trim with finish nails or screws of proper dimension to hold the member firmly in place without splitting the wood.
   3. On exposed finish work, set all nails and screws.
   4. Align exposed fasteners for uniform pattern; random or "shotgun" patterns will not be accepted.

D. Select and arrange standing and running trim so that abutting members have a similar grain and color match to the greatest extent possible. Maintain a higher standard in public [and main office]areas than in [backroom]areas.

3.4 CASEWORK INSTALLATION

A. Coordinate casework installation with work of other trades for final electrical and mechanical connections.

B. Install all casework accurately, plumb, square, and level, and permanently secured in precise position as indicated on the Drawings. Casework shall be scribed to adjacent surfaces as follows:
   1. Countertops and splashes to wall surfaces.
   2. Cabinet endwalls and other exposed surfaces to walls.
   3. Cabinet bases to floors.

C. The casework installation shall be made complete with all required fastenings, clip angles, braces, anchors, adjustable levelers, and other fittings as required to render the work rigid and secure.

D. All fasteners securing casework shall be in concealed or semi-concealed locations, unless approved otherwise.

E. Avoid damaging finished surfaces. Repair or replace all damaged materials and surfaces in a manner approved by the Architect.

F. Upon completion of work, and in the Architect's presence, demonstrate hardware to work freely as intended.

3.5 DOOR AND RELITE FRAMES

A. Install wood door frames to receive operable doors in accordance with 087300.

B. Install in accordance with the applicable requirements specified for standing and running trim.

C. Glaze relite frames and fix in position with wood stops as indicated.

D. Provide wood support framing and nailers.

3.6 CLEANING UP

A. Keep the premises in a neat, safe, and orderly condition at all times during execution of this portion of the work, free from accumulation of sawdust, cut-ends, and debris.

B. At the end of each working day, or more often if necessary, thoroughly sweep and/or vacuum surfaces. Remove the refuse to the area of the job site set aside for its storage.

END OF SECTION

SECTION 071313 –FOUNDATION WATERPROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Pre-applied sheet membrane waterproofing that forms an integral bond to poured concrete for the following applications:
   1. Vertical Applications: Membrane post-applied to concrete foundation walls;
   2. Horizontal soil applications: Membrane applied on prepared soil subbase prior to placement of concrete slabs.

B. Related Sections
   1. 030013 - Concrete: Substrate; single sided forming systems.
   2. 312000 - Earth Moving: Soil preparation.

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.

D. Substitutions shall be in accordance with Section 016000.

1.2 SYSTEM DESCRIPTION

A. Below Grade Waterproofing:
   1. Below grade waterproofing shall form a continuous barrier protecting the below grade spaces from water penetration.
   2. The membrane will be subject to positive hydrostatic pressure. No subgrade drainage will be allowed.
   3. The horizontal below grade membrane below elevator pit shall be installed directly on compacted and prepared soil.
   4. Vertical waterproofing shall be pre-applied continuously over shoring or post-applied to exterior face of concrete foundation walls.

1.3 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM):
   1. C836 - Standard Specification for High Solids, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course
   2. D412 - Standard Test Methods for Rubber Properties in Tension
   3. D570 - Standard Test Method for Water Absorption of Plastics
   4. D903 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds
   5. D1434 - Standard Test Method for Determining Gas Permeability Characteristics of Plastic Film and Sheeting
   6. D1876 - Standard Test Method for Peel Release of Adhesives (T-Peel)
   7. D1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
   8. D3767 - Standard Practice for Rubber - Measurements of Dimensions
   9. D5385 - Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes
   10. E96 - Standard Test Methods for Water Vapor Transmission of Materials
   11. E154 - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover

1.4 QUALITY ASSURANCE

A. Installer: A firm which has at least 3 years experience in work of the type required by this section.

B. Materials: For each type of material required for the work of this section, provide primary materials which are the products of one 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. Schedule Coordination: Schedule work such that membrane will not be left exposed to weather for longer than that recommended by the manufacturer.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in labeled packages. Store and handle in strict compliance with manufacturer's instructions. Protect from damage from weather, excessive temperature and construction operations. Remove and dispose of damaged material in accordance with applicable regulations.

1.6 PROJECT CONDITIONS

A. Perform work only when existing and forecasted weather conditions are within the limits established by the manufacturer of the materials used. Proceed with installation only when the substrate construction and preparation work is complete and in condition to receive sheet membrane waterproofing.

1.7 WARRANTY

A. Sheet Membrane Waterproofing: Provide written five year material warranty issued by the membrane manufacturer upon completion of work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Composite HDPE/Bentonite Membrane: Composite membrane consisting of a 20-mil- thick, HDPE geomembrane liner bonded to up to 1.0 lb/sq. ft. layer of bentonite clay granules, with a spun polypropylene facing.
   1. Basis of Design Product: Tremco, Inc., Paraseal LG.
   2. Puncture Resistance, ASTM E 154: Not less than 155 lbf (689 N).
   3. Tensile Strength, ASTM D 412: Not less than 4,000 psi (28 MPa).
   4. Elongation, ASTM D 412: Not less than 500 percent.
   5. Vapor Permeance, ASTM E 96: Not greater than 0.03 perms.
   6. Resistance to Hydrostatic Head, ASTM D 5385: 230 feet (70 m).
   7. Color: Gray/black.

B. Accessory Materials
   1. Granular Bentonite: Sodium bentonite clay containing a minimum of 90 percent montmorillonite (hydrated aluminum silicate), with a minimum of 90 percent passing a No. 20 sieve.
      a. Basis of Design Product–Tremco, Inc., Paragranular
   2. Bentonite Mastic: Trowelable consistency, bentonite compound, specifically formulated for application at joints and penetrations.
      a. Basis of Design Product – Tremco, Inc., Paramastic
   3. Termination Bar: Extruded-aluminum or formed-stainless-steel bars with upper flange to receive sealant.
      a. Basis of Design Product – Tremco, Inc., Paraseal Paraterm Bar
   4. Plastic Protection Sheet: Polyethylene sheeting complying with ASTM D 4397; thickness recommended by waterproofing manufacturer to suit application but at least 6 mils thick.
   5. Cement Grout Patching Material: Manufacturer's recommended grout mix compatible with substrate being patched.
   6. Tapes: Waterproofing manufacturer's recommended tape for joints between sheets, membranes, or panels. Use with recommended adhesive bonding primer.
   7. Reinforced Overlap Seam Tape: Reinforced, rubberized-asphaltic waterproofing seam tape 4-inch wide by 60 mils thick for sealing membrane overlaps.
      a. Basis of Design Product – Tremco, Inc., Permanent Seam Tape
   8. Non-Reinforced Overlap Tape: Non-reinforced, adhesive tape of partially cross-linked polymeric elastomers 2 by 1/8 inch (50 by 3.2 mm) for molding form-fit seals around contours and for taping seams within overlaps.
      a. Basis of Design Product – Tremco, Inc., Para JT
   9. Bentonite Laminate Tape: Laminate of bentonite sandwiched between a netting and non-woven fabric for wrapping through-concrete imbeds and other detailing.

a. Basis of Design Product – Tremco, Inc., Parastick ‘n’ Dry

10. Waterstops: Flexible, reinforced, bentonite-laminate of bentonite sandwiches between a netting and non-woven fabric for wrapping through-concrete imbeds and other detailing.
    a. Basis of Design Product – Tremco, Inc., Superstop
11. Joint Sealants: Termination Seals:
12. Single component, high performance, medium-modulus, low-VOC, UV-stable, non-sag polyurethane sealant.
    a. Basis of Design Product: Tremco Inc.; Dymonic 100.

PART 3 - EXECUTION

3.1 EXECUTION

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.

3.2 INSTALLATION, GENERAL

A. Install waterproofing and accessories according to manufacturer's written instructions. Protect bentonite material from wetting prior to permanent placement.

B. Install a continuous layer of waterproofing membrane with ends and edges lapped a minimum of 4 inches. Stagger end joints, seal laps and treat fastener penetrations in accordance with manufacturer’s written instructions.

C. Apply granular bentonite around penetrations in horizontal surfaces and changes in plane according to manufacturer's details.

D. Apply bentonite mastic at changes of plane, construction joints in substrate, projections, and penetrations.

E. Protect waterproofing from damage and wetting during construction. Repair punctures, tears, and cuts.

3.3 INSTALLATION, VERTICAL APPLICATIONS

A. Substrates shall be smooth and sound.

B. Strictly comply with installation instructions in manufacturer’s published literature, including but not limited to, the following:
    1. Apply membrane with the HDPE film facing the soil. Remove the release liner and fasten membrane along uncoated edge to substrate with large head nails or as otherwise recommended by manufacturer.
    2. Apply succeeding sheets by overlapping the previous sheet 3 inches along the uncoated edge of the membrane. Side laps shall be firmly rolled to ensure a tight seal.
    3. Overlap the ends of the membrane 3 inches. Apply lapping tape centered over the end lap and roll firmly to ensure a tight seal. Remove release liner.

C. Provide vertical waterproofing at all foundation walls.

3.4 INSTALLATION, HORIZONTAL APPLICATIONS

A. Earth and stone substrates shall be well compacted to produce an even, solid substrate. Remove loose aggregate or sharp protrusions. Concrete substrates shall be smooth or broom finished and monolithic. Fill gaps or voids greater than 1/2 inch. Remove standing water prior to membrane applications.

B. Strictly comply with installation instructions in manufacturer’s published literature, including but not limited to, the following:
    1. Apply membrane with the HDPE film facing the prepared soil substrate. Remove the release liner during application.
    2. Apply succeeding sheets by overlapping the previous sheet 3 inches along the uncoated edge of the membrane. Lap area must be firmly rolled to ensure a tight seal.

3. Overlap the ends of the membrane a minimum of 3 inches and apply lapping tape centered over the lap and roll firmly to ensure a tight seal.

C. Provide horizontal waterproofing below elevator pit and sump slabs.

3.5 PROTECTION

A. Protect membrane in accordance with manufacturer's recommendations until placement of concrete. Inspect for damage just prior to placement of concrete and make repairs in accordance with manufacturer's recommendations.

END OF SECTION

SECTION 071326 - PLAZA DECK WATERPROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes
   1. Self-adhered thermoplastic membrane waterproofing system with integral flashings and other components
   2. Protective covering.
   3. Drainage composite.
   4. Insulation.
   5. Flashings.

B. Related Sections
   1. 030013 - Concrete: Concrete substrate and concrete topping slab.
   2. 071413 - Hot Fluid-Applied Rubberized Asphalt Waterproofing: Alternate plaza deck waterproofing system.
   3. Division 22 - Plumbing: Drain flashing flanges; mechanical penetrations.

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.

D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's complete product data for each product proposed, including, membrane materials, flashing, and other related components of the system.

B. Shop Drawings: Submit details for this specific installation indicating flashing requirements, including details for substrate joints and cracks, sheet flashings, penetrations, and other termination conditions. Include special details to indicated application at special conditions.

C. Quality Control Submittals:
   1. Qualification Data: Submit installer qualifications verifying years of experience; include list of completed projects having similar scope of work identified by name, location, date, reference names and phone numbers.
   2. A letter from manufacturer certifying that the Applicator is an approved waterproofing applicator in good standing.
   3. Warranty Draft: Concurrent with initial product data submittal, submit draft of warranties for Architect’s review. Draft shall include all specified exceptions and inclusions.

D. Closeout Submittal:
   1. Submit warranty in accordance with Section 017700.

1.3 QUALITY ASSURANCE

A. The waterproofing system shall be applied only by a waterproofing Applicator authorized by the manufacturer. All work shall be completed by manufacturer-trained personnel.

B. Installation of waterproofing membrane, flashing membrane, expansion joints, drainage layer, and insulation shall be the responsibility of the waterproofing applicator to ensure undivided responsibility.

C. Obtain primary waterproofing materials, membrane and flashings, from a single manufacturer with not less than 20 years of successful experience in waterproofing applications. Provide other system components only as approved by manufacturer of primary materials.

D. Pre-construction conference to be held with the owner, architect, Applicator’s field superintendent, waterproofing foreman, manufacturer representative, and other involved trades to discuss waterproofing practices applicable to the project.

E. There shall be no deviation made from the contract specification or the approved shop drawings without prior written approval by the owner or the owner's representative, and/or design professional, and manufacturer.

F. The Applicator shall follow manufacturer's most current quality assurance procedures.

G. Adhesion test strips of the self-adhered membrane are required prior to actual installation. Do not install self-adhered membrane until a successful adhesion test has been completed.

H. Mock-up:
   1. Provide mock-up as specified in Section 014500.
   2. Provide 100 sq. ft. mockup of waterproofing system. Locate where approved by Architect.
   3. Mock-up shall represent conditions of finished work including internal and external corners, sealing and flashings.
   4. Approved mock-up may be incorporated as part of the Work.

I. Membrane Testing for Water Tightness
   1. Water Testing of Drains
      The Applicator shall water test drains according to Sika Sarnafil's most current Quality Assurance Procedures. See Section 3.09.
   2. Electronic Leak Detection Testing
      a) Electronic Leak Detection Testing (System Warranty) – The waterproofing applicator shall arrange for testing through manufacturer.
      b) Electronic Leak Detection Testing (Membrane Warranty) – The waterproofing applicator shall arrange for testing by a qualified testing agency.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

A. All products delivered to the job site shall be in the original unopened containers or wrappings.

B. Handle all materials to prevent damage. All materials shall be placed on pallets and fully protected from the elements with canvas tarpaulins.

C. Membrane rolls shall be stored lying down on pallets and fully protected from moisture with canvas tarpaulins.

D. Membrane, adhesives, and surface conditioner/primer shall be stored at temperatures above 40 degree F (5 degree C).

E. All flammable materials shall be stored in a cool dry area away from sparks and open flames. Follow precautions outlined on container or supplied by the material manufacturer/supplier.

F. Any materials which the owner's representative and/or manufacturer determine to be damaged are to be removed from the job site and replaced at no cost to the owner.

1.5 JOB CONDITIONS

A. Proceed with waterproofing membrane installation only after substrate preparation is complete. Owner's representative and/or design professional and waterproofing Applicator must accept substrate before proceeding with membrane installation.

B. Substrate must be clean, smooth and dry. Do not work in rain or snow or adverse weather conditions. Severe temperatures, moisture and humidity may affect the installation of products during construction. Comply with applicable installation requirements for all components. Ambient and substrate temperature must meet the minimum requirements as outlined in manufacturer's Installation Instructions.

C. All work shall be scheduled and executed without exposing the completed waterproofing system and interior building areas to the effects of inclement weather. The building and its contents shall be protected against all risks.

D. The structure must be designed to support the system, including the overburden. The adequacy of the structural support must be verified in writing by the owner, the owner's design professional, architect, or engineer. The Applicator shall take precautions that storage and/or application of materials and/or equipment does not overload the deck or building structure.

E. All new and temporary construction, including equipment and accessories, shall be secured in such a manner, at all times, as to preclude wind blow-off or damage.

F. Liquid materials such as solvents and adhesives shall be stored and used away from open flames, sparks and excessive heat.

G. The Applicator should take necessary precautions when using adhesives or surface conditioner around air in-takes. The smell of the adhesive, primer, or surface conditioner could be a disturbance to the building occupants. It is the Applicator's responsibility to notify the owner and take the proper precautions.

H. The Applicator shall verify that all drain lines are connected and un-blocked before starting work. Report any blockages or non-connected drains to the owner's representative and/or design professional in writing.

I. The Applicator is cautioned that specified membranes are incompatible with asphalt, coal-tar, polystyrene, oil-based and plastic-based cements, creosote, penta-based materials, grease, fats, oils, and solvents. Such materials shall not come in contact with the waterproofing membrane at any time. If such contact occurs, the material shall be cut-out, discarded and patched.

J. The self-adhered membrane can be installed over existing residual asphalt-based waterproofing materials provided the material is fully cured, clean, sound and firmly bonded to the substrate. Do not install self-adhered membrane over coal tar pitch.

K. All waterproofing materials, insulation, flashings and metal work removed for construction shall be immediately taken off the site to a legal dumping area authorized to receive such materials.

L. If any unusual or concealed condition is discovered, stop work and notify the owner's representative and/or design professional and manufacturer immediately, in writing.

M. Site cleanup, including both interior and exterior building areas in any way affected by the construction, shall be complete and to the owner's satisfaction. All landscaped areas affected by waterproofing activities shall be raked clean and seeded, if required. All paved areas shall be swept clean. All areas stained, dirtied, and discolored or otherwise damaged due to waterproofing activities shall be cleaned, restored, and replaced as required.

1.6 SEQUENCING OF THE WORK

A. Do not proceed with installation of subsequent layers and overburden over the completed sections of the waterproofing without the acceptance of the owner's representative, design professional, general contractor, and manufacturer (when a System warranty is specified). A copy of the Final Inspection for Warranty is considered acceptance from manufacturer.

B. Protect the membrane and coordinate with other trades to avoid traffic over completed membrane surfaces. Arrange work sequence to avoid use of newly installed waterproofing for storage, walking surface, and equipment movement. Where such access is absolutely required, the Applicator shall provide all necessary temporary protection and barriers to segregate the work area and to prevent damage to adjacent areas. Adequate protection of the membrane shall be provided for all waterproofing areas which receive traffic during construction. Any damage which occurs to the waterproofing membrane and/or system is to be brought to the attention of the owner's representative and/or design professional and manufacturer. All damage is to be repaired according to manufacturer's recommendations. The party responsible for damage shall bear the cost of repairs.

1.7 WARRANTIES

A. General
   1. A manufacturer's representative's presence on a project regardless of reason, length, or frequency, does not imply that any additional coverage beyond that stated in the warranty is in effect.

B. Applicator's Warranty
   1. The Applicator shall supply the owner with a minimum two-year workmanship warranty. The warranty obligation shall run directly to the owner with a copy to manufacturer.

C. Manufacturer Warranty
   1. Membrane Warranty (5, 10, 15, or 20 Years)
   2. The Applicator shall provide a manufacturer's membrane warranty to the building owner at the successful completion of the project. The warranty shall cover defective waterproofing membrane.
   3. System Warranty (5, 10, 15, or 20 Years)
   4. The Applicator shall provide a manufacturer's warranty to the building owner. Upon successful completion of the work to manufacturer's satisfaction and receipt of final payment, the manufacturer's System Warranty shall be issued.

PART 2 - PRODUCTS

2.1 WATERPROOFING MEMBRANE

A. Self-adhering thermoplastic waterproofing membrane system utilizing a reinforced PVC sheet system; provide products of the following:
   1. Sika Sarnafil, A Division of Sika Corporation, (Canton, MA).
      a) Sarnafil G476-15 SA Waterproofing Membrane – a self-adhered, cold-applied composite sheet consisting of a 60 mil (1.5 mm), thermoplastic waterproofing membrane with fiberglass reinforcement and 60 mil (1.5 mm) closed-cell foam backing layer having an overall thickness of 120 mils (3 mm). The backing layer has a factory-applied pressure sensitive adhesive that is protected by a release liner which is removed during application. Membrane has a selvedge to allow a heat-welded overlap of adjoining sheets.

Parameters	ASTM Test Method	Typical Physical Properties
Membrane thickness, inches (mm)	D 638	0.060 (1.5)
Tensile Strength, psi.	D 751	1631
Elongation at Break, %	D 751	279 MD, 267 CMD
Seam Strength, % of Tensile Strength	D 751	86%
Retention of Properties After Heat Aging	D 3045	
Tensile Strength, % of original	D 751	90%
Elongation at Break, % of original	D 751	90%
Tear Resistance, lbf	D 1004	21.0
Linear Dimensional Change, %	D 1204	0.0
Weight Change after immersion in water, %	D570	1.5
Static Puncture Resistance, 33 lbs.	D5602	Pass
Dynamic Puncture Resistance, 10 J	D5635	Pass

2.2 SYSTEM FLASHING PRODUCTS AND ACCESSORIES

A. Flashing
   1. Non-exposed flashings
      a) Sarnafil G476-15 SA Waterproofing Membrane.
      b) Sarnafil G476-20, 60 mil (1.5 mm), thermoplastic flashing membrane with fiberglass reinforcement.
   2. Exposed flashings
      a) Sarnafil G410-15, 60 mil (1.5 mm), thermoplastic flashing membrane with fiberglass reinforcement.
      b) Sarnafil G459-15, 60 mil (1.5 mm), thermoplastic, asphalt resistant, grid strip and flashing membrane with fiberglass reinforcement.

B. Adhesives
   1. Sarnacol 2170: A solvent-based reactivating-type adhesive used to attach membrane to the flashing substrate in areas where self-adhered membrane is not used.
   2. Sarnacol 2121: A water-based adhesive used to attach the membrane to the flashing substrate in areas where self-adhered membrane is not used.
   3. Sikalfex-11FC: Membrane adhesive for certain flashing details.

C. Accessories
   1. Surface Conditioner 150: For concrete and masonry substrates only. A water-based surface treatment specifically designed to bind dust and concrete efflorescence thereby providing a

suitable surface to install self-adhered membrane. For use when substrate and ambient temperature is 40 degree F (5 degree C) or higher.

2. Sarnavap Self-Adhered Primer: For use on all substrates. A solvent-based surface treatment specifically designed to bind dust and concrete efflorescence thereby providing a suitable surface to install self-adhered membrane. For use when substrate and ambient temperature is 25 degree F (-4 degree C) or higher.
3. Sikaflex Primer 449: A solvent-based primer used to prime the back of G459 grid strip membrane to improve adhesion to Sikalfex-11FC.
4. Sarnaclad-SS: A PVC-coated, heat weldable sheet metal capable of being formed into a variety of shapes and profiles. Sarnaclad-SS is a stainless steel sheet metal with an unsupported Sarnafil membrane laminated on one side for buried or concealed flashing conditions.
5. Sarnaclad: A PVC-coated, heat-weldable sheet metal capable of being formed into a variety of shapes and profiles. Sarnaclad is a 25 gauge, G90 galvanized metal sheet with a 20 mil (0.5 mm) unsupported Sarnafil membrane laminated on one side for above grade flashing locations.
6. Aluminum Tape: A pressure-sensitive aluminum tape used as a separation layer between small areas of asphalt contamination and as a bond-breaker under the coverstrip at Sarnaclad-SS joints.
7. Masonry Anchor: A drive-pin expansion type fastener with zinc sheaths and stainless steel pins for attachment of Sarnabar and Sarnastop to concrete, masonry, and brick.
8. Sarnamatic: 220 volt, self-propelled, hot-air welding machine used to seal long lengths of Sarnafil membrane seams.
9. Sarnacorner-Inside/Outside: Prefabricated inside and outside flashing corners made of PVC membrane that are heat-welded to membrane or Sarnaclad base flashings.
10. Sikaflex®-1a: Sealant used at flashing terminations and pitch pocket filler.
11. Sarnastop: An extruded aluminum, flat low profile bar used to terminate flashing membrane. Sarnastop has predrilled holes every 6 inches (152 mm) on center.
12. Multi-Purpose Tape: A high performance sealant tape used with metal flashings as a preventive measure against air and wind blown moisture entry.
13. Sarnacircle: Circular 48 mil (1.2 mm) G410 membrane patch welded over T-joints formed by overlapping membranes greater than 60 mil (1.5 mm) in thickness.

2.3 SEPARATION LAYER

A. Sarnafelt NWP: A non-asphaltic, non-woven 9 oz/yd2 (305 gms/m2) polypropylene felt separation layer used as an additional protective layer as required.

2.4 DRAINAGE COMPOSITE

A. Drainage Composite 3811R
   1. A 100% recycled polypropylene drainage core of fused, entangled filaments with a geotextile fabric bonded to each side.

2.5 INSULATION

A. Sarnatherm XPS: Extruded polystyrene closed-cell foam insulation. Thicknesses and compressive strength as noted on Project Drawings.

2.6 RELATED MATERIALS

A. Plywood
   1. When adhering the flashing membrane directly to plywood, a minimum 1/2 inch (13 mm) CDX (C side out), smooth-surfaced exterior grade plywood with exterior grade glue shall be used. Rough-surfaced plywood or high fastener heads will require the use of Sarnafelt behind the non-self-adhered (bareback) flashing membrane. Plywood shall have a maximum moisture content of 19% by weight on a dry weight basis.

B. Miscellaneous Fasteners and Anchors
   1. Fasteners are to be compatible with materials in contact with fasteners. All fasteners and anchors shall have a minimum embedment of 1-1/4 inches (31.7 mm) and shall be approved for such use by the fastener manufacturer. Fasteners for attachment of metal to wood blocking shall be annular ring nails. Fasteners for attachment of metal to masonry shall be all-metal expansion

type fasteners. All fasteners shall meet Factory Mutual Standard 4470 for corrosion resistance. All fasteners installed below grade shall be stainless steel.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine all surfaces scheduled to receive waterproofing membrane and flashing for roughness, contaminants, unsound structural substrates or other conditions that may impair the waterproofing application. Notify the owner and copy manufacturer in writing of any such conditions: do not commence work until all defects are remedied.

B. Applicator shall be responsible for acceptance or provision of proper substrate to receive new waterproofing materials.

3.2 SUBSTRATE PREPARATION

A. New Construction
   1. Poured Normal Weight Structural Concrete Deck:
      a. New concrete shall cure a minimum of 14 days or until acceptable adhesion of the membrane has been achieved according to Sika Sarnafil printed quality assurance requirements. The surface shall be equivalent to a smooth float finish and shall be free of dust, excess moisture, oil-based curing agents and loose debris. Sharp ridges or other projections above the surface shall be removed before waterproofing. Depressions and honeycombs shall be patched with SikaQuick® 1000 repair mortar. Repair cracks in concrete up to 3/8 inch (9.5 mm) with Sikadur® Crack Fix epoxy or Sikadur® 35, Hi-Mod LV. Cracks greater than 3/8 inch (9.5 mm) shall be repaired with SikaGrout® 212 non-shrink, cementitious grout.
   2. Precast/Prestressed Concrete Panel Deck:
      a. The deck shall be installed in accordance with the concrete panel manufacturer's requirements and industry practice. The surface shall have a smooth and level finish and shall be free of dust, moisture, oil or loose debris. All joints between precast units shall be grouted with SikaGrout® 212 non-shrink, cementitious grout. Any differentials in height between precast units shall be feathered for a smooth transition. Sharp ridges or other projections above the surface shall be removed before waterproofing.

3.3 SURFACE CONDITIONER APPLICATION

A. Surface Conditioner 150:
   1. Apply Surface Conditioner 150 according to Sika Sarnafil’s printed instructions.
   2. Surface Conditioner 150 must be applied to all horizontal and vertical concrete and masonry substrates to receive G476-15 SA membrane.
   3. Do not apply surface conditioner during periods of inclement weather or when ambient or substrate temperatures are below 40 degree F (4 degree C). Temperature must be a minimum of 40 degree F (4 degree C) for surface conditioner application. Use Sarnavap Self-Adhered primer for applications below 40 degree F.

B. Sarnavap Self-Adhered Primer:
   1. Apply Sarnavap Self-Adhered Primer according to manufacturer ’s printed instructions.
   2. Sarnavap Self-Adhered Primer must be applied to all horizontal and vertical substrates to receive G476-15 SA membrane when the ambient temperature or substrate temperature is below 40 degree F (4 degree C).
   3. Do not apply primer during periods of inclement weather or when ambient or substrate temperatures are below 25 degree F (-4 degree C). Sarnavap Self-Adhered Primer is acceptable for use when application temperature is 25 degree F (-4 degree C) or higher.

3.4 SELF-ADHERED THERMOPLASTIC WATERPROOFING MEMBRANE INSTALLATION

A. Comply with manufacturer ’s most current installation instructions, specific recommendations, and approved shop drawings for this project.

B. Adhesion test strips are required prior to actual installation. Test strips approximately 6 inches wide by 1-1/2 feet long shall be installed by the applicator to test the adhesion prior to the actual installation in representative areas. Do not install G476 Self-Adhered membrane until a successful adhesion test has been completed. Refer to Sika Sarnafil's most current quality assurance requirements for additional information.

C. All surfaces shall be dry and free of dirt, dust, and debris.

D. Apply self-adhered waterproofing membrane only in dry weather, and when the membrane, air, and substrate temperature is a minimum of 25 degree F (-4 degree C) over substrates primed with Sarnavap Self-Adhered Primer, and a minimum of 40 degree F (5 degree C) over substrates conditioned with Surface Conditioner 150.

E. Workmen and all others that walk on the waterproofing membrane shall wear clean, soft-soled shoes so as not to damage membrane. Heed all manufacturer's cautions and warnings in regard to product use. Membrane is slippery when wet or covered with frost, snow and ice. Take proper precautions.

F. Lay out work to minimize traffic over installed areas.

3.5 HOT-AIR WELDING OF LAP AREAS

A. General
   1. All surfaces to be welded shall be clean and dry. No contaminants shall be present within lap areas.
   2. Welding equipment shall be provided by or approved by Sika Sarnafil. All mechanics intending to use the equipment shall be trained and qualified and shall have successfully completed a course of instruction provided by a Sika Sarnafil technical representative prior to welding.
   3. Adjacent sheets shall be hot-air welded in accordance with Sika Sarnafil's instructions. All seams shall be hot air welded. Lap area shall be a minimum of 2-1/2 inch (64 mm) wide. Overlaps shall be with the flow of water where possible.
   4. All cover strips and patches shall be G476, G410, or G459 membrane. Self-adhered membrane cannot be used as cover strips or patches.
   5. A minimum 8 inch (20.3 cm) wide cover strip shall be used where membranes meet at end laps and all non-selvedge edges. Butt adjoining sheets closely, center the cover strip over both membranes and hot-air weld.
   6. Patch all 3-way membrane overlaps (T joints) with a maximum 60 mil thick (1.5 mm), 4 inch (10.2 cm) round or square patch.
   7. Welding equipment shall be provided by or approved by Sika Sarnafil.

B. Machine Welding
   1. Machine welded seams are achieved by the use of automatic welding equipment. When using this equipment, Sika Sarnafil's instructions must be followed and local codes for electric supply, grounding and over current protection observed. Dedicated circuit house power or a dedicated portable generator (30 A, 220 V, and recommended min. 7,500 Watts) is required. No other equipment shall be operated off the generator.

C. Quality Control of Welded Seams
   1. All completed welded seams shall be checked by the waterproofing Applicator after cooling for continuity using a rounded screwdriver or other suitable blunt object. On-site evaluation of welded seams shall be made daily by the Applicator. Cross-section samples shall be taken a minimum of two times a day (AM/PM) through completed seams and evaluated immediately. The samples must be dated and saved for evaluation by a Sika Sarnafil Technical Representative. Each test cut shall be patched by the Applicator.

3.6 MEMBRANE FLASHINGS

A. All flashings shall be installed concurrently with the waterproofing membrane according to Sika Sarnafil approved details as the job progresses. Flashings shall be adhered to compatible, dry, smooth, and solvent-resistant surfaces. All masonry joints shall be struck flush. Rough or incompatible surfaces may be covered with minimum 1/2 inch (13 mm) CDX plywood. (Do not apply surface conditioner to plywood flashing substrates). Flashing may be self-adhered waterproofing

membrane or waterproofing membrane with field-applied adhesive installed according to Sika Sarnafil's printed instructions.

B. When adhering to vertical surfaces greater than 30 inches (76.2 cm) in height, provide intermediate fastening of the flashing membrane according to Sika Sarnafil requirements.

C. Complete the entire waterproofing assembly and flashing in a single working day; avoid exposure of any components to rain, snow, or dew. If rain threatens during the day, or in an emergency, protect the unfinished exposed waterproofing and flashing components.

D. All flashing membranes shall be mechanically fastened along the top edge according to approved Sika Sarnafil details. Acceptable fasteners shall be used to secure flashings to substrate. Seal top of termination with an acceptable sealant.

E. All flashings shall extend a minimum of 8 inches (20.3 cm) above the overburden unless previously accepted by the owner's representative and/or design professional and Sika Sarnafil, in writing.

F. A minimum 8 inch (20.3 cm) wide cover strip shall be used where self-adhered flashing membranes meet at end laps, butt joints, and all non-selvedge edges. Butt adjoining sheets closely, center the cover strip over both membranes and hot-air weld. Complete inside and outside corner flashing details with prefabricated corner patches (Sarnacorners).

G. No bituminous residue shall be in contact with the underside of the membrane flashing, unless self-adhered membrane or asphalt resistant membrane is used. Flashing substrates contaminated with coal-tar shall be completely cleaned, or overlaid with minimum 1/2 inch (13 mm) thick CDX plywood or minimum 24 gauge stainless steel sheet metal.

3.7 SARNACLAD METAL FLASHINGS

A. Complete all metal work in conjunction with waterproofing and flashings so that a watertight condition exists daily.

B. Metal shall be installed to provide adequate resistance to bending and allow for normal thermal expansion and contraction.

C. Metal joints shall be watertight.

D. Metal flashings shall have a minimum 4 inch (10.2 cm) nailing flange and shall be fastened into solid wood blocking 4 inches (10.2 cm) on center staggered, or into concrete with acceptable concrete anchors 6 inches (15.2 cm) on center staggered. Fasteners shall penetrate the wood nailer a minimum of 1-1/4 inch (31.7 mm) or into concrete a minimum of 1 inch (25.4 mm).

E. Adjacent sheets of Sarnaclad metal shall be spaced 1/4 inch (6.3 mm) apart. The end joints of the metal shall be fastened 6 inches (15.2 cm) on center. The joints shall be covered with 2 inch (50.8 mm) wide aluminum tape. A 4 inch (10.2 cm) wide membrane flashing strip shall be hot air welded over the joint.

3.8 TEMPORARY CUT-OFF

A. All flashings shall be installed concurrently with the membrane in order to maintain a watertight condition as the work progresses. Provide temporary cut-offs around exposed edges and at incomplete flashing areas from the new membrane to the structural deck or existing waterproofing. Remove the cut-offs completely before proceeding with subsequent work.

B. If inclement weather occurs while a temporary cut-off is in place, the Applicator shall provide the labor necessary to monitor the situation to maintain a watertight condition.

3.9 WATER TESTING OF DRAINS AND ELECTRONIC LEAK DETECTION TESTING

A. The Applicator shall water test the drains for a minimum of 16 hours prior to the electronic leak detection (ELD) test. Plug the drain and flood with enough water to completely cover the clamping ring the day before the ELD test. The manufacturer's Technical Service Representative attending the ELD test will inspect for leakage upon his arrival to the jobsite.

B. Follow manufacturer's procedures for electronic leak detection testing over the completed waterproofing membrane to check for membrane water tightness prior to the installation of subsequent layers.

C. Should leaks be discovered, the Applicator shall locate leak source(s) and make repairs. Re-test to assure watertightness. All costs associated with the repairs shall be borne by the Applicator.

3.10 SEPARATION LAYER INSTALLATION (If indicated)

A. Separation layer is installed above the membrane as additional protection as specified and according to the detail drawings lapping all edges a minimum of 4 inches (10.2 cm).

B. Cut separation layer with scissors or utility blades. Do not use hot air welding equipment to cut the separation layer.

3.11 DRAINAGE COMPOSITE INSTALLATION

A. Install drainage composite directly over the waterproofing membrane and/or protection layer. If protection layer is not specified, install drainage composite immediately after manufacturer 's inspection and acceptance of the waterproofing installation.

B. Neatly trim drainage composite to fit closely around penetrations and at the base of all drains to ensure that water will flow freely from composite into drain openings.

C. All cut edges of the drainage composite shall be covered in order to protect the waterproofing membrane from damage.

3.12 INSULATION AND FILTER FABRIC INSTALLATION (If indicated)

A. Insulation shall be laid in parallel courses with end joints staggered and tightly butted.

B. Insulation shall be neatly cut to fit around penetrations and projections.

C. Do not install more insulation than can be covered by overburden by the end of the day.

D. Install filter fabric with proper overlaps according to manufacturer's instructions.

E. During installation in hot, sunny weather, the Applicator shall protect the insulation with a white covering to prevent excessive heat build-up and potential warping of the insulation boards.

3.13 MONITORING THE INSTALLATION OF FINISHING LAYERS AND OVERBURDEN

A. The waterproofing Applicator shall monitor finishing layer installation and overburden operations to assure no damage is done to the waterproofing membrane. The type of overburden is to be approved by the designer and owner.

B. Soil overburden materials shall be satisfactory material, free of all foreign matter, clay, rock, gravel larger than 1 inch (25.4 mm) in any dimension, debris, waste, frozen materials, vegetation and other deleterious matter.

C. Overburden materials must be placed carefully and evenly adjacent to structures, piping or conduit to required elevations. Prevent wedging action of backfill against structures. Overburden is to be placed uniformly in lifts around the structure.

D. No large rocks are to be allowed against the waterproofing system.

E. If overburden material has stone sizes greater than 1 inch (25.4 mm), the use of Sarnatherm insulation and or other acceptable protective layers must be used to maximize the protection of the waterproofing system. The use of Sarnatherm does not eliminate the need for proper overburden material and backfill techniques.

F. Alert all parties concerned of any activities that might adversely affect the long-term performance of the waterproofing.

END OF SECTION

SECTION 071413 - HOT FLUID-APPLIED RUBBERIZED ASPHALT WATERPROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes
   1. Hot applied rubberized asphalt membrane waterproofing system [at locations scheduled at the end of this Section.
   2. Protective covering.
   3. Drainage matting.
   4. Insulation.

B. Related Sections
   1. 030013 - Concrete: Concrete substrate and concrete topping slab.
   2. 071326 - Plaza Deck Waterproofing: Alternate plaza deck waterproofing system.
   3. Division 22 - Plumbing: Drain flashing flanges; mechanical penetrations.

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.

D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

1.2 SYSTEM DESCRIPTION

A. Waterproofing system shall be capable of preventing moisture migration to the building interior, in the applications indicated, when installed in accordance with the Contract Documents.

1.3 REFERENCES

A. American Society of Testing and Materials (ASTM):
   1. D92 - Test Method for Flash and Fire Points by Cleveland Open Cup.
   2. D746 - Test Method for Brittleness Temperature of Plastics and Elastomers by Impact.
   3. D1191 - Method of Testing Concrete Joint Sealers.
   4. D4258 - Practice for Surface Cleaning Concrete for Coating.
   5. D4259 - Practice for Abrading Concrete.
   6. E96 - Water Vapor Transmission of Materials.

B. Canadian General Standards Board:
   1. CAN/CGSB-37.50 - Hot Applied, Rubberized Asphalt for Roofing and Waterproofing
   2. CAN/CGSB-37.51 -Application of Rubberized Asphalt, Hot-Applied, for Roofing and Waterproofing.

1.4 SUBMITTALS

A. Make submittals under provisions of Section 013300.

B. Product Data: Submit manufacturer's complete product data for each product proposed, including, membrane materials, flashing, and other related components of the system.

C. Shop Drawings: Submit details for this specific installation indicating flashing requirements, including details for substrate joints and cracks, sheet flashings, penetrations, and other termination conditions. Include special details to indicated application at special conditions.

D. Quality Control Submittals:
   1. Qualification Data: Submit installer qualifications verifying years of experience; include list of completed projects having similar scope of work identified by name, location, date, reference names and phone numbers.
   2. Warranty Draft: Concurrent with initial product data submittal, submit draft of warranties for Architect’s review. Draft shall include all specified exceptions and inclusions.

E. Closeout Submittal:
   1. Submit warranty in accordance with Section 017700.

1.5 QUALITY ASSURANCE

A. Qualifications of Installer:
   1. Approved in writing by system manufacturer.
   2. Minimum of 5 years experience in installation of waterproofing systems of type specified.

B. Pre-installation Conference:
   1. Schedule prior to installation of systems. Conduct in accordance with provisions of Section 013119.
   2. Attendance:
      a. Owner's Representative.
      b. Architect.
      c. Waterproofing installer.
      d. Membrane manufacturer's technical representative.
   3. Agenda:
      a. Review all installation details.
      b. Review installation requirements for other work including concrete conditions, penetrations, and joint conditions.
      c. Review installation requirements including environmental conditions, crack preparation, water and trash removal, storage of materials, and protection of surrounding surfaces.
      d. Establish waterproofing protection procedures after installation.
      e. Resolve conditions which would prevent satisfactory installation of waterproof membrane.

C. Mock-up:
   1. Provide mock-up as specified in Section 014500.
   2. Provide 100 sq. ft. mock-up of waterproofing system. Locate where approved by Architect.
   3. Mock-up shall represent conditions of finished work including internal and external corners, sealing and flashings.
   4. Approved mock-up may be incorporated as part of the Work.]

1.6 PROJECT/SITE CONDITIONS

A. Unless otherwise specifically approved by waterproofing materials manufacture, maintain temperatures above 40 degrees F for 24 hours before application.

B. Coordinate installation sequence to ensure waterproofing system will be covered with concrete topping within 30 days of membrane installation.

C. Do not apply waterproofing to damp, frozen, dirty, dusty, or deck surfaces unacceptable to manufacturer.

1.7 WARRANTY

A. Furnish warranties under provisions of Section 017700.

B. Provide 5 year warranty, cosigned by the General Contractor, the installer, and the waterproofing materials manufacturer, including coverage of materials and installation, and including removal and replacement of covering materials, against failure of waterproofing installation to resist penetration of moisture, except where such failures are the result of structural failures of building. Hairline cracking of concrete due to temperature change or shrinkage shall not be considered as structural failure.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: American Hydrotech, Inc., (Chicago, IL; 312-377-4998).

B. Acceptable Options (Subject to compliance with specification requirements):
   1. American Permaquik Inc (Williamsville NY; 716-633-3124). "
   2. Tremco Incorporated; 515-331-3468.
   3. Carlisle Corporation, Carlisle Coatings & Waterproofing Div. (Sapulpa OK; 800-338-8701).

2.2 MATERIALS

A. System: American Hydrotech, Inc. (Chicago, IL; 312/377-4998) "Monolithic Membrane 6125-FR."

B. Membrane: Hot, fluid applied, rubber/asphalt composition[containing no less than 25 percent recycled content]:
   1. Water Resistance: No delamination, blistering, emulsion, or deterioration after 5 days at 122 deg F.
   2. Elongation: Minimum 1000 percent; ASTM D 1191.
   3. Flash Point: ASTM D92; 500°F minimum.
   4. Cone Penetration: 110 maximum at 25 deg C and 200 maximum at 50 deg C; ASTM D 1191 and CAN/CGSB-37.50.
   5. Flow: 3 mm maximum at 60 deg C; ASTM D 1191 and CAN/CGSB-37.50.
   6. Ratio of Toughness to Peak Load: Not less than 0.040; CAN/CGSB-37.50.
   7. Adhesion Rating: Pass; CAN/CGSB-37.50.
   8. Water-Vapor Permeability: ASTM E96, 0.03 perms maximum.
   9. Water Absorption: 0.35-g maximum mass gain or 0.18-g maximum mass loss; CAN/CGSB-37.50.
   10. Pinholing: Not more than 1 pinhole; CAN/CGSB-37.50.
   11. Low Temperature Flexibility: ASTM D746, no delamination or cracking at -25°C.
   12. Crack Bridging Capability: No cracking, splitting, or loss of adhesion; CAN/CGSB-37.50.
   13. Heat Stability: Meet the requirements of CAN/CGSB-37.50 for penetration, flow, low-temperature flexibility, and viscosity when heated for 5 hours at manufacturer's recommended application temperature.
   14. Viscosity Test: 2 to 15 seconds; CAN/CGSB-37.50.

C. Fabric Reinforcement: Hydrotech "Flex Flash F"; spunbonded polyester fabric.

D. Primers, Surface Conditioners, Fillers, and Sealers: As recommended by membrane manufacturer.

E. Flashing, Adhesives, and Sealants: As recommended by membrane manufacturer.

F. Separator/Protector Sheet: As recommended by the waterproofing system manufacturer.

G. Protection Board:
   1. Typical: American Hydrotech "Permaboard 4.5mm," or approved; preformed bitumen impregnated composition board; compatible with the waterproof membrane.

H. Drainage Matting: American Hydrotech, Inc. "Hydrodrain," or approved; three-dimensional plastic matting with manufacturer's standard woven geotextile filter fabric bonded to one side.

I. Insulation: Extruded polystyrene closed-cell foam insulation. Thicknesses and compressive strength as noted on Project Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify surfaces are solid, free of frozen matter, loose particles, cracks, pits, rough projections, and foreign matter detrimental to adhesion and application of waterproofing.

B. Verify items which penetrate surfaces to receive waterproofing are securely installed.

C. Notify the Architect of all unacceptable conditions, and do not commence work in those areas, until the unacceptable conditions have been resolved. Commencement of application constitutes acceptance of conditions.

3.2 PREPARATION

A. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions.

B. Apply mastic to seal penetrations, small cracks, and honeycomb in substrate.

C. Protect adjacent surfaces not designated to receive waterproofing.

D. Abrasive blast clean concrete surfaces uniformly to expose top surface of fine aggregate according to ASTM D 4259. Remove remaining loose material and clean surfaces according to ASTM D 4258.

E. Apply surface conditioners and related components in strict accordance with manufacturer's recommendation.

3.3 JOINT AND CRACK TREATMENT

A. Prepare, treat, rout, and fill joints and cracks in substrate according to CAN/CGSB-37.51 and the waterproofing materials manufacturer's recommendations. Remove dust and dirt from joints and cracks prior to coating surfaces

B. Prepare vertical and horizontal surfaces at terminations and penetrations through waterproofing and at drains and sleeves according to CAN/CGSB-37.51 and waterproofing manufacturer's recommendations.

3.4 MEMBRANE APPLICATION

A. Apply membrane in accordance with manufacturer's instructions at rate to provide a continuous, monolithic membrane of 90 mils thickness, [into which a fabric reinforcing sheet is fully embedded, followed by another continuous monolithic membrane of 125 mils thickness, for total system thickness of 215 mils.

B. Apply primer at manufacturer's recommended rate, over prepared substrate and allow to dry.

C. Continue membrane up vertical surfaces minimum 6 inches, unless otherwise noted.

D. Seal items projecting through membrane.

E. Install membrane detail/flashings in strict accordance with manufacturer’s instructions.

F. Install protection course with overlapped joints while membrane is still hot. Overlap adjoining sheet edges minimum of 3 inches.Install heavy duty protection board at walls and floors of planters indicated to receive fluid applied waterproof membrane system.

H. Drainage Matting:
   1. Install drainage matting continuously over waterproofed horizontal slabs.
   2. Use adhesives and mechanical fasteners recommended by manufacturer and that do not penetrate waterproofing and as follows.
      a. Install with matting interlocked at the edges.
      b. Install with fabric side up.
      c. Lap fabric at joints.
      d. Fold fabric under to cover all exposed edges.
      e. Arrange fabric as necessary to prevent intrusion of concrete when the concrete is placed.
   3. Provide additional protection as necessary to protect waterproof membrane system from subsequent construction damage.]
   4. Install the drainage matting immediately after completion of testing operations.

3.5 INSULATION AND FILTER FABRIC INSTALLATION

A. Insulation shall be laid in parallel courses with end joints staggered and tightly butted.

B. Insulation shall be neatly cut to fit around penetrations and projections.

C. Do not install more insulation than can be covered by overburden by the end of the day.

D. Install filter fabric with proper overlaps according to manufacturer’s instructions.

E. During installation in hot, sunny weather, the Applicator shall protect the insulation with a white covering to prevent excessive heat build-up and potential warping of the insulation boards.

3.6 FIELD QUALITY CONTROL

A. Waterproofing materials factory representatives shall inspect all surfaces to receive membranes, prior to their installation. Installation procedures shall be approved and witnessed by a representative of the waterproofing material manufacturer.

B. On completion of membrane installation, prior to installation of drainage matting, dam installation in preparation for flood testing.

C. Test each deck area for leaks and before overlying construction are placed. Flood to minimum depth of 2 inches or to within 3 inches of top of sheet flashings with clean water. After 48 hours, check for leaks.

D. If leaking is found, patch using new waterproofing and protection course materials; repeat flood-test. Repair damage to building.

E. When system is proved to be watertight, drain water and remove dam.

3.7 PROTECTION

A. Close off area to prevent unauthorized traffic or work over membrane until final topping is applied.

B. Protect installed insulation from damage due to ultraviolet light exposure, physical abuse, and other causes. Provide temporary coverings where insulation will be subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

3.8 SCHEDULE

A. Apply waterproofing to the following surfaces:
   1. Above grade waterproofed concrete plaza deck slabs.

END OF SECTION

SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Thermal batt insulation with separate vapor barrier.
   2. Rigid board wall insulation.
   3. Rigid board perimeter insulation.
   4. Continuous exterior wall insulation and associated fire safing systems.
   5. Low flame spread rigid board insulation at overhead decks within unconditioned spaces having conditioned space above.

B. Related Sections:
   1. 075429 – Mechanically Anchored Single-Ply Thermoplastic Roofing: Insulation provided as part of the roofing system.
   2. 078400 - Firestopping: Insulation provided as a part of systems for sealing penetrations through fire-rated floors and walls.
   3. 078500 - Fire Rated Construction Joints: Insulation provided as a part of systems for sealing joints in fire-rated floors and walls.
   4. 098100 - Acoustic Insulation.
   5. 312000 - Earth Moving: Backfilling; coordination with installation of rigid board perimeter insulation at building foundation.

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.

D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. C518 - Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by means of the Heat Flow Meter Apparatus.
   2. C578 - Rigid, Cellular Polystyrene Thermal Insulation.
   3. C612 - Specification for Mineral Fiber Block and Board Thermal Insulation.
   4. C665 - Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
   5. D1621 - Test Method for Compressive Properties of Rigid Cellular Plastics.
   6. E84 - Test Method for Surface Burning Characteristics of Building Materials.

1.3 SUBMITTALS

A. Make submittals under provisions of Section 013300.

B. Product Data: Submit manufacturer's product data and installation instructions for each type of insulation.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Unfaced Batt and Blanket Insulation: ASTM C665, Type I; preformed unfaced glass fiber roll; flame spread of 25 or less and smoke developed of 50 or less when tested in accordance with ASTM E84; formaldehyde free, Johns Manville Corp. "Unfaced Formaldehyde-free Thermal and Acoustical Fiber Glass Insulation;" or approved; oversize widths for friction-fit between metal framing.

B. Continuous Exterior Wall Insulation:
   1. Standard: ASTM C665, Type I or III, Class A; preformed mineral fiber roll with foil scrim kraft vapor barrier; 8 lbs/cf density.
   2. Flame Spread: 25 or less when tested in accordance with ASTM E84.

3. Smoke Development: 0 when tested in accordance with ASTM E84.
4. Thickness: 2 inches and 1 inch, at locations indicated.
5. Installation Accessories: Angle clips, horizontal angles, impaling pins with sheet metal shields, and other components as recommended by insulation manufacturer.
6. Approved Products: Thermafiber Firespan Foil-Faced Insulation by United States Gypsum Company / Thermafiber LLC (Tacoma WA; 800-426-8127);or approved.

C. Rigid Extruded Polystyrene Board:
1. Standard: ASTM C578, Type IV; extruded cellular polystyrene.
2. Thermal Resistance: Minimum "R" per inch of 5 when tested in accordance with ASTM C518 at 75 degrees F. mean temperature.
3. Compressive Strength: Minimum 25 psi when tested in accordance with ASTM D1621.
4. Water Absorption: 0.10 to 0.15 percent when tested in accordance with ASTM C272.
5. Thickness/R-value: 1 inch, R-5.
6. Size: 24 inch width, 96 inch length, with square edges.
7. Approved Products:
   a. Styrofoam by The Dow Chemical Company (Midland, MI; 800-441-4369)
   b. Foamular 250 by Owens Corning, (Toledo, OH; 800-438-7465).

D. Low Flame Spread Rigid Polyisocanurate Board: Dow “Thermax Sheathing” or approved equal; foil facing; IBC approved for exposure without thermal barrier in accordance with NER -681. Provide with manufacturer’s recommended tape seal for joints.

E. Spray-Foam Insulation: As specified in Section 072119.

2.2 ACCESSORIES

A. Separate Vapor Barrier for Batt Insulation:
1. At Typical Exterior Wall Assemblies: CertainTeed “MemBrain Continuous Air Barrier & Smart Vapor Retarder”
2. At Mineral Wool Assemblies: Foil scrim kraft FSK 25; flame spread of 25 or less and a smoke developed of 50 or less when tested in accordance with ASTM E84.

B. Tape: To match foil scrim kraft face of vapor barrier; 2 inch minimum width.

C. Impaling Pins: 12 gage pins; length as required with mounting plates for welding or adhesive mounting; include retainer shields.

D. Adhesive:
1. Type recommended by insulation manufacturer for application; compatible with insulation and substrate.
2. For interior applications, adhesives shall meet the requirements of the Southern California South Coast Air Quality Management District (SCAQMD) Rule 1168 using the method of dividing the weight of the solvent in the adhesive by the volume of the material, less water).

E. Related Accessories: Provide other accessories, not specifically described, as required for a complete installation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify adjacent materials are secure, properly spaced, dry, and ready to receive installation.

B. Verify mechanical and electrical services within spaces to insulated have been installed and tested.

C. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.

D. Do not begin installation until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

3.2 INSTALLATION - BATT INSULATION

A. Install batt insulation in accordance with manufacturer's instructions.Install insulation without gaps or voids.

C. Trim insulation neatly to fit spaces. Use batts free of damage.

D. At metal stud framing, insert the insulation edges tightly into the stud channels for a friction fit. Provide additional supports as necessary to prevent sliding of batts in the stud cavity.

E. Mechanical Fastening:
   1. At locations where no support framing is present, provide metal impaling pins and retainers.
   2. Mechanically or adhesively bond the retaining pins to the substrate in accordance with the manufacturer's recommendations.
   3. Space pins at maximum 24 inches on center along the edges and within the field of the batt. Place edge pins within 6 inches from the edge of the batt.

F. Pack batt insulation in shim spaces at perimeter of window assembly to maintain continuity of thermal barrier.

G. Separate Vapor Barrier Installation:
   1. Install separate vapor barrier over unfaced insulation.
   2. Install vapor barrier toward warm side of building spaces.
   3. Vapor barrier shall be continuous.
   4. At locations where insulation is mechanically fastened by impaling pins, place vapor retarder over impaling pins and hold in position with additional retainers. The installation shall present a tight, continuous, and wrinkle free appearance.
   5. At lightgage support framing, secure to studs with double stick tape or spray adhesive.
   6. Lap joints in vapor barrier 2 inches, except provide tape sealed joints at locations where vapor barrier will remain exposed in the finished work.
   7. Tape seal vapor barrier to adjacent construction at perimeter edges.
   8. Tape and seal tears or cuts in vapor barrier.

H. R value Schedule: Provide batt insulation in sufficient thickness to provide minimum R-values as indicated on the Energy Model Matrix.

3.3 LOW FLAME SPREAD RIGID BOARD INSULATION AT UNDERSIDE OF INTERIOR CONCRETE DECKS

A. Provide low flame spread rigid polyisocanurate board insulation at interior overhead decks within unconditioned spaces with conditioned space over, excluding decks with separate membrane and insulation systems.

B. Install insulation tight to the deck in accordance with the manufacturer's applicable current installation instructions.

C. Securing Insulation:
   1. Provide a minimum of 4 impaling pins per board.
   2. Adhesively bond impaling pin base plates to substrate.
   3. Provide additional adhesive over deck surfaces and impale boards onto pins and embed into adhesive.
   4. Secure with retaining caps.

D. Install board insulation to form a continuous insulation barrier.

E. Boards shall be tightly butted and cut to fit around construction mounted to the deck.

F. Trim insulation to tightly fit around penetrations. Cut edges shall be clean and straight.

G. Tape seal joints and penetrations with matching foil tape.

H. Provide sufficient thickness for a minimum uniform thermal value.

3.4 INSTALLATION - RIGID BOARD PERIMETER INSULATION

A. Use rigid extruded polystyrene insulation. Coordinate with Section 312000 for installation of rigid perimeter insulation.

B. Install perimeter insulation vertically and horizontally with tight butt joints at locations detailed.

C. Minimum vertical height: As detailed.

D. Minimum horizontal width: 24 inches.

3.5 INSTALLATION – CONTINUOUS EXTERIOR WALL INSULATION

A. Mechanically fasten 1-1/4" x 1-1/4" x 1/8" metal support angles continuously along the sides of exterior furring supports in locations to receive insulation. Provide intermediate angles at a maximum of 12 inches on center spanning between side angles mounted to mullions. Place angles as necessary to hold insulation a minimum of 1 inch off façade siding, but flush with the backside of the support framing.

B. Secure impaling pins to the faces of support angles at 12 inches on center. Impaling pins shall be long enough to secure both the first insulation layer between mullions and the second insulation layer covering over the first layer.

C. Impale insulation over pins and tightly fit between mullions.

D. Impale a minimum 1 inch thick second layer of insulation continuously over the first layer and the facade support system framing. Place caps over pins to secure both layers.

E. Seal joints in vapor retarder.

F. Conform to requirements of UL System No. CW-S-2001 Firespan. Coordinate with fire rated construction joint assembly components provided in Section 078500.

END OF SECTION

SECTION 072700 – AIR BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Air barrier and weather barrier systems.
   2. Filler and membrane systems required to seal joints and penetrations to form a continuous air barrier assembly.
   3. Related air barrier accessories and components.

B. Related Sections:
   1. 061000 - Rough Carpentry: Sheathing substrate.
   2. 061643 - Gypsum Sheathing: Solid sheathing substrate.
   3. 076200 - Sheet Metal Flashing and Trim: Flexible flashing provided with separate sheet metal flashing systems.

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.

D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

1.2 DEFINITIONS

A. Air Barrier: An air barrier is an assembly of interconnected components within the exterior envelope of a building which prevents air flow across the assembly, and which is intended to prevent excess moisture transfer across the assembly driven by air pressure differentials.

1.3 SYSTEM DESCRIPTION

A. All voids within air barrier systems shall be closed to prevent air flow across the assembly.

B. The following elements provided under the work of other Sections shall be considered integral parts of the air barrier assembly:
   1. Concrete foundation.
   2. Roof membrane. Plumbing vents and roof drains shall not be considered penetrations.
   3. Exterior windows and doors.

C. For the work of this Section, air barrier systems shall consist of the following:
   1. Air/moisture barrier system as specified herein.
   2. Connective seal from foundation wall to the building paper base layer.
   3. Connective seal of air/moisture barrier system to roof membrane.
   4. Sealing of penetrations in the building exterior building air barrier envelope, including windows. doors, plumbing elements, electrical elements, and mechanical components, including duct penetrations at rooftop mechanical unit.

1.4 SUBMITTALS

A. Make submittals in accordance with Section 013300.

B. Product Data: Catalog cuts and installation instructions for specified manufactured products.

1.5 QUALITY ASSURANCE

A. Applicator: Work of this section shall be performed by a single applicator, unless specifically approved otherwise by the Architect.

B. Pre-Installation Conference:
   1. Administer pre-installation conference in accordance with Section 013119.
   2. Schedule meeting prior to installation of air barrier components.
   3. Discuss air barrier components and sequence of installation.
   4. Discuss all joints and penetrations and proposed methods for sealing.
   5. Identify and discuss all special conditions.
   6. Require the attendance of the local manufacturer’s representative.

1.6 DELIVERY, STORAGE, AND HANDLING

A. In accordance with Section 016000.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Air/Moisture Barrier System: Vaproshield, LLC (Gig Harbor, WA; 866-731-7663);
   1. Weather Resistive Barrier: “Wrapshield SA”.
   2. Flashing:
      a. Liquid Flashing: “VaproLiqui-Flash”.
      b. Sheet Flashing: VaproFlashing
   3. Tape: VaproShield “VaproTape,” single or double sided, as applicable.
   4. Adhesive: VaproShield “VaproAdhesive.”
   5. Manufacturer and product are specified for construction, quality, performance and/or appearance. Provide specified product or approved equal. Alternate products shall meet or exceed the following requirements:

Construction	Triple layer spunbond polypropylene
Water Vapor Transmission	308.9 grams/m2/24hrs (50 perms)
Air Permeability	0.0095 L/s/m2 or 0.0019 cmf/ft2

B. Flexible Seal: Ethylene Propylene Diene Terpolymer (EPDM) black membrane, reinforced or non-reinforced, nominal 0.045 inch thick; complete with manufacturer's recommended splicing materials.

C. Weather-Resistive Barrier Sealant: Single component siliocone gun grade sealant; Vaproshield “VaproBond”, or Dow “758”.

D. SPF (Sprayed Polyurethane Foam) Sealant: Furnish one- or two-component, foamed-in-place, polyurethane foam sealant with the following characteristics:
   1. Density: 1.5 to 2.0 pcf.
   2. Flame Spread (ASTM E162): 25 or less.
   3. Acceptable Materials: Flexible Products.

E. Sheet Metal Closures:
   1. Minimum 24 gage prefinished galvanized steel.
   2. Custom fabricated to fit the conditions.

F. Accessories: Provide surface conditioners, primers, mastic, tape, and other accessories as specified by or acceptable to the manufacturer of each product.

G. Fasteners: Copolymer coated galvanized steel, or stainless steel.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.

B. Do not begin installation until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

3.2 INSTALLATION

A. Coordinate work with other trades as necessary to form a continuous weather-resistive barrier envelope for the building.

B. Weather-Resistive Barrier Installation:
   1. Apply single layer of weather-resistive barrier over solid exterior substrates in accordance with the manufacturer's recommendations.
   2. Tape seal all joints and penetrations with manufacturer's recommended tape.
   3. Coordinate installation of windows, metal head and subsilll flashings lapped into flexible flashings, and other wall penetrations with the installation of flexible flashing and weather-resistive barrier.
   4. Secure with staples as recommended by manufacturer.
   5. Sequence with installation of flexible flashing and metal flashing elements as shown and as necessary to form a continuous air and moisture barrier.

C. Flexible Flashing:
   1. Install flexible flashing as indicated and as specified below.
   2. Trim flexible flashing so that it will not be exposed in the finished work.
   3. Coordinate installation of flexible flashing with installation of weather-resistive barrier and sheet metal flashing elements.
   4. Install in accordance with the manufacturer's recommendations for each condition.
   5. Provide flexible flashing as indicated and in the following locations to seal joints and penetrations between weather-resistive barrier base layer and the following:
      a. Concrete foundation walls.
      b. Roof membrane.
      c. Pipe, conduit, and electrical box penetrations.
      d. Window and door frames.
   6. Provide flexible flashing at parapet tops as necessary to link to the weather-resistive sheet membrane layers on both sides of the parapet walls.
   7. Provide flexible flashing to seal the joint between sheet metal closure angles and weather-resistive barrier base layer.
   8. Provide materials separation where required and do not lap or place flexible flashing in direct contact with roofing membrane.

D. Foam Sealant:
   1. Seal holes in electrical boxes, including around wire openings.
   2. Seal penetrations which cannot be sealed with flexible flashing.
   3. Provide lightgage sheet metal angle edge trim at gypsum board edges to receive sealant.

E. Special Construction:
   1. Provide custom fabricated sheet metal enclosures around recessed light fixtures and similar elements which penetrate building weather-resistive barrier assemblies.
   2. Mechanical Curbs:
      a. Rigid insulation boards at equipment curbs are installed as a part of the roofing subcontract.
      b. Foam seal joints between rigid insulation boards. Cut boards as necessary to allow foam penetration between the boards.
      c. Foam seal joints between rigid insulation board and adjacent curb construction.
      d. After installation of rooftop mechanical unit and ducts, foam seal the joint between the rigid insulation boards and the ducts.

END OF SECTION

SECTION 074213 - METAL WALL PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes
   1. Custom fabricated wall panels composed of weathering steel.
   2. Channel furring, associated flashings and accessories.

B. Related Sections:
   1. 061000 – Rough Carpentry: Supporting structure;
   2. 076200 - Sheet Metal Flashing and Trim: Metal copings; flashing for built-up roofing.
   3. 081113 - Hollow Metal Doors and Frames.
   4. 092843 - Gypsum Sheathing.
   5. Division 22 - Plumbing: Wall-mounted mechanical units.

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.

D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. A653 - Steel Sheet, Zinc Coated, (Galvanized), or Zinc-Iron Alloy Coated by the Hot Dip Process.
   2. D226 - Asphalt-Saturated Organic Felt.
   3. D659 - Method for Evaluating Degree of Chalking of Exterior Paints.
   4. D2244 - Method for Instrumental Evaluation of Color Differences of Opaque Materials.

B. Sheet Metal and Air Conditioning Contractors National Association (SMACNA): Architectural Sheet Metal Manual.

1.3 SYSTEM DESCRIPTION

A. Metal wall panel system includes sheet metal siding system, including attachment system, furring channels, adjacent copings, and flashings.

B. Panel system shall be capable of withstanding code imposed design loads, with maximum deflection of L/180, for each loading and support condition indicated.

C. Wall panel system shall be designed and installed to preclude entrance of water into the building interior or into concealed mansard and parapet spaces, and shall drain condensation occurring within the panel system to the building exterior.

D. The wall panel system shall be capable of accommodating movement of supporting components and thermal movement of the panels, themselves, without buckling, failure of joint seals, undue stress on fasteners, and other detrimental effects.

E. System shall accommodate tolerances of the structure.

1.4 SUBMITTALS

A. Make submittals in accordance with Section 013300.

B. Product Data: Submit for all materials and proprietary systems proposed for the work.

C. Shop Drawings:
   1. Indicate material profile, dimensions, jointing details, furring, fastening methods, flashings, penetrations, and installation details.
   2. Include manufacturer's installation instructions for manufactured items incorporated in work.
   3. Indicate all flashing related to the system, including adjacent receivers and cap flashing to be provided under Section 076200.

D. Samples:
   1. Submit one sample of panel material, of sufficient size to indicate profile and color.

2. Submit sample of closure piece.

1.5 QUALITY ASSURANCE

A. Installer: Company specializing in sheet metal installation with minimum three years documented experience in sheet metal panel work similar to that of this project.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in accordance with Section 016000.

B. Stack preformed and prefinished material to prevent twisting, bending, or abrasion, and to provide ventilation.

C. Protect stored materials from heat and direct sunlight.

D. Prevent contact with materials during storage which may cause discoloration or staining.

1.7 WARRANTY

A. Furnish warranties in accordance with Section 017700.

B. Furnish manufacturer's non-prorated 20-year warranty of finish film integrity.

PART 2 - PRODUCTS

2.1 CUSTOM SHEET METAL PANEL SYSTEM

A. System shall consist of custom fabricated perforated weathering steel metal, dimensions as indicated.

2.2 SHEET MATERIALS

A. Weathering Steel: ASTM A242 or A606, as applicable; minimum 20 gage.

2.3 ACCESSORY MATERIALS

A. Furring Channels: Zee profile; 3/4 to 1 inch deep unless otherwise indicated; minimum 20 gage steel minimum ASTM A653 G90 galvanized coating.

B. Furring Channels: Approximately 2-1/2" x 7/8"hat profile; galvanized.

C. Anchorage and support members: Minimum 20 gage galvanized steel sheet, brake formed to appropriate profiles.

D. Fasteners:
   1. Exposed Applications: Galvanized steel with soft neoprene washers, factory prefinished to match panel color.
   2. Nailers, Cleats, and Other Concealed Applications: Hot dip galvanized; sizes as recommended by the roofing materials manufacturer.

E. Formed Closures: Closed cell neoprene or polyethylene foam; size and shape to match panel profile.

F. Underlayment: As specified in Section 072700.

G. Sealant: As recommended by the manufacturer of the panel materials.

2.4 FABRICATION

A. Fabricate cleats and starter strips, if required, from minimum 20-gage galvanized steel sheet material, unless heavier gage recommended for application indicated.

B. Finishing: Apply in accordance with finish material manufacturer's requirements; apply strippable film for protection during shipping, fabrication and installation.

C. Cut and form in accordance with approved shop drawings, using recognized sheet metal practices. Perform cutting with clean, sharp properly aligned shearing tools; do not saw or file edges of sheets.

D. Form pieces in longest practical lengths.

E. Corners, Trim, Metal Closure Pieces, Caps, and Associated Flashing: Same material, thickness, and finish as metal panels; preformed to required angles and profiles, in accordance with the approved shop drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work. Verify that substrate is clean and dry, that joints in sheathing are solidly supported, and that sheathing is ready for installation of sheet metal panels.

B. Do not begin installation until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of conditions as satisfactory.

C. Verify that items required to penetrate siding and soffit panels are solidly set.

3.2 PANEL INSTALLATION

A. Perform metal panel work in accordance with panel system manufacturer's instructions.

B. Verify that air barrier has been correctly installed.

C. Install furring channels horizontally through sheathing to metal framing system. Space 16" o.c. vertically, unless otherwise recommended by the manufacturer for the application.

D. Install starter strips, edge strips, flashings, and furring before starting installation of paneling and soffits.

E. Install each panel as a single continuous piece from top to bottom; securely anchor each panel at highest point; provide for thermal expansion and contraction at low points. Install flashings as required to preclude water penetration.

F. Conceal fasteners wherever possible.

G. Coordinate with work of Section 076200 for installation of copings and for metal flashing.

END OF SECTION

SECTION 074243 - COMPOSITE CLADDING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Composite wood cladding system installed in vented rain-screen application.
   2. Related sheet metal flashing.

B. Related Sections:
   1. 072700 – Air Barriers: Underlayment.
   2. 079200 - Joint Sealants: Requirements for sealants provided in this Section.

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.

D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

1.2 REFERENCES

A. American Architectural Manufacturers Association (AAMA):
   1. 2605 - Voluntary Specification for Performance Requirements and Test Procedures for Superior Performance Organic Coatings on Architectural Extrusions and Panels.

B. American Society for Testing and Materials (ASTM):
   1. E331 - Test for the Water Penetration of Exterior Windows, Curtain walls, and Doors by Uniform Static Pressure.

1.3 SYSTEM DESCRIPTION

A. Structural Design:
   1. Design system to withstand dead loads and live loads as indicated on the Structural Drawings, with a maximum deflection of L/180 or 3/4 inch which ever is less.

B. Appearance Requirements:
   1. Composite cladding system shall conform to the configurations indicated.
   2. Provide concealed anchorage systems, to the greatest extent possible. Exposed anchors, when approved, shall be finished to match adjacent materials.

C. Thermal Performance: Systems shall accommodate expansion and contraction caused by a temperature range of -20 degrees F. to 180 degrees F. without detrimental effects to components, sealing systems, and surrounding construction.

D. Watertightness:
   1. System shall remain watertight when tested in accordance with ASTM E331, at 12 psf or 20 percent of the maximum design wind pressure, whichever is greater.
   2. Provide secondary system for draining water to the exterior, including weep holes as necessary for removal of interior moisture. In addition to the primary sealant joint moisture barrier, provide secondary drainage systems to direct all water to the exterior which might come through leaks in the primary sealant joint.
   3. Wall panel system shall be designed to be vertically and horizontally vented to form an integrated “Rainscreen System.”

1.4 SUBMITTALS

A. Make submittals in accordance with Section 013300.

B. Shop Drawings:
   1. Indicate profiles, sizes, special shapes, joint configurations, colors, support framing, anchorage systems, and adjacent construction.
   2. Include elevations, plans, and orthographic projections where necessary to fully show the execution of the work.

C. Samples:
   1. Color Samples: Samples representative of each color and texture proposed for the work.
   2. Cladding Sample: Minimum of 24 inch plank.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer shall have a minimum of 5 years experience in the manufacturing of composite aluminum panels for use as an exterior architectural cladding.

B. Installer Qualifications: Minimum of 3 years' experience in the installation of composite rain screen systems similar to the one specified.

C. Code Requirements:
   1. Conform to the requirements of the International Building Code as amended by the City of Eau Claire.
   2. Furnish all calculations, engineer's stamps, drawings, and other items required by the code authorities to obtain approval of the installation.

D. Mock-ups:
   1. Provide mock-ups in accordance with Section 014500.
   2. Provide minimum 50 square foot section of the wall panel system in a location on the building as approved by the Architect.
   3. Approved mock-ups may be used in the Work.

1.6 DELIVERY, STORAGE AND HANDLING

A. In accordance with Section 016000.

B. Cover finished surfaces as necessary to prevent damage; where strippable films are provided, maintain in place until panels are installed in position.

1.7 WARRANTY

A. Submit in accordance with Section 017700.

B. Manufacturer's Performance Warranty: Manufacturer's written materials warranty for long-term performance against manufacturing defects, including checks, splinters, and delamination, or damage from rot and fungal decay.
   1. Warranty Period: 10 years from date of Substantial Completion.

C. Manufacturer's Stain and Fade Warranty: Manufacturer's written materials warranty for long-term performance against staining and color fade.
   1. Color Fade: Color change from light and weathering exposure not to exceed 5 Delta E (Hunter) units.
   2. Warranty Period: 10 years from date of Substantial Completion.

D. Submit guaranty against defects in materials and workmanship, including corrosion, coating failure, crazing, delamination, warping, chalking, fading, and other failures.

PART 2 - PRODUCTS

2.1 COMPONENTS

A. Basis of Design: ["Horizon"] ["Symmetry"]; by Fiberon, LLC.

B. Composition: Wood and plastic composite (WPC) core boards with a patented polyethylene-based capping material for superior stain, fade, and scratch resistance. Manufactured through a continuous co-extrusion process.

C. Board Thickness: 0.935 inch total thickness; 0.015 inch capping material thickness.

D. Board Width: 5.4 inches.

E. Board Length: [12 feet] [16 feet] [20 feet].

F. Board Edges: 1/8 inch edge radius.

G. Gapping: The following open joint dimensions for the rain-screen applications are required:
   1. Butted Boards: 1/4 inch to 1/32 inch open joints, depending on temperature.
   2. Edge-to-Edge Boards: 3/16 inch open joints.
   3. Boards Adjacent to Walls or Posts: 1/4 inch open joints.
   4. Boards at Roof Interface: 1 inch open joints.

H. Color: As selected by Architect].

2.2 PERFORMANCE CRITERIA

A. Structural Performance Criteria for WPC Board Cladding Assembly:
   1. General: Comply with governing building code and authorities having jurisdiction for wind load resistance for the geographical location of the Project.

B. Performance Criteria for WPC Board Cladding Product: Comply with ASTM D7031 and the following:
   1. Surface Burning Characteristics: Maximum 200 Flame Spread Index (Class C) and maximum 350 Smoke Development Index; ASTM E84 and UL 723.
   2. Self-Ignition Temperature: 743 deg F; ASTM D1929.
   3. Flash-Ignition Temperature: 698 deg F; ASTM D1929.
   4. Specific Gravity: 1.10; ASTM D792.
   5. Coefficient of Thermal Expansion: 1.67 x 10-5 in/in/deg F; ASTM D6341.
   6. Modulus of Elasticity: 456,000 psi; ASTM D6109.
   7. Modulus of Rupture: 3,500 psi; ASTM D6109.
   8. Flexural Rigidity: 971 lbs. ultimate load, 225 lbs. load at L/180 deflection, and EI 116,200 lb-in2. Tested according to ASTM D7032 and ASTM D6109.
   9. Creep Recovery: 84 percent average recovery with maximum unrecovered deflection not to exceed 1/16 inch for 151 lb. test load; ASTM D7032.
   10. Maximum Load Deflection: Less than 0.120 inch; ASTM D7032.
   11. UV Resistance: Successfully passed after 2000 hours of Xenon-Arc exposure. Tested according to ASTM D2565 Cycle 1.
   12. Fungus Decay Resistance: No significant decay; AWPA E10.
   13. Termite Resistance: Passes; AWPA E1.
   14. Fastener Performance: Minimum 367 lbs.; ASTM D1761.
   15. Delamination - Submersion Test: No delamination after 30 days when tested fully submerged in water at 70 deg F and 150 deg F.
   16. Delamination - High Heat and Humidity Test: No delamination after 30 days suspended directly above, but not immersed into, 150 deg F water.
   17. Delamination - Soak/Freeze/Thaw Test: No delamination after 50 soak/freeze/thaw cycles. Soak in room temperature water, freeze for a minimum 4 hours, thaw, and repeat.

C. Performance Criteria for Mechanical Fasteners:
   1. Pull-Through Resistance: 167 lbs. minimum; ASTM D1761 and ASTM D7032.
   2. Withdrawal Capacity: 196 lbs. minimum; ASTM D1761 and ASDTM D7032.

2.3 MISCELLANEOUS MATERIALS

A. General: Provide miscellaneous materials as recommended by the RVFS manufacturer.

B. Fasteners: Type [304] [316] stainless steel or polymer-coated composite decking screw fasteners complying with ASTM C1002. Minimum #8 by 2-1/2 inch length for face fasteners and #8 by 2-3/4 inch length for WPC board ends.
   1. ACQ Rated Fasteners: Provide fasteners acceptable for alkaline copper quaternary (ACQ) pressure preservative treated wood attachment substrates.
   2. Polymer-Coated Screw Fasteners: Comply with ASTM B117 for corrosion-resistance.

2.4 ACCESSORIES

A. Air Barrier/Underlayment System: As specified in Section 072700.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.

B. Do not begin installation until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

3.2 PREPARATION

A. Air Barrier/Underlayment System: Verify that air barrier/underlayment has been installed in compliance with Section 072700.

3.3 INSTALLATION

A. Coordinate installation of support framing as necessary to accommodate composite cladding system.

B. Install support systems and panels level, plumb, and aligned in relation to adjoining construction.

C. Install system in accordance with the manufacturer's instructions and as indicated on the approved Shop Drawings.

D. Install flashings to divert all moisture to the exterior.

E. Tolerances:
   1. Joint Tolerances: 1/2" + or - 1/8".
   2. Variation from Plane: 1/8 inch in 10 feet maximum.
   3. Erect work plumb, level, and true to line within a tolerance of 1/8 inch in 10 feet maximum
   4. Misalignment of Two Adjoining Members Abutting in Plane: 1/16 inch.

F. Seal joints as specified in 079200.

G. Touch-up all damage coatings with materials to match the original coating. Remove and replace with new all damaged components which cannot be repaired as determined by the Architect.

3.4 PROTECTION

A. Protect installed panels from damage.

B. Provide protective coverings for panels at corners and other areas subject to possible damage from subsequent construction operations. Remove protective coverings prior to Substantial Completion.

END OF SECTION

SECTION 074456 - MINERAL-FIBER-REINFORCED CEMENTITIOUS PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Exterior siding and soffits.
   2. Exterior trim.
   3. Related flashings, accessories, and fastenings.

B. Related Sections:
   1. 061000 - Rough Carpentry: Substrate.
   2. 072700 – Air Barriers: Weather barrier as drainage plane and flexible flashing.
   3. 076200 - Sheet Metal Flashing and Trim: Metal flashing..
   4. 079200 - Joint Sealants: Joint fillers.
   5. 099000 - Painting: Finishing of panel siding.

C. Drawings, the provisions of the Agreement, including bonds and certificates, the General Conditions, and Division 1 specification sections apply to all work of this Section.

D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

1.2 SUBMITTALS

A. Make submittals in accordance with Section 013300.

B. Submit product data for panel siding, including installation instructions.

1.3 DELIVERY AND STORAGE

A. Deliver products to site under provisions of Section 016000.

B. Wood materials shall be allowed to acclimate to the site prior to work under this section. Wood materials shall be stored, stickered, and under cover at the site for a minimum of seven days prior to priming, finishing and installation.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. As specified: James Hardie Building Products (800/942-7343).

B. Alternate Manufacturers: Subject to compliance with requirements, products by the following may be considered by substitution request.
   1. Cemplank, Inc. (877/236-7526)
   2. CertainTeed Corp. (800/233-8990)

2.2 MATERIALS

A. Fiber Cement Lapped Siding: "Hardiplank," 5/16" thick, smooth finish; width as indicated.

B. Fiber-Cement Panel Siding:
   1. "Hardipanel"; 5/16" thick, smooth surface.

C. Fiber Cement Soffit Panels:
   1. "Hardisoffit," smooth surface.

2.3 ACCESSORIES

A. Siding Screws: “Dacrotized”, “Rustpert”, or hot dip galvanized; ribbed bugle-head; self tapping for steel framing; sufficient length to penetrate metal framing a minimum of 1/2 inch.

B. Weather Barrier: As specified in Section 072700.

C. Flexible Flashing: As specified in Section 072700.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this section may properly commence. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.

B. Do not begin installation until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

3.2 INSTALLATION

A. Weather Barrier: Verify that weather barrier has been installed in accordance with Section 071433.

B. Install metal flashings at sills, and head of wall openings to ensure water flow to the exterior. Provide "Z" and drip flashing at non-lapping horizontal joints to prevent water penetration.

C. Flexible Flashing:
1. Provide 6 inch wide flexible flashing strips at all penetrations.
2. Lap to the frame of the penetrating element as necessary seal perimeter joint, but not so that the membrane will be exposed in the finished work.
3. Install strips in sequence; first at the sill, next at the jamb, and last at the head condition. Lap all strips to weather.
4. Integrate flexible flashing with building paper and related metal flashing as necessary to shed water and lap to weather.

D. General Installation Requirements for Panel Siding:
1. Install in accordance with manufacturers specific recommendations for non-shear installation.
2. Install using screws into framing.
3. Arrange components to encourage watershed. Securely fasten in place, aligned, level, and plumb. Cut panel ends over bearing surfaces.
4. Exercise care when site cutting. Cut edges shall be smooth and clean.
5. Allow 1/8 inch space for sealant at adjacent construction and between panels.
6. Use single full sheets to the greatest extent possible to minimize joints..
7. Fabricate exposed surfaces of special shapes to a uniform profile free of saw marks and other surface irregularities.
8. Components shall be plumb and level unless indicated otherwise.

END OF SECTION

SECTION 075429 – MECHANICALLY ANCHORED SINGLE-PLY THERMOPLASTIC ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Mechanically anchored thermoplastic membrane roofing system.
   2. Roof insulation and cover board.

B. Related Sections:
   1. 076200 - Sheet Metal Flashing and Trim: Factory prefinished flashings.

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.

D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

1.2 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.

1.3 PERFORMANCE REQUIREMENTS

A. Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.

B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience.

C. Performance: Roofing system shall conform to the following:
   1. Wind Uplift: Factory Mutual 1-90.
   2. Fire: Underwriter's Laboratory Class B.
   3. Thermal: System shall have a maximum thermal conductance of C = .034 Btuh, averaged over all surfaces to which it is applied.

1.4 SUBMITTALS

A. Make submittals in accordance with Section 013300.

B. Product Data: For each type of product and component proposed, including membrane, insulation, fasteners, and accessories.

C. Shop Drawings:
   1. Details for base flashings, membrane terminations, and penetration details.
   2. Tapered insulation patterns, including slopes, insulation thickness, cricket layouts.
   3. Insulation fastening patterns.
   4. Traffic walkway layouts.

D. Quality Control Submittals:
   1. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.
   2. Guarantee Draft: Concurrent with initial product data submittal, submit a draft of roof guarantee.
   3. Manufacturer’s installation specifications.

E. Contract Closeout Submittals:
   1. Maintenance Data: For roofing system to include in maintenance manuals.
   2. Warranties: Submit specified warranties.
   3. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.

B. Source Limitations: Obtain components for membrane roofing system from or approved by roofing membrane manufacturer.

C. Pre-Installation Meeting:
   1. Prior to ordering materials and starting the work of this Section administer a pre-roofing meeting.
   2. Require in attendance the following parties:
      a. Owner
      b. Architect
      c. General Contractor
      d. Roofing installer
      e. Sheet metal installer
      f. Mechanical installer.
      g. Roofing manufacturer's representative
   3. Agenda: Review all procedures, details, and sequence of construction. Discuss and determine responsibility for protection of the work during and after construction, and subsequent maintenance of the roofing system.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.7 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.8 WARRANTY

A. Manufacturer's Guarantee: Prior to acceptance of work, furnish manufacturer's written 10 year no dollar limit guarantee executed to the Owner. Guarantee shall include workmanship and materials, and shall cover roofing, flashing, and insulation.

PART 2 - PRODUCTS

2.1 THERMOPLASTIC ROOFING MEMBRANE

A. Fabric-Reinforced Thermoplastic Polyolefin or Ethylene Propylene Sheet: Uniform, flexible sheet formed from a thermoplastic polyolefin, internally fabric or scrim reinforced, and as follows:
   1. Approved Manufacturers:
      a. Stevens Roofing Systems; Div. of JPS Elastomerics.
      b. Firestone Building Products Company.
      c. Carlisle SynTec Incorporated.
   2. Thickness: 60 mils nominal.

3. Exposed Face Color: White.
4. Physical Properties:
   a. Breaking Strength: 225 lbf (1 kN); ASTM D 751, grab method.
   b. Elongation at Break: 15 percent; ASTM D 751.
   c. Tearing Strength: 55 lbf (245 N) minimum; ASTM D 751, Procedure B.
   d. Brittleness Point: Minus 22 deg F (30 deg C).
   e. Ozone Resistance: No cracks after sample, wrapped around a 3-inch- (75-mm-) diameter mandrel, is exposed for 166 hours to a temperature of 104 deg F (40 deg C) and an ozone level of 100 pphm (100 mPa); ASTM D 1149.
   f. Resistance to Heat Aging: 90 percent minimum retention of breaking strength, elongation at break, and tearing strength after 166 hours at 240 deg F (116 deg C); ASTM D 573.
   g. Water Absorption: Less than 4 percent mass change after 166 hours' immersion at 158 deg F (70 deg C); ASTM D 471.
   h. Linear Dimension Change: Plus or minus 2 percent; ASTM D 1204.

2.2 ACCESSORY MATERIALS

A. General:
   1. Accessory materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.
   2. Liquid-type accessory materials shall meet VOC limits of authorities having jurisdiction.

B. Sheet Flashing: Manufacturer's standard unreinforced thermoplastic polyolefin or ethylene propylene sheet flashing, 55 mils thick, minimum, of same color as sheet membrane.

C. Bonding Adhesive: Manufacturer's standard solvent based bonding adhesive for membrane, and solvent-based bonding adhesive for base flashings.

D. Cut Edge Sealant: Manufacturer's standard solvent based caulk to seal cut edges.

E. Slip Sheet: Manufacturer's recommended slip sheet, of type required for application.

F. Metal Termination Bars: Manufacturer's standard predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.

G. Metal Battens: Manufacturer's standard aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch (25 mm) wide by 0.05 inch (1.3 mm) thick, prepunched.

H. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.

I. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, termination reglets, cover strips, seam cleaners, and other accessories.

2.3 ROOF INSULATION

A. Polyisocyanurate Insulation: Closed cell polyisocyanurate foam roof insulation board with fiberglass facers on both sides; ASTM C1289; acceptable to the roofing membrane manufacturer, and as listed to meet warranty requirements; Thermal performance calculations shall be based on thermal resistance values not to exceed 5.56 R per inch (conductivity k=0.18) for polyisocyanurate insulations (PIMA 101 6 month conditioned R values will not be accepted).

B. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches, unless otherwise indicated.

C. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

2.4 INSULATION ACCESSORIES

A. Provide roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.

C. Cover Board: ASTM C1177/ C1177M, glass-mat, water-resistant gypsum substrate, 1/4 inch thick; "Dens-Deck" by Georgia-Pacific Corporation.

2.5 WALKWAYS

A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, ~~solid-rubber,~~ slip-resisting, surface-textured walkway **rolls**, approximately 3/16 inch (5 mm) thick, and acceptable to membrane roofing system manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Carefully examine substrate and adjacent construction, and verify that conditions are suitable for installation of the work as indicated and specified. Inspection shall ascertain that:
   1. All surfaces to be covered by roofing are properly pitched to drain, suitable for installation of roofing system free from susceptibility to puddling.
   2. Work of other trades is complete, including installation of blocking and grounds, vents, drains, curbs, and other projections.
   3. Substrate surface is clean and free from lumps, foreign matter, surface spalling or flaking, and excessive amounts of dust.
   4. Penetrations through the roof deck are properly configured and are a minimum of 16 inches between their closest edges.
   5. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place.
   6. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.

3.2 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.3 INSULATION INSTALLATION

A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with membrane roofing system manufacturer's written instructions for installing roof insulation.

C. Install tapered insulation under area of roofing to conform to slopes indicated.

D. Install one or more layers of insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2 inches or greater, install 2 or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.

E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.

G. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

H. Mechanically Fastened Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.

I. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Stagger joints from joints in insulation below a minimum of 6 inches in each direction. Loosely butt cover boards together and fasten to roof deck. Fasten to resist uplift pressure at corners, perimeter, and field of roof.

3.4 MECHANICALLY FASTENED ROOFING MEMBRANE INSTALLATION

A. Install roofing membrane over area to receive roofing according to roofing system manufacturer's written instructions. Unroll roofing membrane and allow to relax before installing.

B. Accurately align roofing membranes and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

C. Mechanically or adhesively fasten roofing membrane securely at terminations, penetrations, and perimeter of roofing.

D. Apply roofing membrane with side laps shingled with slope of roof deck where possible.

E. Seams: Clean seam areas, overlap roofing membrane, and hot-air weld side and end laps of roofing membrane according to manufacturer's written instructions to ensure a watertight seam installation.
   1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roofing membrane.
   2. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
   3. Repair tears, voids, and lapped seams in roofing membrane that does not meet requirements.

F. Spread sealant or mastic bed over deck drain flange at deck drains and securely seal roofing membrane in place with clamping ring.

G. In-Splice Attachment: Secure one edge of roofing membrane using fastening plates or metal battens centered within membrane splice and mechanically fasten roofing membrane to roof deck. Field-splice seam.

3.5 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.

B. Apply solvent-based bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with sheet flashing.

D. Clean seam areas and overlap and firmly roll sheet flashings into the adhesive. Weld side and end laps to ensure a watertight seam installation.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.6 WALKWAY INSTALLATION

A. Flexible Walkways: Install walkway products in locations indicated. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.7 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform roof tests and inspections and to prepare test reports.

B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.
   1. Notify Architect or Owner 48 hours in advance of date and time of inspection.

C. Repair or remove and replace components of membrane roofing system where test results or inspections indicate that they do not comply with specified requirements.

D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.8 PROTECTING AND CLEANING

A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates, and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

END OF SECTION

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Sheet metal flashing and trim.
   2. Requirements for flashing and sheet metal provided in other Sections.

B. Related Sections:
   1. 030013 - Concrete: Installation of embedded reglets.
   2. 042200 - Concrete Unit Masonry.
   3. 061000 - Rough Carpentry: Wood blocking, nailers, and grounds.
   4. 075429 - Mechanically Anchored Single Ply Thermoplastic Roofing: Coordination of flashing installation; installation of lead drain flashing, flexible boot flashing, and vent flashing; pre-installation conference.
   5. 084113 - Aluminum-Framed Storefronts and Entrances: Flashing provided as part of the window and storefront system.
   6. 099000 - Painting: Field painting of flashings.

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.

D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM)
   1. A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
   2. A653 - Steel Sheet, Zinc Coated, (Galvanized), or Zinc-Iron Alloy Coated by the Hot Dip Process.
   3. A792 – Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process]
   4. B32 - Solder Metal

B. Federal Specifications (FS): FS SS-C-153 - Cement, Bituminous, Plastic.

C. Sheet Metal and Air Conditioning Contractors National Association (SMACNA): Architectural Sheet Metal Manual, Sixth Edition 2003.

1.3 SYSTEM DESCRIPTION

A. Provide flashing and trim systems to prevent water leakage to the building interior.

B. Fastening systems shall allow for the thermal movement of the materials without buckling, loosening, and leakage.

1.4 SUBMITTALS

A. Make submittals in accordance with Section 013300.

B. Product Data: Catalog cuts and installation instructions for manufactured products.

C. Shop Drawings: Indicate materials, gages, profiles, jointing patterns, jointing details, fastening methods, and installation details. Include schedule of each type and profile of flashing to be furnished for instillation under Section 042113.

D. Samples: Submit three samples representative of finish and color of prefinished flashing materials.

1.5 QUALITY ASSURANCE

A. Applicator: Company specializing in sheet metal flashing work with 5 years minimum experience.

B. Unless indicated or specified otherwise, perform work in accordance with the recommendations of SMACNA.

C. Pre-Installation Conference: Attend pre-installation conference as specified in Section [013119].

1.6 DELIVERY, STORAGE, AND HANDLING

A. In accordance with Section 016000.

B. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation.

C. Prevent contact with materials during storage which may cause discoloration, staining, or damage.

1.7 GUARANTEE

A. Submit in accordance with Section 017700.

B. Furnish guarantee from the installer of each system that metal flashings will properly shed water to the roof or to the building exterior, under all weather conditions, for a minimum period of two years from the date of Substantial Completion. Leaks due to failure of flashing materials, and due to improper installation shall be promptly repaired at no expense to the Owner, and that watertightness of the repair will be demonstrated to the Owner.

C. For coil-coated sheet metal materials, furnish from the coatings installer non-prorated 20-year warranty against failure of film integrity, and against fade and chalking.

PART 2 - PRODUCTS

2.1 SHEET MATERIALS

A. Prefinished Galvanized Steel Sheet:
   1. ASTM A653 steel sheet with G90 galvanized coating or ASTM A792 steel sheet with AZ60 aluminum/zinc coating; 24 gage unless noted otherwise; factory prefinished with 70 percent resin Kynar 500 or Hylar 5000 coating, standard color as selected by the Architect .
   2. Manufacturers:
      a. AEP-Span, Dallas TX; (214-827-1740; 800-527-2503).
      b. Centria, Moon Township PA (800-759-7474).
      c. Copper Sales, Inc., Minneapolis, MN (612-545-1604; 800-426-7737).

B. Pre-primed Steel Sheet for Shop Applied Paints: ASTM A653; G90 galvanized finish; 24 gage unless noted otherwise; Factory applied epoxy coating to receive field and shop applied paint finishes; available from Pacific Metals (800-777-4544).

C. Stainless Steel: ASTM A167; Type 302 or 304.

2.2 ACCESSORIES

A. Epoxy/Urethane System:
   1. Epoxy Primer: Tnemec Series 69 Hi-Build Epoxoline, Carboline 888, Ameron "Amercoat 385," or approved.
   2. Urethane Finish Coats: Tnemec Series 75 "Endura-Shield III" Acrylic Polyurethane Enamel, Carboline "D833," Ameron "Amercoat 450SA," or approved; semi-gloss or satin sheen; custom colors as selected by the Architect.]

B. Curbs:
   1. One of the following:
      a. Roof Products and Systems Corporation (RPS) (Bensenville, IL; 800-624-8642)."EC-2A."
      b. ThyCurb (Farmers Branch, TX; 800-777-2872) "TC-3."
   2. Description:
      a. Box section design, constructed using minimum 18 gauge galvanized steel, with fully mitered and welded corners).
      b. Internally reinforced on any side longer than 3'-0" with factory internal base plate.
      c. Curbs shall be insulated with 1 1/2" thick 3lb. density fiberglass insulation, and shall have factory installed wood nailers fastened from underside. Height to be 8" above the finished roof or as detailed.
   3. Flashing, Packing And Sealant: Provided under Division 23.

C. Fasteners:
   1. Furnish bonded stainless steel / neoprene sealing washers for exposed applications.
   2. Finish exposed fasteners to match material being fastened.
   3. Material:
      a. Galvanized Steel Sheet: Use galvanized steel or stainless steel.
      b. Aluminum Sheet and Stainless Steel: Stainless Steel.
   4. Use screws when fastening into wood or sheet metal.
   5. Use expansion anchors or drive pins when fastening into concrete or masonry.

D. Sealants:
   1. Butyl Rubber Type (Bedding Applications) - One of the Following:
      a. "Butyl Sealant" by Tremco, Inc. Sealant/Weatherproofing Division; Beachwood, OH; 800-321-7906; 216-292-5000)
      b. "BP-400" by Adco Global, Inc. (800-248-4010).
   2. Polyurethane Sealant (Exposed Applications) - One of the Following:
      a. "Chem-Calk 900" by Bostik Construction Products (Huntington Valley, PA; 800-221-8726; 215-674-5600).
      b. "Dynatrol I" by Pecora Corp. (Harleysville, PA; 800-664-7903; 215-799-7528).
      c. "Sonolastic NP I" by Sonneborn/ChemRex (Shakopee, MN; 800-433-9517; 952-496-6000).]

E. Reglets:
   1. Fry Reglet Co or approved; configurations as indicated.
   2. Galvanized steel with factory applied Kynar coating .
   3. For reglets to be embedded in concrete provide covered ends to prevent infiltration.
   4. Provide stainless steel drive pins and neoprene gaskets for surface applied reglets.

F. Solder: ASTM B32.

G. Cold Galvanizing Compound: ZRC Worldwide, "ZRC Cold Galvanizing Compound," or approved product meeting the requirements of FS DOD-P-21035.

H. Flexible Boot Pipe Flashing: Portals Plus (708/766-5240; 800/774-5240) "Alumi-Flash" with EPDM boots, or approved; sized to match pipe diameter; split type with sealing hardware where necessary for installation at penetrating items which cannot be disconnected for top access. Furnish stainless steel draw bands, adapters, connection hardware, and sealants as necessary for a complete and weather tight installation.

I. Flexible Flashing: "Grace Ultra," by W.R. Grace (800-354-5414), or approved.

J. Slip Sheet: Rosin sized building paper.

K. Splashblocks: Precast concrete; approximately 12" wide x 18" long, with channel depression to distribute water from downspouts onto roof surface.

2.3 FABRICATION

A. General Requirements:
   1. Field measure site conditions prior to fabricating work.
   2. Form sections true to shape, accurate in size, square, and free from distortion or defects.
   3. Fabricate cleats and starter strips of same material as sheet; interlockable with sheet.
   4. Form pieces in longest practical lengths, except as limited by expansion joint requirements.
   5. Non-Moving Joints: Shop fabricate to the greatest practical extent.
      a. Solder all non-moving shop fabricated joints in steel and stainless steel flashing; [weld all non-moving joints in aluminum flashing and trim;]
      b. Prefinished Galvanized Steel: Lap joints 1 inch, minimum; accurately cut and fit as necessary to maintain profile; embed contact surfaces in sealant; rivet with stainless steel or color matched coated steel pop rivets at 3 to 4 inches o.c.
   6. Hem exposed edges on underside 1/2 inch; miter and seam corners.
   7. Shop fabricate corner sections with non-moving corner joints and 18 inch long legs.
   8. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.
   9. Form seams lapped in the direction of water flow.

B. Fabricate all flashing to detail, in accordance with referenced SMACNA Architectural Sheet Metal Manual details, and as specified below. Use minimum 24 gage prefinished galvanized steel sheet unless indicated or specified otherwise.
   1. Parapet Caps (Copings): Fabricate with slotted holes at 24 inches on center for fastening at the back; standing seam (design J8) joints per Table 3-1; 22 gage for copings wider than 18 inches.
   2. Scuppers: 20 gage stainless steel sheet; soldered joints; dull finish.
   3. Counterflashing and Receivers: Removable type; SMACNA Fig 4-4 snaplock or screw-retained configuration; shop fabricated corners; crimped ends to permit lapping at end-to-end joints; 1 Inch at receivers; 3 inches at counterflashing.
   4. Lead Drain Flashing: Dimension for minimum 12 inches between edge of drain and edge of flashing, all around; furnish in one continuous piece, including at drain/overflow locations. Furnish to roofer for installation in the roofing system at the drains.
   5. Pipe Penetrations: SMACNA plate Fig 4-15, B or C as applicable; provide two piece flashing at 4-15B. Provide flexible boot pipe flashing at the locations indicated. Furnish to roofer for installation in the roofing system.
   6. Embedded Flashing: Fabricate embedded flashing with provisions for removable counter flashing (SMACNA Figure 4-4 snaplock or screw-retained configuration; shop fabricated corners). Fabricate all receivers and flashings which are built into brick veneer, precast concrete, cement plaster, and other similar construction, of 24 gage stainless steel. Fully exposed and removable counter flashing which is connected to embedded flashing may be 24 gage prefinished galvanized sheet. Supply embedded flashing to the appropriate installers for installation as a part of their Work.
   7. Wind Clips: 20 gage x 2 inches wide. Match material and finish of flashing being retained.

C. Shop Finishes:
   1. Polyurethane Special Finish:
      a. Prepare surface in accordance with the manufacturer's recommendations.
      b. Primer: Spray apply in accordance with manufacturer's current printed instructions, 2 to 3 mils over previously primed surfaces, 4 to 6 mils over pretreatment primer and unprimed surfaces.
      c. Finish: Spray apply in accordance with manufacturer's current printed instructions to finish film thickness of to mils finish film thickness.
      d. Locations: Provide at flashings which, because of fabrication requirements or size limitations, prefinished steel is prohibitive.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.

B. Do not begin installation until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

3.2 INSTALLATION

A. Coordinate and sequence flashing installation with the work of other Sections. Furnish flashing to other trades as necessary for installation as a part of the work of other Sections.

B. Use flexible flashing in locations indicated, and under all copings and curb flashings.

C. Install starter and edge strips, and continuous cleats before starting installation.

D. Fastening:
   1. Secure flashings using continuous cleats whenever possible. Use exposed fasteners only at the backside of copings, and at other locations not exposed to public view, unless otherwise approved by the Architect.
   2. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
   3. Insert counterflashings into receivers to form tight fit; where snap fit is not provided, secure in place with stainless steel sheet metal screws, 16" o.c., maximum. Stagger counterflashing joints with receiver joints
   4. Insert flashings into reglets to form tight fit; secure in place.

E. Make watertight connections between scuppers and adjacent roofs, walls, and flashings. Seal all laps.]

F. Joints:
   1. Install metal flashings (including embedded flashings and reglets) with provision for plus or minus 1/16 inch thermal movement at each end; provide expansion joints at 12'-0" o.c., maximum.
   2. Seal concealed lap joints in with two parallel beads of butyl sealant; use butyl sealant where bedding sealant is indicated or required.

3.3 FIELD TESTING

A. Upon request of the Architect, demonstrate that installation is completely watertight by hosing with water as directed.

END OF SECTION

SECTION 077233 - ROOF HATCHES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Roof access hatch.
   2. Retractable safety post.
   3. Safety railing system.

B. Related Sections
   1. 099000 - Painting: Painting of preprimed accessories.

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.

D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

1.2 SUBMITTALS

A. Make submittals in accordance with Section 013300.

B. Product data.

PART 2 - PRODUCTS

2.1 ROOF ACCESS HATCH

A. Manufacturer: The Bilco Company (New Haven CT; 203-934-6363), or Milcor, Inc. (Lima OH; 419-228-1411; 800-528-1411).

B. Type: Bilco "NB-50" or Milcor "RD-2."

C. Curb: 11 gage aluminum with 1 inch rigid insulation; integral cap flashing to receive roof flashing system; extended flange for mounting.

D. Cover: 11 gage aluminum with minimum one inch glass fiber insulation retained by inner aluminum liner. Continuous gasket to provide weatherproof seal.

E. Size, Configuration: 30 x 36 inch nominal size, single leaf type.

F. Hardware: Manufacturer's standard manually operated type with compression spring or torsion bar counterbalance, positive snap latch with turn handles inside and out and padlock hasps; automatic hold-open arm with grip handle for easy release.]

G. Hinges: Manufacturer's standard heavy duty zinc-plated pintle type.

H. Provide for removal of condensation.

2.2 ACCESSORIES

A. Retractable Safety Post: Bilco "LadderUp" Safety post or approved; black enamel steel finish.

B. Safety Railing System:
   1. Manufacturer: The Bilco Company (New Haven CT; 203-934-6363).
   2. Model: “Bil-Guard 2.0” Roof Hatch Railing System
      a. Non-roof-penetrating.
      b. Safety yellow powder coat.

PART 3 - EXECUTION

3.1 INSPECTION

A. Verify that deck openings, supports, and other items affecting the work of this Section are complete and positioned correctly.

B. Do not begin installation until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

3.2 INSTALLATION

A. Install components in accordance with manufacturer's instructions, and as indicated. Coordinate with roofing system installer, and other trades as necessary to ensure secure and watertight installation.

B. Mount safety post to access ladder beneath roof hatch in accordance with manufacturer's recommendations.

END OF SECTION

SECTION 078400 - FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Firestopping systems for sealing penetrations through fire-rated construction.

B. Related Sections:
   1. 014500 – Quality Control: Requirements for Owner paid inspections.]
   2. 078500 - Fire Rated Joint Assemblies: Fire rated fillers at fire rated building joint assemblies
   3. Division 22 Mechanical: Penetrating elements.
   4. Division 23 Electrical: Penetrating elements.

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. E119 - Method for Fire Tests of Building Construction and Materials.
   2. E814 - Methods for Fire Tests of Through-Penetration Fire Stops.

B. Underwriters Laboratories (UL): 1479 - Fill, Void or Cavity Materials and Through-Penetration Firestop Systems.

1.3 SYSTEM DESCRIPTION

A. Each firestopping system shall be selected to maintain fire rating of the assembly in which it is used.

B. Firestopping systems shall be resilient as necessary to accommodate differential movement between assemblies.

C. Where firestopping is used to seal penetrations through floors with waterproof membranes, system shall be selected for compatibility with membrane material.

1.4 QUALITY ASSURANCE

A. Code Verification: Prior to installation of fire stopping systems obtain approval from the jurisdictional code authorities for the fire stopping systems and applications proposed.

B. Firestopping: Tested in accordance with ASTM E119, ASTM E814, or UL 1479 to meet the hourly fire ratings of the construction being sealed. Provide F rated assemblies, except where T rated assemblies are required by the code authority.

C. Firestopping systems shall be UL assemblies.

D. Subcontractor Qualifications: Firestopping work shall be performed by a single firestopping subcontractor, specializing in the installation of firestopping systems.

E. The firestopping systems shall be subject to Owner paid inspection.

F. Develop and maintain a system to quickly and easily identify each firestop assembly in the Project. The system shall include a graphic picture of each fire rated assembly being used. Make the system readily available to the Building Inspector, the Architect, and the Owner paid inspector.

1.5 DELIVERY, STORAGE, AND HANDLING

A. In accordance with Section 016000.

1.6 ENVIRONMENTAL CONDITIONS

A. Environmental Requirements: Comply with manufacturer's recommendations.

B. Maintain maximum ventilation to remove volatile emissions produced during the installation process.

PART 2 - PRODUCTS

2.1 FIRESTOPPING SYSTEMS

A. All products shall comply with maximum VOC requirements in accordance with Section 013546.

B. Systems meeting the requirements specified and suitable for the conditions indicated as manufactured by one or more of the following.
   1. Metacaulk.
   2. Tremco Inc.
   3. Hilti USA.
   4. Grace Construction Products.
   5. Specified Technologies, Inc.
   6. 3M.

C. Electrical Box Inserts:
   1. Manufacturer: Rectorseal (Houston TX; 713-263-8001; 800-231-3345).
   2. Fire Rated Pads: "BioFireshield LECTRA-STOP"; 1/4 inch thick intumescent pads; sized to fit electrical boxes; classified by UL; minimum 2 hour rating.

D. Systems with sodium silicate shall not be used.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.

B. Do not begin installation until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

3.2 INSTALLATION OF FIRESTOPPING

A. Provide firestopping at mechanical, electrical, and plumbing penetrations through fire rated floors, walls, and ceilings, and other locations as indicated on the Drawings.

B. Install firestopping in accordance with the manufacturer's recommendations and as necessary to meet the specified fire rating requirements.

C. Where firestopping is used to seal around penetrations through waterproof membranes, install to maintain integrity of waterproof barrier.

D. For sealing electrical boxes, coordinate installation with Division 16. Comply with manufacturer's recommendations for preparation and installation. Install in locations as required by Code for protection of openings through fire rated partitions.

3.3 CLEANING

A. Trim excess material flush with adjacent surface.

B. Remove spills, leave area in undamaged, clean condition.

END OF SECTION

SECTION 078500 - FIRE RATED JOINTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Fire rated construction joint assemblies in fire-rated construction, including joints at the following locations:
      a. Where partition heads meet the underside of overhead floor or roof construction.
      b. Where floor and roof construction meets exterior perimeter wall construction.
      c. Joints in fire rated concrete or masonry walls.
   2. Requirements for fire rated construction joint assembly components provided in other Sections.

B. Related Sections:
   1. 078100 - Applied Fireproofing: Coordination.
   2. 078400 - Firestopping: Fire rated assemblies at penetrations in fire rated construction.
   3. 092200 – Lightgage Metal Support Framing: Integral elements.
   4. 092900 - Gypsum Board: Integral elements.

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.

D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM): E119 - Method for Fire Tests of Building Construction and Materials

B. Underwriters Laboratories (UL): Standard 2079 - Tests for Fire Resistance of Building Joint Systems.

C. International Building Code (IBC)

1.3 SUBMITTALS

A. Make submittals in accordance with Section 013300.

B. Submit product data for proprietary fire rated materials and components.

C. Submit drawings of each fire rated construction joint assembly proposed, showing all components and installation details. Include test number.

1.4 SYSTEM DESCRIPTION

A. Each fire rated construction joint assembly shall be selected to maintain fire rating of the assembly in which it used.

B. Each fire rated construction joint assembly shall be resilient as necessary to accommodate differential movement between assemblies.

1.5 QUALITY ASSURANCE

A. Fire Rated Joint Assemblies: Successfully tested in accordance with ASTM E119 as applicable, to meet the hourly fire ratings of the construction being sealed.

B. Fire rated joint assemblies at partition heads shall have been tested in accordance with the dynamic requirements of UL 2079, including hose stream test.

C. Perimeter Fire-Resistive Joint Systems: For joints between edges of fire-resistance-rated floor assemblies and exterior curtain walls, provide systems of type and with ratings in accordance with

1.6 DELIVERY, STORAGE, AND HANDLING

A. In accordance with Section 016000.

1.7 ENVIRONMENTAL CONDITIONS

A. Environmental Requirements: Comply with manufacturer's recommendations for components.

B. Where applicable, maintain maximum ventilation to remove volatile emissions produced during the installation process.

PART 2 - PRODUCTS

2.1 FIRE RATED CONSTRUCTION JOINT ASSEMBLIES

A. Fire Rated Head Track Assembly: Design for minimum ±1 inch deflection.
   1. Basis of Design: Fire Trak Corporation (Kimball MN; 612-398-7800) "Fire Trak Shadowline."
   2. Acceptable Options (subject to compliance with Contract Document requirements and Architect's approval of conformance to design intent, including equivalent UL listing and deflection capacity):
      a. Dietrich Metal Framing, Inc. (Pittsburgh, PA; 412-281-2805) "SLP-TRK® Sliptrack System."
      b. Total Steel Solutions (Kimball, MN; 877-294-7958) "Snap Trak."
      c. Steeler Inc. (Seattle WA; 206-725-2500; 800-275-2279) "Slotted Stud" "Head of Wall (HD-W) System."
      d. Cemco (Denver, CO; 800.775.2362) "FireStik."
      e. Brady Construction Innovations, Inc. 888-475-7875
      f. Systems by other manufacturers, or non-proprietary field assemblies may be substituted, subject to prior approval of substitution request, including complete description of proposed components, documentation of assembly deflection capacity, and applicable UL design numbers.
   3. Gypsum Board: As specified in Section 092900.
   4. Forming Material: As recommended by the assembly manufacturer.
   5. Fill, Void, or Cavity Material: As listed in the UL assembly indicated on the Drawings.

B. Metal Stud Partition Head Construction Joint Assembly: Based on UL assemblies listed on the Drawings.
   1. Fire Rated Runner: Conform to Section 092200; minimum 20 gage; minimum 2 inch legs.
   2. Gypsum Board: As specified in Section 092900.
   3. Restraining Angles: As specified in Section 092200.
   4. Fill, Void, or Cavity Material: USG Type FC "Fire Code" compound.
   5. Forming Material: 4 lbs/cf density; “Thermafiber” Safing insulation by USG Interiors, Inc.; preformed mineral fiber; flame spread of 25 or less and a smoke developed of 50 or less when tested in accordance with ASTM E84; 4 lbs/cf USG CW40.

C. Concrete or Masonry Wall Partition Head Construction Joint Assembly at Metal Deck with Concrete Fill:
   1. System: UL System No. HW-D- 0022, or approved; 2 hour fire rating at floors
   2. Forming Material: Preformed mineral fiber as listed in the UL assembly; minimum 4 PCF density.
   3. Fill, Void, or Cavity Material: “Firedam Spray” or “Fire Barrier Spray” by 3M.

D. Concrete or Masonry Wall Partition Head Construction Joint Assembly at Concrete Deck:
   1. System 1: UL System No. HW-D-0023, or approved; 2 hour fire rating at floors; 1 hour fire rating at roof deck.
   2. System 2: UL System No. HW-D-0755, or approved; 3 hour fire rating at floors.
   3. Forming Material: Preformed mineral fiber as listed in the UL assembly; minimum 4 PCF density.
   4. Fill, Void, or Cavity Material: “Firedam Spray,” “Firedam Spray 200”, or “Fire Barrier Spray” by 3M; as indicated in UL listing .

E. Concrete or Masonry Wall-to-Wall Construction Joint Assembly:
   1. System: UL System No. WW-D-0046, or approved; 3 hour fire rating.

2. Forming Material: Preformed mineral fiber as listed in the UL assembly; minimum 4 PCF density.
3. Fill, Void, or Cavity Material: "Firedam 150+" fill material by 3M or approved.

F. Concrete or Masonry Wall Partition Head Construction Joint Assembly at Concrete Deck:
1. System: UL System No. HW-D- 0023, or approved; 2 hour fire rating at floors; 1 hour fire rating at roof deck.
2. Forming Material: Preformed mineral fiber as listed in the UL assembly; minimum 4 PCF density.
3. Fill, Void, or Cavity Material: "Firedam Spray" or "Fire Barrier Spray" by 3M.

G. Fill, Void, or Cavity Material: PENN 300 Silicone Joint Sealant, by Specified Technologies Inc. (Somerville, NJ; 800-992-1180), or approved.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.

B. Do not begin installation until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

3.2 INSTALLATION OF FIRE RATED CONSTRUCTION JOINT ASSEMBLIES

A. Install construction joint assemblies in accordance with the fire rated assemblies listed, and as necessary to meet the specified fire rating requirements.

B. Coordinate installation of integral components as necessary to ensure the fire rating of the assemblies.

C. Curtainwall Wall / Floor Edge Assembly:
1. Install curtain wall insulation and support systems in accordance with the approved fire rated assembly.
2. Seal joints in vapor barrier with recommended foil tape.
3. Friction fit a minimum 4 inch deep safing insulation into the joint between the floor slab edge and the backside of the curtainwall insulation Provide metal clip or wire supports as required to meet the assembly requirements. Recess safing insulation into joint as necessary to accommodate fill, void, or cavity material.
4. Provide fill, void, or cavity material over the safing insulation. Trowel flush with adjacent floor surface.
5. Conform to requirements of UL System specified.

3.3 CLEANING

A. Trim excess material flush with adjacent surface.

B. Remove spills, leave area in undamaged, clean condition.

END OF SECTION

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Cleaning and preparation of joint surfaces.
   2. Interior sealant and backing materials.

B. Related Sections:
   1. 088000 - Glazing: Glazing sealants.
   2. 098100 - Acoustic Insulation: Acoustical sealant.

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.

D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. C1193 - Guide for Use of Joint Sealants.

B. South Coast Air Quality Management District (SCAQMD)
   1. Rule #1168 (July 1, 2005; Amended January 7, 2005).

1.3 SUBMITTALS

A. Make submittals in accordance with Section 013300.

B. Product Data: Submit for each sealant material used. Include manufacturer's surface preparation and installation instructions.

C. Quality Control Submittals:
   1. Schedule of sealant types, colors and respective locations.
   2. Letter from the sealant manufacturer stating that the Type S sealant has been tested for compatibility (including resistance to staining and adhesion) with adjacent materials and is acceptable for use in the Project.

1.4 QUALITY ASSURANCE

A. Installers: Use only skilled workmen specially trained in the techniques of sealing, and familiar with the published recommendations of the manufacturers of the sealants being used.

B. Verify that sealants are compatible with the substrates and accessory materials provided under other Sections. Send examples of adjacent materials to the Type S sealant manufacturer for compatibility testing. Notify Architect of evidence of incompatibility.

1.5 ENVIRONMENTAL CONDITIONS

A. Unless recommended otherwise by the manufacturer, install sealant systems as follows:
   1. Do not apply sealant when ambient temperatures are below 40 degrees F, or expected to fall below 40 degrees F before sealant cure is complete.
   2. Do not apply sealant to substrates or accessories that are moist.

1.6 GUARANTEE AND WARRANTY

A. Furnish guarantees in accordance with Section 017700.

B. Furnish a 2 year installer's guarantee covering defects in installation.

C. Furnish Type S sealant manufacturer's standard 5 year warranty.

PART 2 - PRODUCTS

2.1 SEALANTS

A. Type S - Neutral Cure Silicone Sealants:
   1. Dow Corning, 790 Silicone Building Sealant, or "795 Silicone Structural Glazing and Weatherproofing Sealant." or "Contractors Weatherproofing Sealant."
   2. Pecora "890 Architectural Silicone Sealant."
   3. Spectrem 3 by Tremco Incorporated.

B. Type PT: ASTM C920, Type M, Grade P, class 25; Tremco "THC 900", Sonneborn/ChemRex "Sonolastic SL 2", Pecora "Urexpan NR-200", or approved; standard colors as selected.

C. Type PTNS: ASTM C920, Type M, grade NS, Class 25, Use T; Pecora "Dynatred," Tremco "THC901," Sika "Sikaflex-2c NS TG," or approved; custom colors to match the Architect's samples.

D. Type A:
   1. Sealants shall meet the requirements of SCAQMD Rule 1168. (maximum VOC content of 250 grams/liter).
   2. “AC20+Silicone” by Pecora (800-523-6688). Select standard color to match adjacent finishes as close as possible.

E. Type SM: Mildew Resistant Silicone Sealant:
   1. Sealants shall meet the requirements of SCAQMD Rule 1168. (maximum VOC content of 250 grams/liter)
   2. “898 Silicone” by Pecora (800-523-6688), or approved. Select standard color to match adjacent finishes as close as possible; clear color, except use white at white fixtures.

F. Type AB: Neutral one part silicone sealant, designed for adhering to low energy surfaces common in sheet or peel and stick air barrier and weather resistant barriers. Dow Corning 758 Silicone Weather Barrier Sealant.

2.2 ACCESSORY MATERIALS

A. Primer:
   1. Non-staining type, recommended by sealant manufacturer to suit application.
   2. Primers for interior sealants shall meet the requirements of SCAQMD Rule 1168. (maximum VOC content of 250 grams/liter for non-porous surfaces; 775 grams/liter for other surfaces)

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

C. Backer Rod: Closed or open cell foam as recommended by the sealant manufacturer for the application; round profile; thickness approximately 130 percent of joint width.

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.

B. Do not begin installation until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

C. Verify joint dimensions and conditions are acceptable to receive the work of this Section.

3.2 PREPARATION

A. Clean and prepare joints in accordance with manufacturer's instructions. Remove any loose materials and other foreign matter which might impair adhesion of sealant.

B. Apply masking tightly around joints to protect adjacent surfaces from excess sealant.

C. Prime as required for proper bond to substrate materials.

D. Backing Materials:
   1. Place backer rod to achieve proper sealant width/depth ratios and to prevent sealant sag.
   2. Use bond breaker where there is insufficient depth to use joint filler.
   3. Do not use backer rod and bond breaker at joints to receive Type PTNS sealant.

3.3 INSTALLATION

A. Perform work in accordance with ASTM C1193, unless specified otherwise or recommended otherwise by the sealant manufacturer.

B. Apply sealant within recommended temperature ranges.

C. Joint Profile:
   1. Sealant beads shall have a sectional width to depth ratio of 2 to 1, unless specified otherwise or recommended otherwise by the sealant manufacturer.
   2. Install Type PTNS sealant full depth in tile expansion joints with no backer rod.

D. Tooling:
   1. Tool joints concave, unless indicated or specified otherwise. Finish to uniform profile and depth, free of air pockets, embedded matter, ridges, and sags.
   2. Tool type PTNS sealant to match grout joint profile.

3.4 CLEANUP

A. Clean adjacent surfaces free of excess sealant as the work progresses. Use cleaning agents recommended by the sealant manufacturer.

B. Upon completion, remove and dispose of masking.

3.5 PROTECTION

A. Protect sealant in joints subject to dirt, moisture, and traffic during the sealant curing process. Protection shall be able to resist traffic while remaining securely in position.

3.6 SCHEDULE

A. Type S: Provide at all exterior and perimeter joints, unless specified otherwise; colors as selected from manufacturer's complete line for each type of sealant.

B. Type PT: Provide at all horizontal joints subject to traffic and abrasion, unless specified otherwise; standard colors as selected from manufacturer's complete line of pre-formulated colors.

C. Type PTNS: Provide at all expansion joints in tile; custom colors to match grout samples submitted by the tile installer.

D. Type A: Provide at all interior joints, unless specified otherwise.

E. Type SM: Provide at joints around countertops in kitchen or restroom areas.

F. Type AB: Provide at the interior side of all windows, to complete air barrier seal. To be applied between window frame and weather resistant barrier/flashing, all four sides.

END OF SECTION

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Interior and exterior rolled steel doors and frames.
   2. Accessories.

B. Related Sections:
   1. 087100 - Door Hardware.
   2. 099000 – Painting and Coating: Field painting of doors and frames.

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to work of this Section.

D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

1.2 REFERENCES

A. American National Standards Institute (ANSI): A250.8 - SDI-100 Recommended Specifications for Standard Steel Doors and Frames.

B. American Society for Testing and Materials (ASTM)
   1. A366 - Specification for Steel, Carbon, Cold Rolled Sheet, Commercial Quality.
   2. A569 - Specification for Steel, Carbon (0.15 Maximum Percent), Hot Rolled Sheet and Strip, Commercial Quality.
   3. A653 - Specification for Steel Sheet, Zinc-coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by Hot-Dip Process.

C. International Building Code (IBC)

D. National Fire Protection Association (NFPA): NFPA 80 - Fire Doors and Windows.

E. Steel Door Institute (SDI): SDI-105 - Recommended Erection Instructions for Steel Frames.

1.3 SUBMITTALS

A. Make submittals in accordance with Section 013300.

B. Product Literature: Submit manufacturer's published literature for doors and frames.

C. Shop Drawings:
   1. Frames: Indicate configuration, anchor types and spacings, location of cutouts for hardware, reinforcement, and finish.
   2. Doors: Indicate elevations, internal reinforcement, closure method, and cutouts for hardware, glazing and louvers.

1.4 QUALITY ASSURANCE

A. Conform to requirements of ANSI A250.8.

B. Regulatory Requirements: Installed frame and door assembly shall conform to NFPA 80 for fire rated class indicated.

1.5 DELIVERY, STORAGE AND HANDLING

A. In accordance with Section 016000.

B. Protect doors and frames with factory installed protective packaging. Maintain protective packaging until installation commences.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Members of the Steel Door Institute and of the National Association of Architectural Metal Manufacturers, subject to compliance with the specified requirements.

2.2 MATERIALS

A. Steel Sheet: Cold rolled ASTM A366, or hot rolled pickled and oiled sheet conforming to ASTM A569.

2.3 DOORS

A. ANSI A250.8; Seamless.

B. Minimum 18 gage face sheets for interior doors; minimum 16 gage face sheets for exterior doors.

C. Core:
   1. Interior Doors: Vertical steel stiffeners with sound deadening fill between stiffeners, or resin impregnated kraft paper honey comb core.
   2. Exterior Doors: Polystyrene or polyurethane foam core.

D. Provide continuously welded seamless edges.

E. Close top edges of exterior doors flush with steel filler cap; seal joints watertight.

F. Cut mortises for butts using appropriate templates; universal non-handed preparation of doors is not acceptable.

2.4 FRAMES

A. Design: Double equal rabbet, unless indicated otherwise; fully welded. Fabricate frames with throat dimensions as indicated. Provide 1 inch returns at exterior frames.

B. Gages:
   1. Exterior Frames: Minimum 14 gage.
   2. Interior Frames: Minimum 16 gage for frames of door openings up to and including 4 feet in width; 14 gage for frames greater than 4 feet in width.

C. Provide mortar guard boxes at masonry construction.

D. Under Alternate:
   1. Interior frames may be provided knock-down, in gages indicated above.
   2. Knock-down frames shall be field-welded on site at corners and ground smooth prior to painting.

2.5 FINISH

A. Exterior Units:
   1. A60 hot dip galvannealed coating conforming to ASTM A653.
   2. Include reinforcing and other internal components.
   3. Use zinc rich primer to touch-up galvanized coatings damaged during fabrication.
   4. Apply modified epoxy ester baked-on primer to receive epoxy/urethane coating system specified in Section 099000.

B. Interior Units: Manufacturer's standard rust inhibitive primer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.

B. Do not begin installation until unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

3.2 INSTALLATION OF FRAMES

A. Install frames in accordance with SDI-105 and in accordance with labeling requirements.

B. Coordinate with wall construction for anchor placement.

C. Install accessories.

D. Install roll formed steel reinforcement channels between two abutting frames. Anchor to structure and floor.

E. Installation Tolerances; Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

F. Door and hardware installation is specified in Section 087300.

END OF SECTION

SECTION 081400 - WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Wood doors.
   2. Door accessories.

B. A portion of the Work of this Section is by Alternate only. Refer to Section 012300.

C. Related Sections:
   1. 012300 - Alternates
   2. 064000 – Architectural Woodwork: Wood door frames.
   3. 081113 - Hollow Metal Doors and Frames: Steel frames.
   4. 087100 - Door Hardware.
   5. 087300 - Door and Hardware Installation.
   6. 088000 - Glazing: Vision lites.

D. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to work of this Section.

E. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

1.2 REFERENCES

A. Architectural Woodwork Institute (AWI): Architectural Woodwork Quality Standards, Guide Specifications, and Quality Certification Program; current edition.

B. International Building Code (IBC)

C. NFPA 80 - Fire Doors and windows.

1.3 SUBMITTALS

A. In accordance with Section 013300.

B. Product Data: Submit manufacturer's product literature for each type of door.

C. Shop Drawings: Indicate door sizes and thickness, materials, stile and rail reinforcement, internal blocking for hardware attachment, cutouts for glazing and louvers, louver details and glazing stops.

D. Samples: Submit two 8 x 10 inch samples of each transparent finish species and finish combination proposed.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Installed frame and door assembly shall conform to NFPA 80 for fire rated class indicated.
   2. Where doors are noted with an hourly fire resistance rating, provide door and frame assemblies labeled by Underwriter's Laboratory, or any other testing laboratory approved by the local code authorities, to meet the hourly fire rating noted. Assemblies shall meet SBC requirements for positive pressure.
   3. Include "S" label on fire rated door assemblies which are located at 1 hour rated exit corridors.

B. Urea-Formaldehyde Free: All materials used to manufacture the door shall be urea-formaldehyde free.

1.5 DELIVERY, STORAGE, AND PROTECTION

A. In accordance with Section 016000.

B. Package, deliver, and store doors in accordance with AWI requirements.

1.6 WARRANTY

A. Furnish manufacturer's standard warranty under provisions of Section 017700.

PART 2 - PRODUCTS

2.1 DOORS

A. Stile and Rail Type Doors:
   1. AWI Section 1400, Premium grade.
   2. Furnish veneered stiles and rails with solid stock wood molded profiles, unless approved otherwise; MDF, glued up lumber or laminated veneer core.
   3. Face Veneer:
      a. Paint Grade Veneer: Medium density overlay (MDF) as specified in Section 064000.
   4. Where indicated, provide factory preglazing with 1/2 inch insulating tempered glass units as specified in 088000.
   5. Where scheduled, provide 20 minute labeled doors.
   6. 1-3/4 inch thick, unless indicated otherwise.
   7. Where intumescent seals are required to meet positive pressure labeling requirements, provide concealed edge sealing system built into the door edge.

B. Solid Core Flush Doors:
   1. Approved Manufacturers: One of the following.
      a. Algoma Hardwoods, Inc. (Algoma WI; 920-487-5221; 800-678-8910).
      b. Marshfield Door Systems (Marshfield, WI 800-869-3667).
      c. Eggers Industries (Two Rivers WI; 920-793-1351).
   2. AWI Section 1300, PC-5 or PC-7 (5 or 7 ply construction; bonded core); Premium grade.
   3. Core: Solid particleboard, unless required otherwise for fire labeling requirements; formaldehyde free.
   4. Furnish labeled doors as required to meet the hourly fire rating indicated.
   5. Face Veneer:
      a. Transparent Finish Veneer: AWI Grade A; White Oak (Quercus alba); all heart; quarter sawn or plain sawn as indicated; no sap; veneer panels slip matched; minimum 1/50" thickness; unless otherwise indicated on the Finish Schedule.
      b. Paint Grade Veneer: Medium density overlay (MDF) as specified in Section 064000; AWI Grade A.
   6. Where intumescent seals are required to meet positive pressure labeling requirements, provide concealed edge sealing system built into the door edge.

2.2 ACCESSORIES

A. Glass Stops: Wood type, except as required to conform to labeling requirements; finished to match door finish.

B. Non-Rated Louvers: Roll formed steel or extruded aluminum material, factory primed for field painting as specified elsewhere; Inverted 'V' blade design; 30 percent free area; tamperproof fasteners.

2.3 FABRICATION

A. Fabricate doors to the configurations indicated, in accordance with the AWI standards specified, and to fire rated labeling requirements. Attach fire and smoke rating labels.

B. Bevel lock and hinge edges 1/8 inch in 2 inches on single acting doors.

C. Bond edge banding to solid core with hot melt or RF cured adhesive.

D. Prefit and premachine doors in accordance with AWI 1300-S-6. Premachine for hardware specified in Section 087100, and locate as specified in Section 087300.

E. Doors shall be factory prefinished as scheduled to match Architect's sample:
   1. Transparent Finish: AWI Premium Grade TR-4 or TR-6; satin sheen.
   2. Opaque Finish: AWI Premium Grade OP-5 or OP-6; satin sheen.

F. Under Alternate:
   1. Interior wood doors may be field-finished, in accordance with Section 099000.
   2. Field-finished wood doors shall be factory-primed with clear sealer as recommended by door manufacturer for clear and opaque field finishing.

G. Factory install door louvers.

H. Factory pre-glaze doors.

I. Flush Door Blocking: For flush doors, provide solid lock blocks and special blocking as required for the hardware components specified elsewhere. Blocking for fire rated doors shall meet the door manufacturer's labeling requirements.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install doors as specified in Section 087300.

3.2 ADJUSTING AND CLEANING

A. Adjust for smooth and balanced door movement.

END OF SECTION

SECTION 083323 - OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Overhead coiling doors.
   2. Support framing.

B. Related Sections:
   1. Division 26 - Electrical: Installation of key operated push button station, conduit, and wiring; connection of alarm and detection system to fire rated door assemblies.

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to work of this Section.

D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

1.2 SYSTEM DESCRIPTION

A. Overhead coiling door assembly includes curtain, curtain guides, brackets, counterbalance, hood, motor or manual operators as specified, push button card-reader stations, steel structural supports and other accessories required for a complete installation.

1.3 SUBMITTALS

A. Make submittals in accordance with Section 013300.

B. Product Data: Submit manufacturer's complete product literature indicating specified items and method of installation.

C. Shop Drawings:
   1. Indicate details and dimensions of installation, including tracks, supports, connection points and details, and locations of operating components.
   2. Shop Drawings of framing support system shall be stamped by an Engineer licensed to practice in the State of Washington.

1.4 QUALITY ASSURANCE

A. Installers: Trained and authorized by the door manufacturer.

B. Pre-Installation Conference:
   1. Conduct in accordance with Section 013119.
   2. Require in attendance the General Contractor, the Architect, the overhead door subcontractor, the electrical subcontractor, the lightgage metal framing subcontractor, and others as may be affected by the work of this Section.
   3. Agenda: Address coordination, existing conditions, switch locations, connection points, baffle installation, access requirements, motor locations, and field testing procedures.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The Overhead Door Corporation is specified as the standard of approval. Similar and equal products from Cornell Iron Works, Inc., Cookson Company, Wayne-Dalton Corporation, and McKeon Rolling Door Company may be submitted for approval.

2.2 PREMANUFACTURED DOOR ASSEMBLIES

A. Motorized Insulated Non-Rated Glazed Doors:
   1. Overhead Door Type 521; motorized operation.
   2. Motor Operator: Heavy duty gear head motor operator; 3 phase power; verify voltage.
   3. 100K cycle springs.

4. Curtain:
   a. Aluminum curtain with ½-inch thick insulated glazed panels and polyurethane insulated panels; factory powder-coated finish.
   b. Polyurethane insulation at stiles and rails.
5. Reversing footpiece; provide concealed self-winding electrical cord reel; located directly above connection point on bottom-bar.
6. Weatherstripping at exterior doors.
7. Card-key operated switch.
8. Key operated override switch, constant pressure (spring return) type, labeled "OPEN" and "CLOSE," with center off position; keyed cylinder to be furnished under Section 087100.

B. Manual Insulated Non-Rated Glazed Doors:
1. Overhead Door Type 511; manual operation.
2. Curtain: Aluminum curtain with ½-inch thick insulated glazed panels and polyurethane insulated panels; factory powder-coated finish.
3. Weatherstripping at exterior doors.
4. Chain hoist.

2.3 SUPPORT FRAMING

A. Provide tube steel framing as indicated to support the overhead coiling doors.

B. The support framing shall be Contractor designed.

C. Provide bracing, attachments, and anchors to adjacent structure to maintain the installation firmly in position.

D. Framing shall be designed to accommodate deflection from the structure above without transmission of the load to the structure below.

E. Design framing system to meet the seismic requirements City of Seattle Building Code.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.

B. Do not begin installation until unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

C. Verify that openings are prepared with headers level, jambs plumb, floor level, without projections, and are correctly dimensioned to receive door.

3.2 INSTALLATION

A. Install door assemblies as indicated in accordance with manufacturer's installation instructions and approved shop drawings.

3.3 FIELD QUALITY CONTROL

A. Verify that moving parts operate smoothly, coiling doors are free from warp, twists, or distortion, doors remain in required position, and safety features function properly.

B. Repair damage to overhead coiling doors to match manufacturer's original finish. Replace components which cannot be properly repaired.

3.4 ADJUST

A. Adjust mechanism so moving parts operate smoothly.

END OF SECTION

SECTION 084113 – ALUMINUM-FRAMED STOREFRONTS AND ENTRANCES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Stick framed aluminum storefront systems.
   2. Exterior and interior systems.
   3. Aluminum and glass entrances.
   4. Fixed aluminum storefront windows.

B. Related Sections:
   1. 079200 - Joint Sealants: Perimeter sealants.
   2. 088000 - Glazing: Glass and glazing.

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.

D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
   2. B209 - Aluminum and Aluminum Alloy Sheet and Plate.
   3. B221 - Aluminum Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
   4. E283 - Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors.
   5. E330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
   6. E331 - Test Method for Water Penetration of Exterior Windows, Curtainwalls, and Doors by Uniform Static Air Pressure Difference.

B. Architectural Aluminum Manufacturer's Association (AAMA).
   1. 101-88 Voluntary Specifications for Aluminum Prime Windows and Sliding Glass Doors.

1.3 SYSTEM DESCRIPTION

A. Performance:
   1. System shall provide for expansion and contraction caused by a cycling temperature range of -20°F to +160°F without causing detrimental effects to components, sealing systems, and surrounding construction.
   2. Design system with provisions to drain moisture to the exterior of the system.
   3. Air Infiltration:
      a. Fixed Glazing: Limit air infiltration through assembly to 0.06 cfm/sf of assembly surface area, measured at a reference differential pressure across assembly of 6.24 psf as measured in accordance with ANSI/ASTM E283
      b. Swing Door: Limit to 1 cfm/ft of perimeter crack around pair of doors, measured at a reference differential pressure across assembly of 1.57 psf, as measured in accordance with ANSI/ASTM E283.
   4. Water Infiltration; Storefront System: No water penetration at a test pressure of 6.24 lb/sf when measured in accordance with ASTM E331.

B. Thermal Performance; Exterior Storefront and Entrance Systems:
   1. Glazing system shall have been tested by the manufacturer in accordance with NFRC Standard 100-91and certified in accordance with Washington State Energy Code Section 131as capable of achieving a U factor of 0.42, maximum, for vision areas, including frames and glazing. Test shall have been performed with glazing equivalent to that specified for vision glass in Section 088000, or with glass from which system performance requirements may be reasonably extrapolated, if written agreement is obtained from the City of Kent.

C. System Structural Design:
   1. Design and size members to withstand loads as required by the jurisdictional code authorities.
   2. Limit mullion deflection to 1/175, or flexure limit of glass with full recovery of glazing materials, whichever is less.

D. Dynamic Movement: System shall accommodate the following without damage to system components or performance.
   1. Movement within the system.
   2. Application and release of design live loads.
   3. ±5/8" maximum deflection of structural support framing between head and sill.

E. Profiles: Framing member profiles, as indicated in the Drawings, indicate proportions and intent. Minor variations in profiles, assemblies, and connections which are indicated on the shop drawings will be accepted, provided that, in the opinion of the Architect, they do not substantially alter the intended appearance.

1.4 SUBMITTALS

A. Make submittals in accordance with Section 013300.

B. Shop Drawings: Include wall opening dimensions, component dimensions, tolerances required, anchorages and fasteners, relationship to adjacent construction, and installation details.

C. Samples:
   1. Submit one sample of each type of extrusion; 12 inch minimum length
   2. Finish Sample: Submit three samples, minimum 2"x4", of aluminum finished with system and color proposed for the finished work.

D. Quality Control Submittals:
   1. Certification: Submit certification that the aluminum storefront and stair systems have been designed to meet the specified requirements.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Company authorized by system manufacturer, one installer for total system.

1.6 DELIVERY, STORAGE, AND HANDLING

A. In accordance with Section 016000.

1.7 GUARANTEE AND WARRANTY

A. Furnish in accordance with Section 017700.

B. Manufacturer's Warranty: Furnish three year written warranties executed to the Owner, from the manufacturers of the storefront and aluminum window systems, against defects in materials and workmanship.

C. Installer's Guarantee: Furnish three year written guarantee against defects in installation.

PART 2 - PRODUCTS

2.1 STOREFRONT SYSTEMS

A. Manufacturers:
   1. Basis of Design: Kawneer Co. Inc. (Norcross, GA; 770 449 5555).
   2. Acceptable Manufacturers: Arcadia, EFCO.

B. Framing Systems:
   1. Exterior: Kawneer Trifab VG 451T, 2 x 4-1/2 inch extruded aluminum section; thermally improved frame, center set design.
   2. Interior: Kawneer “In Frame” interior framing system.

C. Furnish spacers and adapters as necessary for a complete installation.

2.2 DOORS

A. Exterior Swinging Entry Doors:
   1. Kawneer Company, Inc.
   2. "360 Insulclad Thermal Entrance" or similar by acceptable manufacturer;
   3. Heavy duty aluminum/glass type; outswinging; 10 inch high bottom rail.

B. Interior Swinging Doors:
   1. Kawneer Company, Inc.
   2. "350 Standard Entrance" or similar by acceptable manufacturer;
   3. Outswinging; 10 inch high bottom rail.

2.3 MATERIALS

A. Extruded Aluminum: ANSI/ASTM B221; 6063-T5 Alloy and Temper.

B. Sheet Aluminum: ASTM B209, minimum .019 inch thickness for flashings, minimum .062 inch thick for brake formed trim applications.

C. Fasteners: Stainless steel, or zinc-plated in accordance with ASTM A164.

D. Glazing: Furnished under Section 088000. Provide shop glazed units at Contractor's option.

E. Miscellaneous Accessories: Furnish reinforcing, attachment hardware, aluminum flashings, and other items as necessary.

2.4 DOOR HARDWARE

A. Door Hardware:
   1. Security Enhancement Options, including armored strike retrofit, lockguard, and security strobe.
   2. Weatherstripping: Hard-backed poly pile in door and/or frame. Meeting stile of each leaf shall have a double line of hard-backed poly-pile astragal.
   3. Sill Sweeps: Brush strip, concealed.
   4. Exit Indicator.
   5. Remaining hardware is specified in Section 087100.

2.5 FABRICATION

A. Field verify openings prior to fabrication.

B. Fabricate frames allowing for shim spacing around perimeter of assembly, yet enabling installation.

C. Rigidly fit joints and corners. Accurately fit and secure corners tight. Make corner joints flush, hairline, and weatherproof. Seal joints with sealant.

D. Provide drainage holes to allow water to flow to exterior.

E. Prepare components to receive anchorage devices. Fabricate anchorage items.

F. Form bent components accurately to line, without deformation of component profiles. Fabricate in lengths consistent with finisher's capacity to handle bent shapes. Prefit all clips and mating components to ensure secure fit at time of assembly.

G. Fabricate custom extrusions, closures, and sheet materials to the shapes indicated; fabricate for attachment with concealed fasteners to the greatest possible extent.

H. Provide internal reinforcement in mullions with members to maintain rigidity. Provide reinforcing at all door strike jambs.

I. Fabricate storefront system to accommodate hardware using templates furnished from Section 087100. Provide weatherstripping and seals at exterior doors.

J. Provide plastic backing plates at jambs to receive sealant and backing rod.

2.6 FINISHES

A. Exposed Surfaces:

1. Storefront Framing, Entrances, and Windows: .7 mil clear anodized finish to match Architect's sample, to AAMA AA-M31C22A41.

B. Concealed Steel Items: Galvanized in accordance with ANSI/ASTM A123 to oz/sf.

C. Apply two coats of bituminous paint to concealed aluminum and steel surfaces in contact with cementitious or dissimilar materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify wall openings are ready to receive work of this Section.

B. Notify Architect of unacceptable conditions, prior to installation. Do not install window units until such conditions have been corrected.

3.2 INSTALLATION

A. Install frames and hardware in accordance with manufacturer's instructions.

B. Align frames plumb and level, free of warp or twist. Maintain dimensional tolerances, aligning with adjacent work.

C. Install under sill aluminum flashings. Seal all frame joints, and penetrations in flashings.

D. Sub-Sills:
1. Provide extruded aluminum sub-sills in accordance with manufacturer’s installation instructions and as specified below.
2. Provide manufacturer’s standard end dams and splice plates sealed into position. End dams and splice plates shall match the height of the sub-sill back.
3. Seal joint between end dam and jamb.
4. Fasten the sub-sill securely to the sill construction. Cap seal tops of fasteners.
5. Fasten the storefront framing into the sub-sill. Use manufacturer’s standard interlocking anchors which engage the sub-sill and allow fastening of the storefront without penetrating the horizontal pan of the sub-sill.

E. Install water diverters.

F. Compensation Heads:
1. Provide compensation channels at head conditions in accordance with manufacturer’s installation instructions and as specified below.
2. Provide manufacturer’s standard end caps sealed into position. End caps shall match the height of the compensation channel and shall be pre-finished to match the framing at exposed locations.
3. Provide interlocking mullion anchors at vertical tubes.

G. Provide plastic backing plates at jambs to receive sealant and backing rod.

H. Doors:
1. Install closers and doors for uniform clearances and smooth operation.
2. Coordinate with Division 16, and other trades as necessary for installation of barrier free entrance operators.

I. Perimeter sealant is provided under Section 079200.

3.3 ADJUSTING

A. Set clearances and adjust operating hardware for smooth operation.

B. Closers:
1. Set manual closers at exterior entrances to pounds spring tension at the pull handles.
2. Set initial opening force to 5 pounds and time delay at barrier free entrances to 15 seconds, unless otherwise directed.

3.4 FIELD QUALITY CONTROL

A. After completion of all glazing and sealing work, hose test all exterior glazed storefront and window systems. Notify Architect a minimum of 72 hours prior to hose testing.

B. All areas which exhibit water penetration to the inside of the building shall be repaired, resealed, and retested until watertightness can be demonstrated.

3.5 CLEANING

A. Remove protective material from prefinished aluminum surfaces.

B. Wash down exposed surfaces using a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

END OF SECTION

SECTION 084500 - TRANSLUCENT WALL ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide vertical wall systems as shown in the Drawings
   1. The design, manufacture and installation of an aluminum and polycarbonate insulating translucent system. A complete assembly of extruded cellular UV resistant polycarbonate glazing panels incorporated into a complete aluminum framing system, tested and warranted by the manufacturer.
   2. All anchors, brackets, and hardware attachments necessary to complete the specified structural assembly, when included within project scope.
   3. Weatherability and water-tightness performance as specified.
   4. All flashings up to adjoining work are also required as part of the system and shall be included, unless specifically noted as being supplied by others.
   5. Installation of the system.

B. Related Sections:
   1. 072700 - Air Barriers
   2. 074456 - Mineral-Fiber Reinforced Cementitious Panels
   3. 076200 - Sheet Metal Flashing and Trim
   4. 084113 - Aluminum-Framed Storefronts and Entrances

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.

D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000. Include documentation as follows.
   1. A sample of applicable system assemblies.
   2. ICC-ES Listing.
   3. Test reports, including color stability on uncoated face sheets.
   4. Documentation of regular, independent quality control monitoring under a building code review and listing program.
   5. Documentation of successful projects.
   6. Installer qualifications.

1.2 1.3 SYSTEM DESCRIPTION

A. An aluminum-framed wall system that is to be glazed with translucent cellular polycarbonate panels that interconnect via extruded tongue and groove edges.

B. Design Requirements:
   1. Support structure, constructed of materials of adequate load bearing capacity and to maintain visual design concepts, and for attachment to and support of the specified system, supplied by other trades.
   2. Glazing shall be polycarbonate, extruded and supplied in one single length whenever possible. In addition, they shall be extruded with integral tongue and groove vertical edges that facilitate connecting the panels together.
   3. Systems assembled from two (2) or more individual layers of polycarbonate shall not be permitted.
   4. Aluminum grid systems with glued fiberglass reinforced facings shall not be permitted.
   5. Whenever possible, fasteners shall be concealed.
   6. System shall be dry glazed.
   7. Bottom edges of glazing panels shall rest on non-continuous supports, which allow atmospheric air to reach their bottom edges, which shall be covered by a continuous air permeable tape. EPDM, silicone rubber, or neoprene setting blocks, or any other support method that would tend to restrict the flow of air through the panels is not acceptable.
   8. Air permeable tape shall also be applied to the top edges of the glazing panels.
   9. Unrestricted thermal movement of the glazing panels shall be allowed to occur within the framing system without compromising its weathertightness.

10. The rabbet depth of all framing members shall, at a minimum, be based on a ¾" (.75") engagement of the glazing panel, plus 1/8" (.125") cutting tolerance, plus .005 x the glazing dimension (in inches) that affects that rabbet. For example, a glazing panel that is 100" long will require a minimum rabbet depth of .75" + .125" + (.005 x 100") = 1.375".
11. System shall not require vertical aluminum framing in the field of the glazing with exception of the jamb locations at the outermost perimeters of the openings.
12. System shall be able to be integrated with top-hinged window units.

C. Performance Requirements:
1. Air Infiltration: Not to exceed 0.022 cfm/sq. ft. of glazing area when tested at a pressure of 6.24 psf (0.03 kPa) in accordance with ASTM E-283.
2. Water Penetration: None when tested vertically at a pressure equal to 9psf per ASTM E-331.
3. Structural Performance: The system shall be capable of meeting codes for supporting the design loading for this project as indicted on the Structural Drawings:
   a. Testing by a certified independent testing laboratory, in accordance with ASTM E-330, shall evidence this.
4. The deflection of all framing members oriented normal to the glazing plane shall not exceed L/175.

1.3 SUBMITTALS

A. Make submittals in accordance with Section 013300.

B. Samples: Submit three (3) each of the following to the Architect for review at the same time the Shop Drawings are submitted:
1. Each aluminum frame section – 6" long.
2. Samples of aluminum illustrating the specified finish.
3. Glazing gaskets – 6" long – each type.
4. Samples of glazing, each minimum 6" x 6", in specified color.

C. Shop Drawings: Show in detail all system components, connections to the building, interface with other materials and methods of construction. Include seal and signature of designing engineer.

D. Structural Calculations: Include calculations or structural adequacy of the translucent panel system and all connections to the building structure.

E. Submit certified test reports made by an independent testing organization for each type and class of panel system. Reports shall verify that the material will meet all performance requirements of this specification. Previously completed test reports will be acceptable if current and indicative of products used on this project. Minimum test reports required are as follows.
1. Flame Spread and Smoke Development (ASTM E84).
2. Burn Extent (ASTM D635).
3. Color Difference (ASTM D2244), on white without protective coatings.
4. Impact Strength (SPI Method).
5. Bond Strength (ASTM C-297 and ASTM D1002).
6. Accelerated Aging (ASTM D1037).
7. Insulation "U" Factor (NFRC-100).
8. Class A Burning Brand (ASTM E108).

F. Submit current U.L. listing documenting that the face sheets are manufactured by the translucent panel fabricator.

G. Submit certified proof of regular, independent quality control monitoring under a building code review and listing program.

H. Submit maintenance manuals for the panel systems with a sequence of items, materials and methods used for proper cleaning and maintenance.

1.4 QUALITY ASSURANCE

A. Materials and Products shall be manufactured by a company continuously and regularly employed in the manufacture of glazing systems using cellular polycarbonate panel systems for a period of at least

ten (10) years. Manufacturers shall provide a list of at least ten (10) projects having been in place a minimum of five (5) years using similar systems.

B. Erection shall be by the system manufacturer or an installer experienced in erection of systems of the type specified.

C. The system manufacturer shall be responsible for the configuration and fabrication of the complete system, and will ensure that it fully meets all requirements of this specification.

D. Approved Manufacturers: All manufacturers acceptable for use on this project under this section must be approved prior to bid. Manufacturers must submit evidence of compliance with all performance criteria specified herein. Any exceptions taken to this specification must be noted on an approval request. If approval is granted and non-compliance is subsequently discovered, the previously given approval will be invalidated and use of the product on the project will be disallowed. Requests for approval, with all test reports, submittals, and samples as specified herein, must be received no less than twelve (12) days prior to bid date. A list of all newly approved manufacturers and products (if any) will be issued by addendum. No verbal approvals will be given.

1.5 DELIVERY, STORAGE, AND HANDLING

A. In accordance with Section 016000.

B. Store translucent panels on the long edge, several inches above the ground, blocked and tied off and under cover to prevent warping.

C. Allow air to circulate freely around and under the material to prevent excessive condensation in the panels.

D. Combustion type heaters shall be properly vented to the exterior to prevent possible staining of the panels.

1.6 WARRANTIES

A. The Manufacturer shall provide a written warranty certifying that if, within one (1) year from the shipment date of the system, the system experiences water leakage owing to defects in fabrication or materials, the Manufacturer will, in a timely manner, furnish (only) new components to replace all of those found to be defective.

B. The above warranty does not apply in the cases of structural movement of the building(s), negative air pressure inside the building(s), acts of God, alteration or abuse of the products, or unreasonable use.

C. The liability of the Warrantor shall be limited to the above and shall not include incidental or consequential damages of any kind.

D. The polycarbonate or glass glazing materials or any other materials or system (example… finishes on metals) furnished and warranted by others, shall be covered by only those warranties.

E. These additional written warranties will also be provided:
   1. The polycarbonate manufacturer’s ten (10) year prorated warranty against defective materials, color change and damage.
   2. The framing finish applicator’s warranty as specified below:
      a. Anodized Finish: Five (5) year from date of application against chalking, fading, cracking, crazing, and blistering.

PART 2 - PRODUCTS

2.1 MANUFACTURER AND PRODUCT

A. Exterior Technologies, Inc. (EXTECH), (Pittsburgh, PA; 800-500-80830.

B. Series #3440 Interconnecting Cellular Polycarbonate Translucent Wall System.

2.2 MATERIALS

A. Framing:
   1. Shall be extruded aluminum of 6063-T5, 6005-T5 or 6105-T5 alloy and temper. All sections shall be formed true to detail and free from defects impairing appearance, strength or durability.
   2. Sill frame shall include continuously extruded aluminum weep hoods integral to the pressure cap. Post applied metal or plastic weep hoods are not approved.
   3. Pressure caps retaining the polycarbonate panels shall be designed to prevent over compression of the polycarbonate panels during installation to ensure free thermal movement of the polycarbonate. Screw on pressure caps or other designs that to not prevent over compression of the polycarbonate shall not be permitted.
   4. Thermally broken perimeter aluminum framing members, exclusive of cover caps, shall incorporate an integral structural polyurethane thermal break.

B. Glazing Gaskets:
   1. Shall be elastomeric, having low friction surfaces where they contact the glazing.
   2. Shall be tested for chemical compatibility with the glazing, and test reports evidencing same shall be presented to the Architect.

C. Fasteners:
   1. In general, concealed fasteners are to be used for all aluminum framing.
   2. In system construction, the use of adhesives, plastic welding, or sealants is not allowed.
   3. Where exposed, shall be stainless steel, 300 Series, with stainless steel backed neoprene washers.
   4. Concealed fasteners they may be stainless or zinc-plated steel in accordance with ASTM Specifications A165-55 or A164-55.
   5. Bolts, anchors and other fastening devices shall be as required for the strength of the connections and shall be suitable for conditions encountered. Washers shall be of the same metals as fasteners.

D. Flashing:
   1. Minimum 0.040 thick Aluminum [painted finish: 3105-H14] [anodized finish: 5005-H34].
   2. Factory formed to required profile(s) in 10-ft lengths, whenever practical, to allow for field trimming to suit as-built conditions.
   3. The finish on this metal shall match as closely as possible that which is on the extruded aluminum framing members.

E. Polycarbonate Glazing Panels:
   1. Appearance:
      a. The extruded panels shall be uniform in color with an integral extruded multi-cell core. The panel's exterior skins shall be interconnected and spaced apart by continuous ribs, perpendicular and/or be diagonal "X" Pattern to the skins. The space between the two exterior skins, in a cross section, shall be divided by multiple parallel intermediate walls. Dual wall systems with an interstitial space shall not be permitted.
      b. Panels shall consist of a polycarbonate resin with permanent, co-extruded, ultraviolet (UV) protective layers on exterior face of the panels. This protective layer shall be co-extruded by the manufacturer during the original extrusion of the panel and shall be a permanent part of both the interior and exterior of the panels. Post-applied coating or films of dissimilar materials are unacceptable.
      c. Panel thickness shall be a minimum of 40mm (1-9/16").
      d. Panel width shall be nominally 19-11/16"
      e. Panel weight shall be nominally 0.82 lbs. per sq. ft.
      f. Color (Panel):_____
      g. The panels shall be designed and formed with interlocking sides so that multiple panel installations can be achieved without the need to introduce independent mullion framing members.
      h. The panels shall be designed and formed in a manner that allows the insertion of optional internal reinforcement bars, each in close proximity to the interlocking joints of a multiple panel application.
      i. Panel shall be extruded in one single length. Transverse connections are not acceptable.

j. Free thermal movement of the panels shall be allowed to occur without compromising the weather tightness of the completed system.
k. The interior cells of the cellular polycarbonate sheets shall be blown clean prior to being sealed. The top and bottom of each sheet shall be sealed with an air permeable filter tape.
l. The open end of each panel shall rest on a continuous metal setting fin or setting block which is designed to allow atmospheric air to reach the air permeable tape at the bottoms of the panels.
m. Glazing shall be installed in accordance with panel and system manufacturer's guidelines.

2. Thermal and Solar Performance:
   a. Insulation Value ("U-Value"): BTU/hr. ft2 0F.
   b. Light Transmission (LT %):
   c. Shading Coefficient (SC): _____
   d. Solar Heat Gain Coefficient (SHGC): _____
3. Attachment:
   a. Attachment of glazing sheets to the intermediate structural elements (i.e. purlins, or girts) or to structural members parallel to the translucent panels shall be achieved by means of one of the following:
      1) One-piece aluminum or stainless steel clips, which are designed with protruding "T" portions which engage the corresponding grooves extruded in the polycarbonate panels and thereby constrain the sheets. These clips are face mounted on the transverse or parallel structural elements.
4. Flammability:
   a. The panel shall have a CC1 fire rating classification when tested in accordance with ASTM D-635 or equivalent.
   b. The panel shall have a Class A flame spread and smoke development rating when tested in accordance with ASTM E-84. Or equal systems must submit ASTM E-84 tests results documenting that the glazed panel has been tested and passed as a complete and full assembly in a manner intended for use on this project. Test results of individual components of a glazed assembly shall not be accepted or permitted as evidence of compliance.

2.3 FABRICATION AND WORKMANSHIP

A. Construct wall(s) using extruded aluminum members.

B. Carefully and accurately design, fabricate and assemble work with proper provision for thermal contraction and expansion. Work shall conform to profiles and sections noted on the shop drawings. Work shall be assembled with joints in a neat and finished manner.

C. All framing members shall be factory fabricated and assembled to the greatest degree possible, including the following:
   1. Cutting members to length.
   2. Installation of glazing gaskets, to be glued within extruded gasket tracks.
   3. Drilling straight and countersunk mounting holes, fastener access holes, and weep holes.
   4. Fabricating miter joints with concealed joint reinforcements and joint gaskets.
   5. Installation of non-metallic thermal isolation spacers.
   6. Removal of extrusion portions to accommodate tight over-lapping joinery and connections, including coped ends, mid-span notches, etc.
   7. Fabrication and installation of splice plates at jointed connections.

2.4 FINISHES

A. Exposed surfaces of the aluminum framing members shall be finished as follows:
   1. Anodized Coatings:
      a. Architectural Class I (215-R1) Clear Anodized type AA-M10C22A41 complying with AAMA 611, 0.7 mil thick minimum.

PART 3 - EXECUTION

3.1 EXAMINATION

A. All submitted opening sizes, dimensions and tolerances are to be field verified by the installer unless otherwise stipulated.

B. Installer to examine site conditions to verify readiness. Notify general contractor or owner about any defects requiring correction, including but not limited to improperly sloping sill substrates and uneven planar substrates. Do not work until conditions are satisfactory.

3.2 INSTALLATION

A. Install components in strict accordance with manufacturer's instructions and approved shop drawings. Use proper fasteners and hardware for material attachments as specified.

B. Use methods of attachment to structure which include provisions for thermal movement.

C. Glazing shall be installed in accordance with panel and system manufacturer's guidelines.

D. Remove all protective coverings on polycarbonate panels during or immediately after installation.

E. Installation shall be performed by a company with ten (10) years continuous experience in commercial construction.

F. Protect contact points between unprotected dissimilar metals (except stainless steel) using continuous separators of FRP, PVC tape (or approved equal)

3.3 CLEANING AND PROTECTION

A. During installation, protect exposed surfaces against accumulation of paint, caulking, disfiguration and damage.

B. Interior glazing surfaces shall be cleaned as the panels are being installed. The exterior shall be cleaned as each phase of the work is completed.

C. Follow panel manufacturer instructions when cleaning exposed panel surfaces. Clean polycarbonate and frame at time of installation.

D. Follow panel manufacturer's guidelines when removing foreign substances from panel surfaces. Use only solvents that are deemed acceptable for use.

E. Before final acceptance, repair and/or replace any defective materials or work.

END OF SECTION

SECTION 085313 - VINYL WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Factory manufactured vinyl (uPVC) windows.
   2. Shop glazing
   3. Framed insect screens.
   4. Operable hardware and weather-stripping.

B. Related Sections:
   1. 061000 - Rough Carpentry: Prepared openings.
   2. 064000 – Architectural Woodwork: Interior wood trim.
   3. 072100 - Thermal Insulation: Insulation for window perimeter stuffing.
   4. 079200 - Joint Sealants: Perimeter sealing.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. E283 - Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors.
   2. E547 - Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Cyclic Static Air Pressure Differential.
   3. E330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

1.3 SYSTEM DESCRIPTION

A. Air Leakage: ANSI/ASTM E283; 0.15 cfm/sf of window area at test pressure of 1.57 psf.

B. Water Penetration: None when subjected to ASTM E547 under static pressure of 2.86 psf for 15 minutes.

C. Deflection: No glass breakage, damage to hardware, or permanent deformation, after subjection to positive and negative pressure of 3psf.

1.5 SUBMITTALS

A. Make submittals under provisions of Section 013300.

B. Product Literature: Manufacturer's descriptive literature and installation instructions .

C. Shop Drawings: Include dimensions, relation to construction of adjacent work, air and vapor barrier seal to adjacent construction, component anchorage and locations, anchor methods and materials, and hardware details.

D. Samples:
   1. Submit color samples as necessary for selection and verification of colors.
   2. Two samples of glazed window frame, corner, mullion joint and operating hardware, as necessary to illustrate quality of materials and joints, color and texture of finish.

1.6 WARRANTY

A. Submit warranty under provisions of Section 017700.

B. Warranty: Submit written warranty, executed by the window manufacturer, agreeing to repair or replace units which fail because of defects in material and workmanship, for as long as the indicated owner maintains ownership of the building.

PART 2 - PRODUCTS

2.1 WINDOW UNITS

A. Manufacturer: Heartland Windows Inc (Aplington, IA; 800-847-2352).

B. Type: Series “Elite”; double hung and fixed.

C. Glazing: Manufacturer’s “Standard” clear, sealed, insulating glazing with low-e coating on #2 surface; argon-filled; in compliance with ASTM E774; Class A; 7/8” overall thickness.

D. Hardware:
   1. Weatherstripping: Replaceable double weatherstripping system; EPDM.
   2. Operators: Manufacturer’s standard with plated hinge arms; non-corroding material with compatible fasteners.
   3. Locking Assembly: Manufacturer’s standard lever mechanism.

E. Insect Screen: Fiberglass with matching frame color.

F. Fabrication
   1. Windows shall be fabricated from high impact resistant uncured polyvinyl chloride.
   2. Frame extrusions shall include integral nailing fin for framed wall locations. Provide flangless window units at concrete or concrete masonry openings.
   3. All corners of the frame and sash shall be mitered and fusion welded; welds shall be dressed and finished to match surrounding area.
   4. Include clips for securing insect screen.
   5. Factory glaze units using manufacturer’s standard snap-on PVC beads sized to accommodate the glass thickness.
   6. Install all hardware.

G. Finish: Homogeneous with rigid PVC co-extruded frame cap; colors as selected by the Architect.

PART 3 - EXECUTION

3.1 INSPECTION

A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence. Verify that rough openings are correctly sized and located. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.

B. Do not begin installation until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

3.2 INSTALLATION

A. Install windows in accordance with manufacturer's instructions.

B. Maintain alignment with adjacent work. Secure assembly to frame openings without distortion or stress.

C. Ensure air and vapor retarder is sealed to window frame. Coordinate placement of insulation in spaces around unit perimeter as specified in Section 072116.

D. Perimeter sealant is specified in Section 079200.

E. Install insect screens.

F. Close and latch operating sash.

3.3 CLEANING

A. Clean window frames and glass.

B. Remove labels and visible markings.

END OF SECTION

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Mechanical and electrified door hardware for:
      a. Swinging doors.
      b. Sliding doors.
   2. Electronic access control system components, including:
      a. Electronic access control devices.
   3. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.

B. Exclusions: Unless specifically listed in hardware sets, hardware is not specified in this section for:
   1. Windows
   2. Cabinets (casework), including locks in cabinets
   3. Signage
   4. Toilet accessories
   5. Overhead doors

C. Related Sections:
   1. Division 01 Section "Alternates" for alternates affecting this section.
   2. Division 07 Section "Joint Sealants" for sealant requirements applicable to threshold installation specified in this section.
   3. Division 09 sections for touchup, finishing or refinishing of existing openings modified by this section.
   4. Division 26 sections for connections to electrical power system and for low-voltage wiring.
   5. Division 28 sections for coordination with other components of electronic access control system.

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

1.2 REFERENCES

A. UL - Underwriters Laboratories
   1. UL 10B - Fire Test of Door Assemblies
   2. UL 10C - Positive Pressure Test of Fire Door Assemblies
   3. UL 1784 - Air Leakage Tests of Door Assemblies
   4. UL 305 - Panic Hardware

B. DHI - Door and Hardware Institute
   1. Sequence and Format for the Hardware Schedule
   2. Recommended Locations for Builders Hardware
   3. Key Systems and Nomenclature

C. ANSI - American National Standards Institute
   1. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties

1.3 SUBMITTALS

A. General:
   1. Submit in accordance with Conditions of Contract and Division 01 requirements.
   2. Highlight, encircle, or otherwise specifically identify on submittals deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.
   3. Prior to forwarding submittal, comply with procedures for verifying existing door and frame compatibility for new hardware, as specified in PART 3, "EXAMINATION" article, herein.

B. Action Submittals:
   1. Product Data: Technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
   2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:
      a. Wiring Diagrams: For power, signal, and control wiring and including:
         1) Details of interface of electrified door hardware and building safety and security systems.
         2) Schematic diagram of systems that interface with electrified door hardware.
         3) Point-to-point wiring.
         4) Risers.
   3. Samples for Verification: If requested by Architect, submit production sample of requested door hardware unit in finish indicated, and tagged with full description for coordination with schedule.
      a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.
   4. Door Hardware Schedule: Submit schedule with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule as published by the Door and Hardware Institute. Indicate complete designations of each item required for each door or opening, include:
      a. Door Index; include door number, heading number, and Architects hardware set number.
      b. Opening Lock Function Spreadsheet: List locking device and function for each opening.
      c. Quantity, type, style, function, size, and finish of each hardware item.
      d. Name and manufacturer of each item.
      e. Fastenings and other pertinent information.
      f. Location of each hardware set cross-referenced to indications on Drawings.
      g. Explanation of all abbreviations, symbols, and codes contained in schedule.
      h. Mounting locations for hardware.
      i. Door and frame sizes and materials.
      j. Name and phone number for local manufacturer's representative for each product.
      k. Operational Description of openings with any electrified hardware (locks, exits, electromagnetic locks, electric strikes, automatic operators, door position switches, magnetic holders or closer/holder units, and access control components). Operational description should include operational descriptions for: egress, ingress (access), and fire/smoke alarm connections.
         1) Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work that is critical in Project construction schedule.
   5. Key Schedule:
      a. After Keying Conference, provide keying schedule listing levels of keying as well as explanation of key system's function, key symbols used and door numbers controlled.
      b. Use ANSI/BHMA A156.28 “Recommended Practices for Keying Systems” as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
      c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
      d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
      e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion.
         1) Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
      f. Prepare key schedule by or under supervision of supplier, detailing Owner’s final keying instructions for locks.
      g. Templates: After final approval of hardware schedule, provide templates for doors, frames and other work specified to be factory or shop prepared for door hardware installation.

C. Informational Submittals:
   1. Qualification Data: For Supplier, Installer and Architectural Hardware Consultant.
   2. Product data for electrified door hardware:
      a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
   3. Certificates of Compliance:
      a. UL listings for fire-rated hardware and installation instructions if requested by Architect or Authority Having Jurisdiction.
      b. Installer Training Meeting Certification: Letter of compliance, signed by Contractor, attesting to completion of installer training meeting specified in “QUALITY ASSURANCE” article, herein.
      c. Electrified Hardware Coordination Conference Certification: Letter of compliance, signed by Contractor, attesting to completion of electrified hardware coordination conference, specified in “QUALITY ASSURANCE” article, herein.
   4. Warranty: Special warranty specified in this Section.

D. Closeout Submittals:
   1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:
      a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
      b. Catalog pages for each product.
      c. Factory order acknowledgement numbers (for warranty and service)
      d. Name, address, and phone number of local representative for each manufacturer.
      e. Parts list for each product.
      f. Final approved hardware schedule, edited to reflect conditions as-installed.
      g. Final keying schedule
      h. Copies of floor plans with keying nomenclature
      i. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.
      j. Copy of warranties including appropriate reference numbers for manufacturers to identify project.

1.4 QUALITY ASSURANCE

A. Supplier Qualifications and Responsibilities: Recognized architectural hardware supplier with record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that provides certified Architectural Hardware Consultant (AHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.
   1. Warehousing Facilities: In Project's vicinity.
   2. Scheduling Responsibility: Preparation of door hardware and keying schedules.
   3. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
   4. Coordination Responsibility: Assist in coordinating installation of electronic security hardware with Architect and electrical engineers and provide installation and technical data to Architect and other related subcontractors.
      a. Upon completion of electronic security hardware installation, inspect and verify that all components are working properly.

B. Architectural Hardware Consultant Qualifications: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:
   1. For door hardware, DHI-certified, Architectural Hardware Consultant (AHC).
   2. Can provide installation and technical data to Architect and other related subcontractors.
   3. Can inspect and verify components are in working order upon completion of installation.
   4. Capable of producing wiring diagrams.
   5. Capable of coordinating installation of electrified hardware with Architect and electrical engineers.

C. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.

D. Fire-Rated Door Openings: Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed products tested by Underwriters Laboratories, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.

E. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.

F. Accessibility Requirements: For door hardware on doors in an accessible route, comply with governing accessibility regulations cited in “REFERENCES” article, herein.

G. Keying Conference
   1. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
      a. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
      b. Preliminary key system schematic diagram.
      c. Requirements for key control system.
      d. Requirements for access control.
      e. Address for delivery of keys.

H. Pre-installation Conference
   1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   2. Inspect and discuss preparatory work performed by other trades.
   3. Inspect and discuss electrical roughing-in for electrified door hardware.
   4. Review sequence of operation for each type of electrified door hardware.
   5. Review required testing, inspecting, and certifying procedures.

I. Coordination Conferences:
   1. Installation Coordination Conference: Prior to hardware installation, schedule and hold meeting to review questions or concerns related to proper installation and adjustment of door hardware.
   2. Electrified Hardware Coordination Conference: Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site.

B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.
   1. Deliver each article of hardware in manufacturer’s original packaging.

C. Project Conditions:
   1. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
   2. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.

D. Protection and Damage:
   1. Promptly replace products damaged during shipping.
   2. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work.
   3. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.

E. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

F. Deliver keys to Owner by registered mail or overnight package service.

1.6 COORDINATION

A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.

B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.

D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

1.7 WARRANTY

A. Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
   1. Warranty Period: Beginning from date of Substantial Completion, for durations indicated.
      a. Closers:
         1) Mechanical: **Falcon SC series, 10 years**
      b. Exit Devices:
         1) Mechanical: 3 years.
      c. Locksets:
         1) Mechanical: Falcon, 10 years.
      d. Continuous Hinges: Lifetime warranty.
      e. Key Blanks: Lifetime
   2. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.

1.8 MAINTENANCE

A. Maintenance Tools: Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Approval of manufacturers and/or products other than those listed as “Scheduled Manufacturer” or “Acceptable Manufacturers” in the individual article for the product category shall be in accordance with QUALITY ASSURANCE article, herein.

B. Approval of products from manufacturers indicated in “Acceptable Manufacturers” is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer’s product.

C. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.2 MATERIALS

A. Fasteners
   1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
   2. Furnish screws for installation with each hardware item. Finish exposed (exposed under any condition) screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
   3. Provide concealed fasteners for hardware units exposed when door is closed except when no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless thru-bolts are

required to fasten hardware securely. Review door specification and advise Architect if thru-bolts are required.

4. Install hardware with fasteners provided by hardware manufacturer.

B. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.
   1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

2.3 HINGES

A. Manufacturers and Products:
   1. Scheduled Manufacturer and Product: Ives 5BB series.
   2. Acceptable Manufacturers and Products: Hager BB series, McKinney T4B series, Stanley FBB Series.

B. Requirements:
   1. Provide hinges conforming to ANSI/BHMA A156.1.
   2. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:
      a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
      b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high
   3. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:
      a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
      b. Interior: Heavy weight, steel, 5 inches (127 mm) high
   4. 2 inches or thicker doors:
      a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
      b. Interior: Heavy weight, steel, 5 inches (127 mm) high
   5. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
   6. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
      a. Steel Hinges: Steel pins
      b. Non-Ferrous Hinges: Stainless steel pins
      c. Out-Swinging Exterior Doors: Non-removable pins
      d. Out-Swinging Interior Lockable Doors: Non-removable pins
      e. Interior Non-lockable Doors: Non-rising pins
   7. Width of hinges: 4-1/2 inches (114 mm) at 1-3/4 inch (44 mm) thick doors, and 5 inches (127 mm) at 2 inches (51 mm) or thicker doors. Adjust hinge width as required for door, frame, and wall conditions to allow proper degree of opening.
   8. Provide spring hinges where specified. Provide two spring hinges and one bearing hinge per door leaf for doors 90 inches (2286 mm) or less in height. Provide one additional bearing hinge for each 30 inches (762 mm) of additional door height.

2.4 CONTINUOUS HINGES

A. Aluminum Geared
   1. Manufacturers:
      a. Scheduled Manufacturer: Ives.
      b. Acceptable Manufacturers: Select, Stanley.
   2. Requirements:
      a. Provide aluminum geared continuous hinges conforming to ANSI/BHMA A156.26, Grade 1.
      b. Provide aluminum geared continuous hinges, where specified in the hardware sets, fabricated from 6063-T6 aluminum.
      c. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
      d. Provide hinges capable of supporting door weights up to 450 pounds, and successfully tested for 1,500,000 cycles.
      e. On fire-rated doors, provide aluminum geared continuous hinges that are classified for use on rated doors by testing agency acceptable to authority having jurisdiction.
      f. Provide aluminum geared continuous hinges with electrified option scheduled in the hardware sets. Provide with sufficient number and wire gage to accommodate electric function of specified hardware.

g. Install hinges with fasteners supplied by manufacturer.
h. Provide hinges 1 inch (25 mm) shorter in length than nominal height of door, unless otherwise noted or door details require shorter length and with symmetrical hole pattern.

2.5 PIVOT SETS

A. Manufacturers:
1. Scheduled Manufacturer: Ives.
2. Acceptable Manufacturers: Rixson.

B. Requirements:
1. Provide pivot sets complete with oil-impregnated top pivot, unless indicated otherwise.
2. Where offset pivots are specified, Provide one intermediate pivot for doors less than 91 inches (2311 mm) high and one additional intermediate pivot per leaf for each additional 30 inches (762 mm) in height or fraction thereof. Intermediate pivots spaced equally not less than 25 inches (635 mm) or not more than 35 inches (889 mm) on center, for doors over 121 inches (3073 mm) high.
3. Provide appropriate model where pivot sets are scheduled at fire rated openings.
4. Provide lead-lined model where pivot sets are specified at lead-lined doors.
5. Provide pivots with electrified options as scheduled in the hardware sets. Provide with sufficient number and wire gage to accommodate electric function of specified hardware. Locate electrified pivot nearest to electrified locking component. If manufacturer of electrified locking component requires another device for power transfer then provide recommended power transfer device and appropriate quantity of pivots.
6. Provide mortar guard for each electric pivot specified, unless specified in hollow metal frame specification.

2.6 FLUSH BOLTS

A. Manufacturers:
1. Scheduled Manufacturer: Ives.
2. Acceptable Manufacturers: Burns, Rockwood.

B. Requirements:
1. Provide automatic, constant latching, and manual flush bolts with forged bronze or stainless-steel face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch (305 mm) steel or brass rods at doors up to 90 inches (2286 mm) in height. For doors over 90 inches (2286 mm) in height increase top rods by 6 inches (152 mm) for each additional 6 inches (152 mm) of door height. Provide dust-proof strikes at each bottom flush bolt.

2.7 COORDINATORS

A. Manufacturers:
1. Scheduled Manufacturer: Ives.
2. Acceptable Manufacturers: Burns, Rockwood.

B. Requirements:
1. Where pairs of doors are equipped with automatic flush bolts, an astragal, or other hardware that requires synchronized closing of the doors, provide bar-type coordinating device, surface applied to underside of stop at frame head.
2. Provide filler bar of correct length for unit to span entire width of opening, and appropriate brackets for parallel arm door closers, surface vertical rod exit device strikes or other stop mounted hardware. Factory-prepared coordinators for vertical rod devices as specified.

2.8 LOCKSETS – INTERCONNECTED TYPE

A. Manufacturers and Products:
1. Scheduled Manufacturer and Product: Falcon H2 series.
2. Acceptable Manufacturers and Products: Schlage CS210 series, Yale YH Collection™.

B. Requirements:
1. Provide interlocked locksets conforming to ANSI/BHMA A156.12 Series 5000, Grade 2 with simultaneous retraction of deadbolt and latch for single motion egress. Cylinders: Refer to “KEYING” article, herein.

2. Provide locks with **2-3/8 inches (60 mm) or 2-3/4 inches (70 mm)** backset, based on door detail, with 1/2 inch (13 mm) latch throw latchbolt and 1 inch (25 mm) throw deadbolt.
3. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
4. Provide manufacturers standard T-strike, unless extended lip strike is necessary to protect trim, and deadbolt strike.
5. Lever Design: Falcon Latitude.

2.9 CYLINDRICAL LOCKS – GRADE 1

A. Manufacturers and Products:
1. Scheduled Manufacturer and Product: Falcon T series.
2. Acceptable Manufacturers and Products: Corbin-Russwin CL3300 series.

B. Requirements:
1. Provide cylindrical locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 1, and UL Listed for 3 hour fire doors.
2. Cylinders: Refer to “KEYING” article, herein.
3. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with 1/2 inch latch throw. Provide proper latch throw for UL listing at pairs.
4. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
5. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
7. Provide electrified options as scheduled in the hardware sets.
8. Lever Trim: Solid cast levers without plastic inserts and wrought roses on both sides.
   a. Lever Design: Falcon Latitude.

2.10 CYLINDRICAL LOCKS – GRADE 2

A. Manufacturers and Products:
1. Scheduled Manufacturer and Product: Falcon W series.
2. Acceptable Manufacturers and Products: Corbin-Russwin CL3800 series.

B. Requirements:
1. Provide cylindrical locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 2, and UL Listed for 3 hour fire doors.
2. Cylinders: Refer to “KEYING” article, herein.
3. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with 1/2 inch latch throw. Provide proper latch throw for UL listing at pairs.
4. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
5. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
7. Lever Trim: Solid cast levers without plastic inserts and wrought roses on both sides.
   a. Lever Design: Falcon Latitude.

2.11 AUXILIARY LOCKS

A. Deadbolts:
1. Manufacturers and Products:
   a. Scheduled Manufacturer and Product: Falcon D100 Series.
   b. Acceptable Manufacturers and Products: Schlage B600 Series, Sargent 480 Series.
2. Requirements:
   a. Provide deadbolt series conforming to ANSI/BHMA A156 and function as specified.
   b. Cylinders: Refer to “KEYING” article, herein.
   c. Provide deadbolts with standard 2-3/4 inches (70 mm) backset. Provide 2-3/8 inches (60 mm) where noted or if door or frame detail requires. Provide deadbolt with full 1 inch (25 mm) throw, constructed of steel alloy.
   d. Provide manufacturer’s standard strike.

B. Sliding Door Locks:
   1. Manufacturers and Products:
      a. Scheduled Manufacturer and Product: Accurate 2001 Series.
      b. Acceptable Manufacturers and Products: No Substitute.
   2. Requirements:
      a. Provide mortise sliding door lock series and function as specified.
      b. Cylinders: Refer to “KEYING” article, herein.
      c. Provide mortise sliding door locks with standard 2-3/4 inches (70 mm) backset.
      d. Provide manufacturer’s standard strike.

C. Pocket Door Locks:
   1. Manufacturers and Products:
      a. Scheduled Manufacturer and Product: Accurate 2002 Series.
      b. Acceptable Manufacturers and Products: No Substitute.
   2. Requirements:
      a. Provide mortise pocket door lock series and function as specified.
      b. Cylinders: Refer to “KEYING” article, herein.
      c. Provide mortise pocket door lock with standard 2-3/4 inches (70 mm) backset.
      d. Provide manufacturer’s standard strike.

2.12 EXIT DEVICES – BAR TYPE

A. Manufacturer and Product:
   1. Scheduled Manufacturer: Von Duprin 55/88 series.
   2. Acceptable Manufacturers and Products: Corbin-Russwin ED7000/ED3000 series, Sargent 90 series.

B. Requirements:
   1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware.
   2. Cylinders: Refer to “KEYING” article, herein.
   3. Provide bar type exit devices, cast or forged of brass, bronze, or stainless steel, plated to standard architectural finishes to match balance of the door hardware.
   4. Latch Bolt Throw: 3/4 inch (19 mm) for rim and mortise devices, 5/8 inch (16 mm) for surface and concealed vertical rod devices.
   5. Mechanism Case: One piece without cover plate. Mount flush on face of doors, or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
   6. Provide UL labeled fire exit devices for fire rated openings.
   7. Provide manufacturer’s standard strikes.
   8. Provide exit devices cut to door width and height. Locate exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
   9. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion, provide type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.
   10. Provide electrified options as scheduled in the hardware sets.
   11. Furnish all necessary wood door kits and cover plates, for proper installation of exit device.
   12. Provide exit devices with optional trim designs to match other lever and pull designs used on the project.
      a. Tactile Warning (Knurling): Where required by authority having jurisdiction. Provide on levers on exterior (secure side) of doors serving rooms considered to be hazardous.

2.13 ELECTRIC STRIKES

A. Manufacturers and Products:
   1. Scheduled Manufacturer and Product: Von Duprin 6000 Series.
   2. Acceptable Manufacturers and Products: Folger Adam 300 Series.

B. Requirements:
   1. Provide electric strikes designed for use with type of locks shown at each opening.
   2. Provide electric strikes UL Listed as burglary-resistant.

3. Where required, provide electric strikes UL Listed for fire doors and frames.
4. Provide transformers and rectifiers for each strike as required. Verify voltage with electrical contractor.

2.14 ROLLER LATCHES

A. Manufacturers:
1. Scheduled Manufacturer: Ives.
2. Acceptable Manufacturers: Burns, Rockwood.

B. Requirements:
1. Provide roller latches with 4-7/8 inches (124 mm) strike at single doors to fit ANSI frame prep. If dummy levers are used in conjunction with roller latch mount roller latch at a height as to not interfere with proper mounting and height of dummy lever.
2. Provide roller latches with 2-1/4 inches (57 mm) full lip strike at pair doors. Mount roller in top rail of each leaf per manufacturer's template.

2.15 CYLINDERS

A. Manufacturers:
1. Scheduled Manufacturer: **Falcon.**

B. Requirements:
1. Provide **permanent and interchangeable** cylinders/cores compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset, manufacturer's series as indicated. Refer to "KEYING" article, herein.

C. Construction Keying:
1. Replaceable Construction Cores.
   a. Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
      1) 3 construction control keys
      2) 12 construction change (day) keys.
   b. Owner or Owner's Representative will replace temporary construction cores with permanent cores.

2.16 KEYING

A. Provide cylinders/cores complying with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

B. Requirements:
1. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.
   a. Master Keying system as directed by the Owner.
2. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
3. Provide keys with the following features:
   a. Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
   b. Patent Protection: Keys and blanks protected by one or more utility patent(s) until the year, 2029.
4. Identification:
   a. Mark permanent cylinders/cores and keys with applicable blind code per DHI publication "Keying Systems and Nomenclature" for identification. Do not provide blind code marks with actual key cuts.
   b. Identification stamping provisions must be approved by the Architect and Owner.
   c. Stamp cylinders/cores and keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
   d. Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.

e. Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.

5. Quantity: Furnish in the following quantities.
   a. Change (Day) Keys: 3 per cylinder/core.
   b. Permanent Control Keys: 3.
   c. Master Keys: 6.

2.17 KEY CONTROL SYSTEM

A. Manufacturers:
   1. Scheduled Manufacturer: Telkee.
   2. Acceptable Manufacturers: HPC, Lund.

B. Requirements:
   1. Provide key control system, including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by system manufacturer, with capacity for 150% of number of locks required for Project.
      a. Provide complete cross index system set up by hardware supplier, and place keys on markers and hooks in cabinet as determined by final key schedule.
      b. Provide hinged-panel type cabinet for wall mounting.

2.18 DOOR CLOSERS

A. Manufacturers and Products:
   1. Scheduled Manufacturer and Product: Falcon SC70A series.
   2. Acceptable Manufacturers and Products: Sargent 351 series.

B. Requirements:
   1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
   2. Provide door closers with fully hydraulic, full rack and pinion action with aluminum cylinder.
   3. Closer Body: 1-1/2 inch (38 mm) diameter with 5/8 inch (16 mm) diameter heat-treated pinion journal.
   4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
   5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
   6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.
   7. Pressure Relief Valve (PRV) Technology: Not permitted.
   8. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.19 DOOR CLOSERS

A. Manufacturers and Products:
   1. Scheduled Manufacturer and Product: Falcon SC80A series.
   2. Acceptable Manufacturers and Products: Sargent 1331 series.

B. Requirements:
   1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory.
   2. Provide door closers with fully hydraulic, full rack and pinion action with aluminum cylinder.
   3. Closer Body: 1-1/4 inch (32 mm) diameter, with 5/8 inch (16 mm) diameter heat-treated pinion journal.
   4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
   5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.

6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.
7. Pressure Relief Valve (PRV) Technology: Not permitted.
8. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.20 DOOR TRIM

A. Manufacturers:
1. Scheduled Manufacturer: Ives.
2. Acceptable Manufacturers: Burns, Rockwood.

B. Requirements:
1. Provide push plates 4 inches (102 mm) wide by 16 inches (406 mm) high by 0.050 inch (1 mm) thick and beveled 4 edges. Where width of door stile prevents use of 4 inches (102 mm) wide plate, adjust width to fit.
2. Provide push bars of solid bar stock, diameter and length as scheduled. Provide push bars of sufficient length to span from center to center of each stile. Where required, mount back to back with pull.
3. Provide offset pulls of solid bar stock, diameter and length as scheduled. Where required, mount back to back with push bar.
4. Provide flush pulls as scheduled. Where required, provide back-to-back mounted model.
5. Provide pulls of solid bar stock, diameter and length as scheduled. Where required, mount back to back with push bar.
6. Provide pull plates 4 inches (102 mm) wide by 16 inches (406 mm) high by 0.050 inch (1 mm) thick, beveled 4 edges, and prepped for pull. Where width of door stile prevents use of 4 inches (102 mm) wide plate, adjust width to fit.
7. Provide wire pulls of solid bar stock, diameter and length as scheduled.
8. Provide decorative pulls as scheduled. Where required, mount back to back with pull.

2.21 PROTECTION PLATES

A. Manufacturers:
1. Scheduled Manufacturer: Ives.
2. Acceptable Manufacturers: Burns, Rockwood.

B. Requirements:
1. Provide kick plates, mop plates, and armor plates minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
2. Sizes of plates:
   a. Kick Plates: 10 inches (254 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs
   b. Mop Plates: 4 inches (102 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs
   c. Armor Plates: 36 inches (914 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs

2.22 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

A. Manufacturers:
1. Scheduled Manufacturers: Glynn-Johnson.
2. Acceptable Manufacturers: Rixson, Sargent.

B. Requirements:
1. Provide heavy duty concealed mounted overhead stop or holder as specified for exterior and interior vestibule single acting doors.
2. Provide heavy duty concealed mounted overhead stop or holder as specified for double acting doors.
3. Provide heavy or medium duty and concealed or surface mounted overhead stop or holder for interior doors as specified. Provide medium duty surface mounted overhead stop for interior doors and at any door that swings more than 140 degrees before striking wall, open against

equipment, casework, sidelights, and where conditions do not allow wall stop or floor stop presents tripping hazard.

4. Where overhead holders are specified provide friction type at doors without closer and positive type at doors with closer.

2.23 DOOR STOPS AND HOLDERS

A. Manufacturers:
   1. Scheduled Manufacturer: Ives.
   2. Acceptable Manufacturers: Burns, Rockwood.

B. Provide door stops at each door leaf:
   1. Provide wall stops wherever possible. Provide convex type where mortise type locks are used and concave type where cylindrical type locks are used.
   2. Where a wall stop cannot be used, provide universal floor stops for low or high rise options.
   3. Where wall or floor stop cannot be used, provide medium duty surface mounted overhead stop.

2.24 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

A. Manufacturers:
   1. Scheduled Manufacturer: Zero International.
   2. Acceptable Manufacturers: National Guard, Reese.

B. Requirements:
   1. Provide thresholds, weather-stripping (including door sweeps, seals, and astragals) and gasketing systems (including smoke, sound, and light) as specified and per architectural details. Match finish of other items.
   2. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
   3. Size of thresholds:
      a. Saddle Thresholds: 1/2 inch (13 mm) high by jamb width by door width
      b. Bumper Seal Thresholds: 1/2 inch (13 mm) high by 5 inches (127 mm) wide by door width
   4. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.

2.25 MAGNETIC HOLDERS

A. Manufacturers:
   1. Scheduled Manufacturer: LCN.
   2. Acceptable Manufacturers: Rixson, Sargent.

B. Requirements:
   1. Provide wall or floor mounted electromagnetic door release as specified with minimum of 25 pounds of holding force. Coordinate projection of holder and armature with other hardware and wall conditions to ensure that door sits parallel to wall when fully open. Connect magnetic holders on fire-rated doors into the fire control panel for fail-safe operation.

2.26 MAGNETIC CATCHES

A. Manufacturers:
   1. Scheduled Manufacturer: Ives.
   2. Acceptable Manufacturers: Engineered Products Company, Rockwood.

B. Requirements:
   1. Provide magnetic catches with self-aligning magnets that can be surface mounted or mortised.
   2. Provide magnetic catches in an aluminum case 1 inch wide x 3-1/8 inch long. Provide dual triple pole (Ives 327), where scheduled, with 14 pound load capacity, and dual double pole catches (Ives 326), where scheduled, with 9 pound load capacity.

2.27 DOOR POSITION SWITCHES

A. Manufacturers:
   1. Scheduled Manufacturer: Schlage.

2. Acceptable Manufacturers: GE-Interlogix, Sargent.

B. Requirements:
1. Provide recessed or surface mounted type door position switches as specified.
2. Coordinate door and frame preparations with door and frame suppliers. If switches are being used with magnetic locking device, provide minimum of 4 inches (102 mm) between switch and magnetic locking device.

2.28 DOOR VIEWERS

A. Manufacturers:
1. Scheduled Manufacturer: Ives.
2. Acceptable Manufacturers: Burns, Rockwood.

B. Provide appropriate door viewer for door type and rating with minimum of 180-degree view area.

2.29 BARN DOOR HARDWARE

A. Manufacturers:
1. Scheduled Manufacturer: National Hardware.
2. Acceptable Manufacturers: No substitute.

B. Requirements:
1. Provide complete sets of sliding door hardware as recommended by manufacturer for door type and weight.
a. Include track, channels, brackets, hangers, fasteners, guides, pulls, stops, and other hardware as required for complete installation.

2.30 BY-PASS DOOR HARDWARE

A. Manufacturers:
1. Scheduled Manufacturer: Johnson Hardware.
2. Acceptable Manufacturers: No substitute.

B. Requirements:
1. Provide complete sets of by-pass door hardware as recommended by manufacturer for door type and weight.
a. Include track, hangers, fasteners, guides, cup pulls, stops, and other hardware as required for complete installation.

2.31 POCKET DOOR HARDWARE

A. Manufacturers:
1. Scheduled Manufacturer: Johnson Hardware
2. Acceptable Manufacturers: No substitute.

B. Requirements:
1. Provide complete sets of pocket door hardware as recommended by manufacturer for door type and weight.
a. Include track, hangers, fasteners, guides, stops, and other hardware as required for complete installation.

2.32 FINISHES

A. Finish: BHMA 626/652 (US26D); except:
1. Hinges at Exterior Doors: BHMA 630 (US32D)
2. Continuous Hinges: BHMA 630 (US32D)
3. Continuous Hinges: BHMA 628 (US28)
4. Push Plates, Pulls, and Push Bars: BHMA 630 (US32D)
5. Protection Plates: BHMA 630 (US32D)
6. Overhead Stops and Holders: BHMA 630 (US32D)
7. Door Closers: Powder Coat to Match
8. Wall Stops: BHMA 630 (US32D)
9. Latch Protectors: BHMA 630 (US32D)

10. Weatherstripping: Clear Anodized Aluminum
11. Thresholds: Mill Finish Aluminum

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Door hardware installation is specified in Section 087300.

3.3 FIELD QUALITY CONTROL

A. Engage qualified manufacturer trained representative to perform inspections and to prepare inspection reports.
   1. Representative will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

3.4 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
   1. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 30 degrees.
   2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
   3. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, Installer's Architectural Hardware Consultant must examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

3.5 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.6 DOOR HARDWARE SCHEDULE

A. Hardware items are referenced in the following hardware. Refer to the above-specifications for special features, options, cylinders/keying, and other requirements.

B. Hardware Sets:

HARDWARE GROUP NO. 1
For use on Door #(s):
112.A 115.C 115.D B06.A U20

HARDWARE GROUP NO. 2
For use on Door #(s):
U08
Provide each PD door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	POCKET DOOR HW KIT	1500	AL	JOH
1	EA	SPRING LOADED EDGE PULL	2000	626	ACC
2	EA	FLUSH PULL	955	626	IVE

HARDWARE SUPPLIER SHALL PROVIDE ALL COMPONENTS REQUIRED FOR INSTALLATION OF POCKET DOOR HARDWARE. INCLUDE TRACK, PIVOTS, BALL-BEARING HANGERS, HINGES, FASTENERS, GUIDES AND ALL OTHER COMPONENTS REQUIRED FOR INSTALLATION.

HARDWARE GROUP NO. 3
For use on Door #(s):
U09 U10
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	PIVOT SET	7255J SET	626	IVE
1	EA	ROLLER LATCH	RL30A	626	IVE
1	EA	PERIMETER EDGE SEAL	34AA	AA	ZER
1	EA	CABINET HARDWARE	CL12	626	IVE
1	EA	CABINET HARDWARE	CL14	626	IVE

HARDWARE GROUP NO. 4
For use on Door #(s):
U05 U06 U07
Provide each BP door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	BY-PASSING TRACK AND HARDWARE KIT	138F	626	JOH
2	EA	FLUSH PULL	955	626	IVE

HARDWARE SUPPLIER SHALL PROVIDE ALL COMPONENTS REQUIRED FOR INSTALLATION OF BY-PASSING/SLIDING DOOR HARDWARE. INCLUDE TRACK, PIVOTS, BALL-BEARING HANGERS, HINGES, FASTENERS, GUIDES AND ALL OTHER COMPONENTS REQUIRED FOR INSTALLATION.

HARDWARE GROUP NO. 5
For use on Door #(s):
U11 U12.A U12.B
Provide each BD door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	PLAIN BOX RAIL	5114 NATIONAL HARDWARE		
1	SET	BOX RAIL HANGERS	5055		
1	SET	SINGLE BOX RAIL BRACKETS	DP51MBC		
2	EA	FLUSH PULL	955	626	IVE

HARDWARE SUPPLIER SHALL PROVIDE ALL COMPONENTS REQUIRED FOR INSTALLATION OF BARN DOOR HARDWARE. INCLUDE TRACK, PIVOTS, BALL-BEARING HANGERS, HINGES, FASTENERS, GUIDES, TRACK STOPS AND ALL OTHER COMPONENTS REQUIRED FOR INSTALLATION.

HARDWARE GROUP NO. 6
For use on Door #(s):
108.B 111.B 112.B 115.B
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	112XY	628	IVE
1	EA	PANIC HARDWARE	55-NL-OP-110MD-SNB	626	VON
1	EA	RIM CYLINDER	951	626	FAL
1	EA	ELECTRIC STRIKE	6300 FSE 12/24 VAC/VDC	630	VON
1	EA	90 DEG OFFSET PULL	8190EZHD 10" STD	630-316	IVE
1	EA	SURFACE CLOSER	SC71A SS	689	FAL
1	EA	TOP RAIL DROP PLATE	SC70-18PA	689	FAL
1	EA	CUSH SHOE SUPPORT	SC70-30	689	FAL
1	EA	BLADE STOP SPACER	SC70-61	689	FAL
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	625A-V3-223	A	ZER
1	EA	CREDENTIAL READER	FURNISHED, COMMISSIONED AND INSTALLED BY DIV. 28	BLK	SCE
1	EA	DOOR CONTACT	679-05HM	BLK	SCE
1		WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
1			PROVIDE FACTORY POINT TO POINT WIRING DIAGRAMS		
1	EA	NOTE	WEATHERSTRIP BY DOOR/FRAME MANUFACTURER		

OPERATIONAL DESCRIPTION: CREDENTIAL READER DEVICE IS TO RELEASE THE ELECTRIC STRIKE ALLOWING THE DOOR TO BE OPENED. KEYED INGRESS IS ALSO AVAILABLE. IMMEDIATE EGRESS IS ALWAYS AVAILABLE.

ITEMS TO BE PROVIDED BY THE DIVISION 28 SUPPLIER:
CREDENTIAL READER DEVICE. REQUIRED POWER AND WIRING TO THE CREDENTIAL READER DEVICE, ELECTRIC STRIKE AND THE DOOR POSITION SWITCH.

HARDWARE GROUP NO. 7
For use on Door #(s):
100.B
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	112XY	628	IVE
1	EA	PANIC HARDWARE	55-NL-OP-110MD-SNB	626	VON
1	EA	RIM CYLINDER	951	626	FAL
1	EA	ELECTRIC STRIKE	6300 FSE 12/24 VAC/VDC	630	VON
1	EA	90 DEG OFFSET PULL	8190EZHD 10" STD	630-316	IVE
1	EA	SURFACE CLOSER	SC71A SS	689	FAL
1	EA	TOP RAIL DROP PLATE	SC70-18PA	689	FAL
1	EA	BLADE STOP SPACER	SC70-61	689	FAL
1	EA	CUSH SHOE SUPPORT	SC70-30	689	FAL
1	EA	CREDENTIAL READER	FURNISHED, COMMISSIONED AND INSTALLED BY DIV. 28	BLK	SCE
1	EA	DOOR CONTACT	679-05HM	BLK	SCE
1			PROVIDE FACTORY POINT TO POINT WIRING DIAGRAMS		
1	EA	NOTE	WEATHERSTRIP BY DOOR/FRAME MANUFACTURER		
1		WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH

OPERATIONAL DESCRIPTION: CREDENTIAL READER DEVICE IS TO RELEASE THE ELECTRIC STRIKE ALLOWING THE DOOR TO BE OPENED. KEYED INGRESS IS ALSO AVAILABLE. IMMEDIATE EGRESS IS ALWAYS AVAILABLE.

ITEMS TO BE PROVIDED BY THE DIVISION 28 SUPPLIER:
CREDENTIAL READER DEVICE. REQUIRED POWER AND WIRING TO THE CREDENTIAL READER DEVICE, ELECTRIC STRIKE AND THE DOOR POSITION SWITCH.

HARDWARE GROUP NO. 8
For use on Door #(s):
105 113.A 115A
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	T581P LAT	626	FAL
1	EA	ELECTRIC STRIKE	6211 FSE CON 12/16/24/28 VAC/VDC	630	VON
1	EA	SURFACE CLOSER	SC71A RW/PA	689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	CREDENTIAL READER	FURNISHED, COMMISSIONED AND INSTALLED BY DIV. 28	BLK	SCE
1	EA	DOOR CONTACT	679-05HM	BLK	SCE
1			PROVIDE FACTORY POINT TO POINT WIRING DIAGRAMS		
1		WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH

OPERATIONAL DESCRIPTION: CREDENTIAL READER DEVICE IS TO RELEASE THE ELECTRIC STRIKE ALLOWING THE DOOR TO BE OPENED. KEYED INGRESS IS ALSO AVAILABLE. IMMEDIATE EGRESS IS ALWAYS AVAILABLE.

ITEMS TO BE PROVIDED BY THE DIVISION 28 SUPPLIER:
CREDENTIAL READER DEVICE. REQUIRED POWER AND WIRING TO THE CREDENTIAL READER DEVICE, ELECTRIC STRIKE AND THE DOOR POSITION SWITCH.

HARDWARE GROUP NO. 9
For use on Door #(s):
B09
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	T581P LAT	626	FAL
1	EA	ELECTRIC STRIKE	6211 FSE CON 12/16/24/28 VAC/VDC	630	VON
1	EA	OH STOP	90S	630	GLY
1	EA	SURFACE CLOSER	SC71A RW/PA	689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	CREDENTIAL READER	FURNISHED, COMMISSIONED AND INSTALLED BY DIV. 28	BLK	SCE
1	EA	DOOR CONTACT	679-05HM	BLK	SCE
1		WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
1			PROVIDE FACTORY POINT TO POINT WIRING DIAGRAMS		

OPERATIONAL DESCRIPTION: CREDENTIAL READER DEVICE IS TO RELEASE THE ELECTRIC STRIKE ALLOWING THE DOOR TO BE OPENED. KEYED INGRESS IS ALSO AVAILABLE. IMMEDIATE EGRESS IS ALWAYS AVAILABLE.

ITEMS TO BE PROVIDED BY THE DIVISION 28 SUPPLIER: CREDENTIAL READER DEVICE. REQUIRED POWER AND WIRING TO THE CREDENTIAL READER DEVICE, ELECTRIC STRIKE AND THE DOOR POSITION SWITCH.

HARDWARE GROUP NO. 10
For use on Door #(s):
100.A
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	112XY	628	IVE
1	EA	PUSH/PULL BAR	9190EZHD-10"-NS	630-316	IVE
1	EA	SURFACE CLOSER	SC71A SS	689	FAL
1	EA	CUSH SHOE SUPPORT	SC70-30	689	FAL
1	EA	TOP RAIL DROP PLATE	SC70-18PA	689	FAL
1	EA	BLADE STOP SPACER	SC70-61	689	FAL
1	EA	RAIN DRIP	142AA	AA	ZER
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	625A-V3-223	A	ZER
1	EA	NOTE	WEATHERSTRIP BY DOOR/FRAME MANUFACTURER		

HARDWARE GROUP NO. 11
For use on Door #(s):
B06.B
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PASSAGE SET	T101 LAT	626	FAL
1	EA	SURFACE CLOSER	SC71A DEL RW/PA	689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE

HARDWARE GROUP NO. 12
For use on Door #(s):
113.B
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PASSAGE SET	T101 LAT	626	FAL
1	EA	OH STOP	90S	630	GLY
1	EA	SURFACE CLOSER	SC71A RW/PA	689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE

HARDWARE GROUP NO. 13
For use on Door #(s):
201 204 206 301 303 306
B01 B13
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	PASSAGE SET	T101 LAT	626	FAL
1	EA	OH STOP	90S	630	GLY
1	EA	SURFACE CLOSER	SC71A RW/PA	689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

HARDWARE GROUP NO. 14
For use on Door #(s):
108.A 111.A
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	PASSAGE SET	T101 LAT	626	FAL
1	EA	SURFACE CLOSER	SC71A RW/PA	689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

HARDWARE GROUP NO. 15
For use on Door #(s):
107
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	PASSAGE SET	T101 LAT	626	FAL
1	EA	SURFACE CLOSER	SC71A SS	689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

HARDWARE GROUP NO. 16
For use on Door #(s):
101A 101B
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PASSAGE SET	T101 LAT	626	FAL
1	EA	SURFACE CLOSER	SC71A HDPA	689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	FIRE/LIFE WALL MAG	SEM7800 SERIES AS REQUIRED	689	LCN
1	EA	GASKETING	488SBK PSA	BK	ZER
1			PROVIDE FACTORY POINT TO POINT WIRING DIAGRAMS		

OPERATIONAL DESCRIPTION: DOOR NORMALLY HELD OPEN BY MAGNETIC HOLDER. MAGNETIC HOLDER TO BE CONNECTED TO BUILDING'S FIRE/SMOKE ALARM SYSTEM. MAGNETIC HOLD OPEN SHALL RELEASE IMMEDIATELY UPON ACTIVATION OF BUILDING'S FIRE/SMOKE ALARM SYSTEM ALLOWING DOOR TO CLOSE.

HARDWARE GROUP NO. 17
For use on Door #(s):
U12
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	BY PREHUNG DOOR MANUFACTURER	652	BYO
1	EA	PASSAGE SET	W101S LAT	626	FAL
1	EA	DOOR STOP	63/70 AS REQUIRED	A26D	IVE

HARDWARE GROUP NO. 18
For use on Door #(s):
U03
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	BY PREHUNG DOOR MANUFACTURER	652	BYO
1	EA	PASSAGE SET	W101S LAT	626	FAL
1	EA	DOOR STOP	63/70 AS REQUIRED	A26D	IVE
1	EA	ROLLER BUMPER	RB471 -WHERE REQUIRED	626	IVE

HARDWARE GROUP NO. 19
For use on Door #(s):
114
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	PRIVACY LOCK	T301S LAT	626	FAL
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS	630	IVE
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

HARDWARE GROUP NO. 20
For use on Door #(s):
U02
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	BY PREHUNG DOOR MANUFACTURER	652	BYO
1	EA	PRIVACY LOCK	W301S LAT	626	FAL
1	EA	DOOR STOP	63/70 AS REQUIRED	A26D	IVE

HARDWARE GROUP NO. 21
For use on Door #(s):
104
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	ENTRY / OFFICE LOCK	T511P LAT	626	FAL
1	EA	WALL STOP	WS406/407CCV	630	IVE

HARDWARE GROUP NO. 22
For use on Door #(s):
115 B07 B08
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	T581P LAT	626	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE

HARDWARE GROUP NO. 23
For use on Door #(s):
B11
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	T581P LAT	626	FAL
1	EA	OH STOP & HOLDER	90F J	630	GLY
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE

HARDWARE GROUP NO. 24
For use on Door #(s):
B03 B04 B05
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	W581P LAT	626	FAL
1	EA	OH STOP & HOLDER	90F J	630	GLY
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE

HARDWARE GROUP NO. 25
For use on Door #(s):
B10 B12
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	630	IVE
1	EA	PASSAGE SET	T101 LAT	626	FAL
1	EA	SURFACE CLOSER	SC71A RW/PA	689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE

HARDWARE GROUP NO. 26
For use on Door #(s):
109 110
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	T581P LAT	626	FAL
1	EA	SURFACE CLOSER	SC81A RW/PA PROVIDE MTG BRKT, SPCR & PLATE AS REQ	689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

HARDWARE GROUP NO. 27
For use on Door #(s):
203 205 304 305
Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	SET	CONST LATCHING BOLT	FB51P	630	IVE
1	EA	DUST PROOF STRIKE	DP2	626	IVE
1	EA	STOREROOM LOCK	T581P LAT	626	FAL
1	EA	COORDINATOR	COR X FL X MB AS REQUIRED	628	IVE
2	EA	SURFACE CLOSER	SC81A DS	689	FAL
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	GASKETING	322A-S	A	ZER

HARDWARE GROUP NO. 28
For use on Door #(s):
U01.1&2 U01.3
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	BY PREHUNG DOOR MANUFACTURER	652	BYO
1	EA	PASSAGE SET	W101S LAT	626	FAL
1	EA	SGL CYL X TURN DB	D141P	626	FAL
1	EA	DOOR STOP	63/70 AS REQUIRED	A26D	IVE
1	EA	WEATHER STRIPPING	BY PREHUNG DOOR MANUFACTURER		BYO

HARDWARE GROUP NO. 29
For use on Door #(s):
U01
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	SPRING HINGE	3SP1 4.5 X 4.5	652	IVE
1	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	ENTRANCE LOCK	H2101P LAT	626	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	DOOR STOP	63/70 AS REQUIRED	A26D	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	VIEWER	U698	626	IVE

HARDWARE GROUP NO. 30
For use on Door #(s):
U13
Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	BY PREHUNG DOOR MANUFACTURER	652	BYO
2	EA	SINGLE DUMMY TRIM	W12 LAT	626	FAL
2	EA	ROLLER LATCH	RL30A	626	IVE
2	EA	DOOR STOP	63/70 AS REQUIRED	A26D	IVE

END OF SECTION

SECTION 087300 - DOOR AND HARDWARE INSTALLATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Installation of hardware specified in Section 087100.
   2. Installation of wood doors.
   3. Installation of hollow metal doors.
   4. Installation of aluminum doors in aluminum frames; frames installation is specified in other Sections.

B. Related Sections:
   1. 064000 – Architectural Woodwork: Wood frames.
   2. 081113 - Hollow Metal Doors and Frames.
   3. 081400 - Wood Doors.
   4. 083323 - Overhead Coiling Doors.
   5. 084113 - Aluminum-Framed Storefronts and Entrances.
   6. 087100 - Door Hardware.

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.

1.2 REFERENCES

A. Hollow Metal Manufacturer's Association (HMMA): 840 - Installation and Storage of Hollow Metal Doors and Frames.

B. National Fire Protection Association (NFPA): 80 - Fire Doors and Windows.

C. American National Standards Institute (ANSI): A250.8 - SDI-100 Recommended Specifications for Standard Steel Doors and Frames.

D. The Door and Hardware Institute (DHI): Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames.

1.3 QUALITY ASSURANCE

A. Installers of doors and finish hardware shall be skilled mechanics experienced in this type of work.

B. Fire rated doors and hardware shall be installed in accordance with the labeling requirements.

1.4 ENVIRONMENTAL CONDITIONS

A. Do not subject wood doors to abnormal heat, dryness, or humidity, or sudden changes thereof. Condition doors to average prevailing humidity prior to hanging.

PART 2 - PRODUCTS

2.1 DOORS, FRAMES, AND HARDWARE

A. Doors, frames and hardware are specified in other sections.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.

B. Do not begin installation until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

3.2 DOOR INSTALLATION

A. Install doors in accordance with the door manufacturer's printed instructions.

B. Install doors plumb and square in associated frames maintaining specified clearances.

C. Except where specified otherwise in the respective door sections, maintain clearances of 1/8 inch at jambs and heads, 1/8 inch at meeting stiles for pairs of doors, and 1/2 inch from bottom of door to top of decorative floor finish or covering, except where threshold is shown or scheduled provide 1/4-inch clearance from bottom of door to top of threshold.

D. Install hollow metal doors in accordance with ANSI A250.8 and HMMA 840.

E. Install fire rated doors in accordance with NFPA 80.

F. Install doors to operate freely, but not loosely, free from hinge bound conditions, sticking or binding. Do not install in frames which would hinder operation of doors.

G. Ensure doors are free from rattling when in latched position.

3.3 FINISH HARDWARE INSTALLATION

A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.
   1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
   2. Custom Steel Doors and Frames: HMMA 831.
   3. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."

B. Install each hardware item in compliance with manufacturer’s instructions and recommendations, using only fasteners provided by manufacturer.

C. Install fire rated hardware in accordance with NFPA 80.

D. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.

E. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.

F. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

G. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.

H. Where cutting and fitting is required on substrates to be field painted or similarly finished, install, fit, remove and store hardware prior to finishing. Reinstall hardware after finishing operations are completed.

I. For substrates which are not factory prepared for hardware:
   1. Mortise work to correct size and location without gouging, splintering or causing irregularities in exposed finish work.
   2. Fit faces of mortised components snug and flush without excessive clearance.

J. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated or one hinge for every 30 inches (750 mm) of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.

K. Lock Cylinders: Install construction cores to secure building and areas during construction period.

L. Replace construction cores with permanent cores as indicated in keying section.

M. Coordinate installation of electronic hardware with electrical service and fire alarm system as applicable.

N. Electrified Hardware
   1. Factory Representative Services Required
      a. Provide for local representatives of specified electrical hardware manufacturer(s) to assist in the supervision of installation of one of each type of electrified hardware items.
      b. Provide for supervision of final checkout and adjustment of electrified hardware.
      c. Provide for continued maintenance site visits during the 1 year warranty period.]
   4. Wiring: Coordinate with Division 26, ELECTRICAL sections for:
      a. Conduit, junction boxes and wire pulls.
      b. Connections to and from power supplies to electrified hardware.
      c. Connections to fire/smoke alarm system and smoke evacuation system.
      d. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.
      e. Testing and labeling wires with Architect's opening number.

O. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.

P. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.

Q. Closer/Holders: Mount closer/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.

R. Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room, or alternate location as directed by Architect.

S. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."

T. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.

U. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

V. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

W. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.4 ADJUSTMENT AND CLEANING

A. Adjust and check each operating item of hardware and each door to ensure proper operation of function of every unit.

B. Lubricate moving parts with graphite type lubricant unless otherwise recommended by the hardware manufacturer.

C. Ensure weatherstripping and seals do not inhibit closing and positive latching of door.

D. Replace defective materials or units which cannot be adjusted to operate as intended. Reinstall items found improperly installed.

E. Replace or re-hang doors which are hinge bound and do not swing or operate freely.

F. Remove and replace doors which are warped, twisted or which are not in true planes.

G. Replace factory finished doors damaged during installation. Refinish or replace field finished doors damaged during installation.

H. Prior to date of Substantial Completion, readjust and relubricate hardware items as necessary.

3.5 FINAL ADJUSTMENT

A. Wherever hardware installation is made more than 30 calendar days prior to date of Substantial Completion of a space or area, return to the work during the week prior to acceptance or occupancy and make a final check and adjustment of all hardware items in such space or area. Clean and lubricate operating items as necessary to restore proper function and finish of hardware and doors.

Adjust door control devices to compensate for final operation of heating and ventilating equipment, spring power, back check, closing and latching speeds, and handicap requirements.

B. Instruct Owner's personnel in proper adjustment of hardware during the final adjustment of hardware.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Glass and glazing for aluminum entrances, storefronts, and curtain wall.
   2. Glass for wood and hollow steel doors.
   3. Glazing schedule at the end of the Section.

B. Related Sections:
   1. 081113 - Hollow Metal Doors and Frames: Doors and frames to receive glazing.
   2. 084400 - Curtain Wall and Glazed Assemblies: Metal framing and glazing materials.

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.

D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

1.2 REFERENCES

A. American National Standard (ANSI): Z97.1 - Performance Specifications and Test Methods for Safety Glazing Materials in Buildings.

B. American Society for Testing and Materials (ASTM):
   1. C1036 - Standard Specification for Flat Glass.
   2. C1048 - Standard Specification for Heat Treated Flat Glass, Kind HS, Kind FT (Coated and Uncoated).
   3. E773 - Test Method for Seal Durability of Sealed Insulating Glass Units.
   4. E774 - Specifications for Sealed Insulating Glass Units.

C. Glass Association of North America (GANA): Glazing Manual.

D. National Fire Protection Association (NFPA): NFPA 80 - "Standard for Fire Doors and Windows, 1999 Edition."

E. National Fenestration Rating Council Inc. (NFRC).

1.3 GLASS PERFORMANCE CRITERIA

A. Stress Analysis:
   1. The glass manufacturer shall perform stress analysis to determine the proper glass thickness and treatment required to resist the structural and thermal stresses for each glazing condition (based on the worse case for each condition). All costs in conjunction with the analysis shall be borne by the Contractor.
   2. Submit all documentation to the glass manufacturer as required to obtain glass manufacturer's stress analysis.

B. Thermal Stress Criteria:
   1. Assume that warm or cold air from HVAC ceiling registers (located on room side of blinds) will be directed away from window.
   2. Assume that light colored "mini-blinds' will be installed. Assume the space between the window and blinds will be ventilated.
   3. Consideration should be given to shading of the building from adjacent structures.

C. Structural Stress Criteria:
   1. Vertical Glazing: Design glazing to withstand positive and negative wind loads as indicated on the structural drawings.
   2. Design for a glass breakage based on statistical glass breakage factor of 8 lights per 1,000. Breakage of either light in an insulating glass unit shall constitute unit breakage.
   3. Center Deflection: Maximum deflection shall not exceed L/175 or 3/4 inch, whichever is less.

1.4 SUBMITTALS

A. Make submittals in accordance with Section 013300.

B. Submittals specified in this Section may be incorporated into submittal specified in other Sections, where glass is to be provided in those Sections.

C. Product Data: Submit product data on glass, glazing materials, and insulating glass system.

D. Shop Drawings: Show size and thicknesses of glass, proposed "bites" in frames, sizes and locations of blocking, spacers, beads, stops, and edge treatments. Note quality, type, and strength of each light.

E. Documentation:
   1. Submit glass manufacturer's written and graphic analysis demonstrating compliance with requirements as follows.
      a. Indicate the design criteria for each worse case glazing condition.
      b. Indicate calculations verifying conformance to thermal and structural criteria for each worse case glazing condition.
      c. For each separate worse case glazing condition, indicate glass thickness, type, and whether glass is annealed, heat-strengthened, or tempered.
   2. Submit coated glass manufacturer's written verification of review and approval of all glazing details and conditions, including pocket widths, edge bites and edge stresses, and glass thicknesses.
   3. Warranty: Submit draft of manufacturer's and fabricator's warranty for Architect's review. Draft of warranties shall be submitted concurrent with glass analysis submittal and shall include all specified inclusions.

1.5 QUALITY ASSURANCE

A. Comply with pertinent recommendations in the GANA "Manual of Glazing."

B. Safety Glass Standard: Comply with code applicable IBC requirements.

C. Qualifications of Glass Manufacturer: Provide glass produced by a nationally recognized manufacturer of high efficiency glass.

D. Qualifications of Glazers: Provide personnel thoroughly trained and experienced in the skills required, and at least one person completely familiar with the referenced standards and the requirements of this Work, who shall personally direct installation of glazing materials.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with applicable provisions of Section 016000.

B. Provide cushions at edges of glass to prevent impact damage during shipment and storage.

C. Keep vacuum cups free from foreign material that could scratch glass.

D. Comply with insulating unit fabricators requirements for limits on exposure to reduced barometric pressure during shipment.

1.7 WARRANTY

A. Submit warranties under provisions of Section 017700.

B. Replacement Guarantee:
   1. Provide new conforming glass units to replace glass units which break for a period of two years.
   2. Units broken by impact, fire, earthquake, or similar events which exceed the design loads and conditions are not subject to this requirement.
   3. Do not include probability for glass breakage based on specified statistical glass breakage analysis factor.
   4. Include all labor and materials for replacement of failed unit(s). Replacement shall include coordination with the Owner, immediate provision for maintaining openings secure and weathertight, timely ordering and fabrication of replacement items as required, installation, and cleaning.

C. Reflective Coating Warranty: Furnish ten year warranty from the glass manufacturer agreeing to replace glass units which have defective reflective coating. Defective coating is defined as peeling, discoloration, or other forms of deterioration to the reflective coating.

D. Insulating Glass Unit Warranty:
   1. Furnish ten year manufacturer's warranty, including coverage of units for seal failure, interpane dusting or misting, and replacement of same, under provisions of Section 017700.
   2. Furnish manufacturer's warranty, including coverage of units against seal failure, or interpane dusting or misting; term of warranty as follows.
      a. Vertical Applications: Ten years.
      b. Sloped Glazing Applications: Five years.

PART 2 - PRODUCTS

2.1 GLASS

A. Furnish the following glass in combinations as scheduled at the end of this Section:
   1. Clear Glass: ASTM C1036, Type I, class 1 (clear), quality Q3 glazing select.
   2. Low Iron Glass: Pilkington Industries “OptiWhite”, Guardian Industries Corp. "UltraWhite," or PPG Industries "Starphire."
   3. Clear Fire Rated Glass: Clear, polished glazing material which has been tested and approved for 60 minute fire rating. Thickness: 3/16 inch minimum; one of the following.
      a. Technical Glass Products "FireLite - Architectural Quality.",
      b. Vetrotech Saint-Gobain North America, Inc. (Auburn WA; 253-333-0660; 888-803-9533) "SGG Keralite FR-R."
   4. Fire Rated Laminated Glass: 5/16 inch thick laminated fire-rated and impact safety-rated glazing material; one of the following.
      a. Technical Glass Products (Kirkland, WA; 800-426-0279) "FireLite Plus."
      b. Vetrotech Saint-Gobain North America, Inc. (Auburn WA; 253-333-0660; 888-803-9533) "SGG Keralite FR-L."

2.2 ACCESSORIES

A. Setting Blocks: Neoprene; 70-90 Shore A durometer hardness; 4 inches long x 1/4 high x width as required for application indicated.

B. Weather Glazing Sealant: Compatible with insulating glass seal. Refer to Section 084400 for structural sealant requirements.

C. Glazing Tape (Interior): Norton "V-980," PTI "303," or approved. Size: 1/8 inch by 1/2 inch.

D. Translucent Film (GF-1): TBD

2.3 FABRICATION

A. Insulating Glass Units:
   1. Dual lite units fabricated from glass as scheduled; 1/2 inch nominal airspace, unless required otherwise to meet energy performance requirements; dual seal system.
   2. Twin seals; polyisobutylene primary seal and silicone secondary seal. Outer seal shall be compatible with glazing system.
   3. Spacer Bar:
      a. At Base Bid: Stainless steel; “Warm Edge” by Viracon or similar approved.
      b. At Alternate: Mill finish aluminum; fill with desiccant; corners shall be partially miter cut and bent (not cut through), or formed with corner keys ultrasonically soldered in place.
   4. Seals:
      a. Primary Seal – Sealed Unit: Silicone
      b. Secondary Seal – Sealed Unit: Silicone
      c. Spandrel Spacers: Low profile /2” aluminum spacer with clear anodized finish; fill with desiccant; corners shall be partially miter cut and bent (not cut through), or formed with corner keys ultrasonically soldered in place.

5. Certified through the Insulating Glass Certification Council (IGCC) in accordance with ASTM E773 and E774; certified to level CBA.
6. Each piece shall bear certification number, date, and manufacturer's identification mark.
7. Assembly of insulating units shall be by a fabricator approved by the glass materials manufacturer.

B. Tempered and Heat Strengthened Glass:
   1. Tempered Glass:
      a. ASTM C1048, FT; glass which has been heat treated to strengthen glass in bending to not less than 4 times the annealed strength; certified safety glass in accordance with ANSI Z97.1.
      b. Fabricate tempered glass under heat-soaking program to reduce risk of nickel sulfide inclusion.
   2. Heat Strengthened Glass: ASTM C1048, HS ; glass which has been heat treated to strengthen glass in bending to not less than 2 times annealed strength.
   3. Fabricate tempered and heat strengthened glass units so that principle distortion will be in the horizontal direction in the finished installation.
   4. Unless otherwise approved by the building official, provide manufacturer's label on each light, indicating type and thickness of glass.
   5. Comply with IBC para 2406.2 requirements for identification and labeling of safety-glazing materials in hazardous locations subject to human impact loads.
   6. Fabrication Process: Horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.

C. Laminated Glass:
   1. Two layers of glass as scheduled with a minimum .030 inch thick vinyl interlayer. Use .060 thick vinyl interlayer at skylight or canopy conditions with heat treated glass.
   2. Film:
      a. Type 1:
         1) Manufacturer: Kuraray Co., Ltd. (licensee of E. I. du Pont de Nemours, Wilmington, DE; 800-635-3182).
         2) Type: Proprietary isomer, uniform in color or clarity, specifically manufactured for use in fabrication of laminated glass sheets, ultraviolet stabilized, uniform thickness as specified.
         3) Laminating Film: Clear.
      b. Type 2: Interlayer by GlasPro as required to provide specialty laminated glazing indicated on the Drawings.

D. STC-Rated Glazing:
   1. Provide fabricated glazing units as required to achieve STC ratings indicated on the Drawings.
   2. STC ratings may be achieved through the use of laminated glass panes in insulated units, modified airspace thickness in insulated units, or a combination of the two.
   3. Provide certificates of testing demonstrating achieved STC ratings.
   4. Provide minimum STC rating of 37. Provide a minimum STC rating of 39 where indicated or required.

E. Low E Coatings: High performance type; applied by using sputtered deposition technology.
   1. Basis of Design: PPG (Pittsburgh PA; 412-434-2858) "Solarban 60."
   2. Acceptable Substitution: Viracon (Otawana MN; 800 533 2080) "Solarscreen 2000."

F. Edge Treatment:
   1. Glass Edges to be Exposed in the Finished Work: Pencil edge, polished.
   2. Glass Edges Indicated for Exposed Silicone Sealant Treatment: Ground edge, seamed.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this section may properly commence. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.

B. Do not begin installation until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

C. Verify surfaces of glazing channels or recesses are clean, free of obstructions, and ready for work of this Section.

3.2 PREPARATION

A. Clean contact surfaces and wipe dry.

B. Seal frame corner joints, and other leakage points with sealant. At insulating glass units the sealant shall be compatible with the seal of the unit. Do not plug weep holes.

C. Prime surfaces scheduled to receive sealant, unless otherwise recommended by the sealant manufacturer.

3.3 INSTALLATION

A. Setting Blocks: Place setting blocks in frames for support of glass. Place at quarter points unless approved otherwise.

B. Set glass tightly in position with proper clearances in accordance with the referenced standards.

C. Perimeter glass clearances within setting frame shall be in accordance with GANA recommendations, and as required by the glass manufacturer to provide for wind, earthquake drift, and thermal expansion.

D. Unless specified otherwise, glaze units with gaskets furnished with the framing systems specified in other sections.

E. Glazing for Interior Non-Rated Doors and Windows, Where Gaskets Are Not Furnished:
   1. Glaze with glazing tape.
   2. Pre-measure and cut tapes to required lengths; adhere to fixed stops, setting horizontal tape at heads and sills before vertical tape.
   3. Install tape with tight butt joints; no overlaps will be accepted. Set tape with straight lines level with frame sight line.
   4. Position glass, uniformly sealing against tape. Install inside removable stops and place tape in stops forming a uniform seal against glass, level with sight lines.

F. Glazing for Fire Rated Doors and Windows: Glaze in accordance with NFPA 80, unless required otherwise by the labeling requirement of the frame.

G. Butt Glazing: Install butt glazing sealant as indicated; tool to a smooth concave configuration; remove excess sealant. Provide joint width of 3/8 inch plus or minus 1/8 inch.

H. Adjust glazing materials to form a uniform sight line.

I. Glazing Film: Apply protective film to clean #4 surface. Apply glazing film within temperature range recommended by the manufacturer.

3.4 CLEANING

A. Clean excess glazing materials from adjacent finished surfaces.

B. Remove labels after work is completed.

3.5 GLASS TYPE SCHEDULE

A. GL-1: Insulating glass unit with 1/2 inch air space between two panes of glass as follows:
   1. Exterior Glass: Minimum 1/4 inch clear glass with low e coating on #2 surface.
   2. Interior Glass: Minimum 1/4 inch thick clear.

B. GL-20: Minimum 1/4 inch thick clear monolithic glass.

C. Provide tempered glass in hazardous locations to meet the requirements of the jurisdictional code authorities.

D. Provide tempered or heat strengthened panes to meet specified stress analysis requirements.

3.6 GLASS LOCATION SCHEDULE

A. GL-1: Exterior vision glazing, unless specified otherwise.

B. GL-2: Interior glazing unless scheduled otherwise.

END OF SECTION

SECTION 092200 - LIGHTGAGE METAL SUPPORT FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes contractor's option to substitute for wood framing at following locations:
   1. Framing of nonbearing interior partitions.
   2. Ceiling and soffit framing.
   3. Furring.

B. Related Sections:
   1. 055000 - Metal Fabrications: Partial height wall bracing.
   2. 061000 - Rough Carpentry: Blocking and backing.
   3. 098100 - Acoustic Insulation: Insulation between framing members.

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to work of this Section.

D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. A641 - Zinc-Coated Galvanized) Carbon Steel Wire.
   2. C635 - Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings.
   3. C645 - Non-Loadbearing Steel Studs, Runners, and Rigid Furring Channels.
   4. C754 - Installation of Steel Framing Members to Receive Screw-Attached Gypsum Wallboard, Backing Board, or Water-Resistant Backing Board.

1.3 SUBMITTALS

A. Make submittals in accordance with Section 013300.

B. Closeout Submittal:
   1. In accordance with Section 017700.

1.4 QUALITY ASSURANCE

A. Unless indicated or specified otherwise, perform work in accordance with ASTM C754.

B. Code Requirements:
   1. Provide assemblies meeting the hourly fire ratings indicated and specified. Assemblies shall been tested in accordance with ASTM E119, and shall be approved by the local jurisdictional code authorities. Coordinate installation of other materials which are a part each assembly.
   2. Fire rating requirements take precedence over the construction requirements indicated. In the event of conflict, notify the Architect, and do not begin construction in the area of conflict until the conflict has been resolved.
   3. Provide calculations, drawings, product data, and other verification as required by the jurisdictional code authority to obtain approval of the lightgage metal framing installation.

C. Deflection Criteria:
   1. Unless otherwise indicated, maximum allowable deflection of metal support framing at walls shall be L/240.
   2. Maximum allowable deflection of metal support framing at walls where tile is indicated, or where wall-mounted casework is indicated, shall be L/360.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Non-Load Bearing Light Gage Metal Framing:
   1. ASTM C645; galvanized; minimum 25 gage unless indicated or specified otherwise.
   2. Furnish "C" shaped studs, depth as scheduled, with return lip and not less than 1-1/4 inch flanges; prepunched openings for the installation of stiffening channels and mechanical and electrical items.
   3. Furnish U shaped tracks (runners), hat and "Z" shaped furring channels, and other sizes and shapes as indicated on the Drawings, and required by the referenced standards.
   4. Gages:
      a. Furnish gages as necessary to meet deflection requirements, unless indicated or specified otherwise.
      b. Top runner for partitions extending only to the acoustical ceiling grid shall be 20 gage.
      c. Provide minimum 20 gage for full height partition framing extending from structure to structure.
      d. Provide minimum 20 gage studs at jambs of doors and interior relites.
      e. Provide minimum 20 gage studs at walls where wall-mounted casework is indicated.
   5. Partition Head Compensating Channel (Non-Fire Rated): Design for minimum ±1/2 inch deflection. Profiles as indicated; one of the following.
      a. 20 gage deep leg track; 2 inch legs.
      b. Proprietary compensating channel system; Contractor's option.

B. Channels: Hot or cold rolled channels; rust inhibitive paint coating; sizes in accordance with ASTM C754.

C. Proprietary Ceiling Suspension System:
   1. Manufacturer:
      a. As specified: Chicago Metallic (Los Angeles CA; 800-323-7164).
      b. Acceptable Substitutions:
         1) USG Interiors, Inc. (Chicago, IL; 800-874-4968).
         2) Armstrong (800-207-2321).
   2. Suspension System: Similar to System 650, or 670; ASTM C635 heavy duty classification.
      a. Furring Runners: Manufactured from 0.020 inch thick steel 1-3/8 inch wide with knurled face by 1-1/2 inches high; factory punched cross tee slots, hanger holes, and non-directional bayonet end tab couplings.
      b. Furring Tees: Manufactured from 0.020 inch thick l-3/8 inch wide with knurled face by 1-1/2 inches high; factory punched cross tee slots and hanger holes.
      c. Furring Cross Channel: 0.020 inch thick steel; 1-3/8 Inch wide with knurled face by 7/8 inches high by 48 inches long with straight locking end tabs.
      d. Cross Tees: 0.020 inch thick steel 15/16 inch wide by 1-1/2 inches high; with staked-on dip end tab couplings, factory punched cross tee slots.
      e. Moldings: Manufacturer's standard.
      f. Channel beam splice clip: Manufacturer’s standard.

D. Accessories:
   1. Screws: Self tapping; low profile head; galvanized.
   2. Hanger wire: ASTM A641; Class 1 zinc coating; soft temper; prestretched; 12 gage.
   3. Partition Clips (for attachment of head channel to acoustical ceiling suspension system): "The Revoe Clip “WSC-18/18A" by Revoe Manufacturing Ltd. (Calgary, AB; 403-225-2170; 800-665-9419), "Donn Partition Attachment Clip" PAC15-SQ by USG Corporation (Chicago IL; 877-874-4200), or approved.

E. Other Framing Materials: Provide other framing materials in accordance with ASTM C754.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.

B. Do not begin work until unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

3.2 INTERIOR PARTITION FRAMING

A. Runners:
   1. Secure runners with fasteners at maximum 24 inches oc.
   2. At concrete floors, use powder driven fasteners or drilled in concrete anchors.
   3. Where indicated, attach top track to acoustical ceiling grid using specified partition clip at 24 inches on center. Provide spacer strip between runner and ceiling suspension system to allow tegular or reveal edge acoustical panels to clear partition. Use minimum 20 gage top track.
   4. Top Runner: Secure head track to structure with allowance for structural deflection.
      a. Non Rated Partitions: Use proprietary compensating channel or deep leg track at Contractor's option, as necessary to accommodate building deflection.
   5. Align to tolerances specified.

B. Unless indicated otherwise, install studs vertically at 24 inches oc, and not more than 2 inches from abutting construction, at each side of openings, and at corners.

C. Fit runners under and above openings; secure intermediate studs at spacing of wall studs.

D. Brace partition framing system and make rigid. Provide diagonal stud bracing at maximum 8 ft on center at framing which does not extend to structure. At partitions attached to acoustical ceiling grid with partition clip, screw attach bracing to clip. Brace shall allow placement of acoustical tile without cutting.

E. Install double studs continuous from floor to ceiling track at the jamb of each door frame and cased opening. Studs shall be no less than 20 gage. Provide diagonal steel stud bracing to structure at each jamb at partitions which do not extent to structure.

F. Install minimum 20 gage studs at partitions indicated for support of modular wall-mounted casework.

G. Coordinate erection of studs with installation of service utilities. Align stud web openings.

H. Coordinate installation of bucks, anchors, blocking, electrical, and mechanical work to be placed in or behind stud framing.

I. Coordinate erection of stud system with requirements of door and window frames, fire extinguisher cabinets, recessed toilet accessories, access doors, acoustical insulation, and other construction within partition.

J. Coordinate the installation of framing with the gypsum board installer to ensure support at board edges. Provide framing immediately either side of expansion joints.

K. Stud splicing not permissible.

L. At non-load bearing full height partitions subject to compression caused by overhead structural deflection, and where proprietary compensating channel system is not used, cut studs 1/2 inch short from full height. Do not rigidly connect stud to top runner.

M. Furring at Rigid Insulation:
   1. Space "Z" furring channels at a maximum of 16 inches on center, and no more than 3 inches from corners.
   2. Unless indicated otherwise, install framing vertically with fasteners at 24 inches on center. Provide shims as required to meet tolerance requirements specified.
   3. Coordinate installation of framing to allow installation of rigid insulation as specified in another Section.

N. Stud Bridging:
   1. At interior partitions greater than 4 feet in length, and with rigid facing material on one stud flange only, provide 3/4" bridging channels in horizontal rows at a maximum of 5'-0" on center for the full height of the partition.
   2. Interior full height partitions (studs extending from the floor to the structure above) with rigid facing material stopping 3'-0" or more below top of studs - Provide one row 3/4" bridging channel horizontally at termination of gypsum board material, and one additional row for each 5'-0" of exposed studs.
   3. Install stud bridging channels in long lengths, wire tying and lapping the joints a minimum of 12 inches. Attach bridging channel to each stud as shown in manufacturer's printed instructions.

3.3 BACKING

A. Provide steel backing, unless indicated otherwise, for the support of wall mounted items.

B. Unless indicated otherwise, steel backing shall consist of minimum 4 inch wide 16 gage steel plate screwed rigidly to the studs.

C. Provide wood backing and blocking at handrails, grab bars, and similar items in accordance with Section 061000.

3.4 CEILING, SOFFIT, AND FASCIA FRAMING

A. Coordinate locations of hangers and supports with the work of other Sections.

B. Ceiling framing shall consist of stud and runner framing or suspended framing, unless indicated or specified otherwise.

C. Stud and Runner Framing:
   1. Secure runners to structure above with fasteners at a maximum of 24 inches on center. Size fasteners and use reinforcements as necessary to support the dead loads applied.
   2. Screw fasten framing at each flange joint.
   3. Space studs at 16 inches on center at horizontal locations.
   4. Select members to meet the structural requirements specified.

D. Lightgage Suspended Framing:
   1. Install in accordance with ASTM C754, unless indicated or specified otherwise.
   2. Suspend ceiling from overhead structural elements only. Do not support from any electrical, HVAC, plumbing, or sprinkler system components.
   3. Space carrying channels 4 feet on center with splices lapped 12 inches and tied.
   4. Support cold rolled carrying channels with hanger wires spaced at 3 feet on center for lath and plaster ceilings and 4 feet on center for gypsum board ceilings. Loop hanger wire around support element and tightly wrap around vertical wire 3 times; cut off neatly.
   5. Space furring channels 16" o.c. with splices lapped 12", minimum and tied; clip or saddle tie to runner channels with 16-gage tie wire.
   6. Where overhead obstructions prevent the regular spacing of hangers, provide secondary carrying members for indirect support of the suspension system, or reinforce the nearest adjacent hangers and related framing components as required to span the required distance.

E. Proprietary Suspended Framing: Install in accordance with manufacturer’s recommendations.

F. Stabilize suspended ceiling, soffit, and fascia framing against lateral movement by means of diagonal bracing. At locations where partitions extend to ceiling, only, install supplementary bracing at maximum 8'-0" o.c. along length of partition, and above each door hinge and strike jamb.

G. Form openings in ceilings and frame openings for recessed light fixtures, air diffusers, access doors, hatches, etc.

H. Install supplementary hanger wires for support of ceiling mounted equipment.

3.5 TOLERANCES

A. Install members to provide surface plane with maximum variation of 1/8 inch in 10 feet in any direction.

B. Locate assemblies within 1/4 inch of required locations.

C. Locate framing on the center of the joint between gypsum board panels, within a tolerance of 1/4 inch.

END OF SECTION

SECTION 092843 - GYPSUM SHEATHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Gypsum sheathing.

B. Related Sections:
   1. 061000 – Rough Carpentry: Support framing.
   2. 072700 – Air Barriers
   3. 092200 – Lightgage Metal Support Framing: Support framing.
   4. 092900 - Gypsum Board: Interior gypsum products.

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.

D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. C1177 - Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
   2. C1278 - Standard Specification for Fiber Reinforced Gypsum Panel

1.3 SUBMITTALS

A. Make submittals in accordance with Section 013300.

B. Product Data: Product literature on gypsum sheathing and screw fasteners.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Gypsum Sheathing: One of the following:
   1. G-P Gypsum Corporation "Dens-Glass Gold"; glass mat faced; ASTM C1177; 5/8 inch thickness.
   2. Certainteed. "GlasRoc"; glass mat faced; ASTM C1177; 5/8 inch thickness.
   3. USG "FIBEROCK® Brand Sheathing with Aqua-Tough™"; ASTM C1278; 5/8 inch thickness.

B. Screws: Galvanized, self-drilling bugle head screws; minimum 1-1/4 inch long.

C. Joint and Penetration Sealant: Dow Corning 795 Building Sealant.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.

B. Do not begin installation until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

C. Verify that framing is ready for installation of sheathing.

3.2 GYPSUM SHEATHING INSTALLATION

A. Install sheathing boards parallel or perpendicular to framing. Install parallel to framing at fire rated walls. Apply sheathing with vertical joints staggered. All edges shall be supported as follows:
   1. Maximum span: 24 inches.
   2. Maximum cantilever: 2 inches.

B. Install sheathing with coating towards exterior.

C. Screw to framing. Space fasteners 8 inches o.c. in field and 4 inches o.c. at ends along each framing member.

D. Do not bridge expansion or seismic joints.

E. Tape joints when required by manufacturer of air barrier system with manufacturer's recommended joint tape. Coordinate with Section 072700.

F. Coordinate with Division 26 work for cutouts for electrical penetrations.

END OF SECTION

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Interior gypsum board.

B. Related Sections:
   1. 061000 – Rough Carpentry: Support framing for gypsum board; blocking and backing.
   2. 092200 - Lightgage Metal Support Framing: Support framing for gypsum board; tolerance requirements.
   3. 098100 - Acoustic Insulation.

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to work of this Section.

D. Substitutions: Substitutions will be considered only under the terms and conditions of Section 016000.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. C475 - Joint Treatment Materials for Gypsum Wallboard Construction.
   2. C931 - Standard Specification for Exterior Gypsum Soffit Board
   3. C1002 - Steel Drill Screws for the Application of Gypsum Board.
   4. C1177 Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing
   5. C1395 - Specification for Gypsum Ceiling Board
   6. C1396 - Specification for Gypsum Board
   7. D3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber

B. Gypsum Association (GA):
   1. GA-214 - Recommended Levels of Gypsum Board Finish.
   2. GA-216 - Recommended Specifications for the Application and Finishing of Gypsum Board.

C. South Coast Air Quality Management District (SCAQMD)
   1. Rule #1168 (July 1, 2005; Amended January 7, 2005).

1.3 SUBMITTALS

A. Make submittals in accordance with Section 013300.

B. Submit complete manufacturer's product literature and installation instructions for each of the materials used.

1.4 QUALITY ASSURANCE

A. Perform work in accordance with GA 216, unless specified otherwise, or required otherwise to meet fire rating requirements.

B. Regulatory Requirements:
   1. Provide assemblies meeting the hourly fire ratings indicated and specified. Assemblies shall be approved by the local jurisdictional authorities.
   2. Fire rating requirements take precedence over the construction requirements indicated. In the event of conflict, notify the Architect, and do not begin construction in the area of conflict until the conflict has been resolved.

C. Assembly Instructions: Contractor shall keep at the site and make available to installers a copy of the following:
   1. GA 216.

1.5 SEQUENCE AND SCHEDULING

A. Conform to the requirements of the Indoor Air Quality Management Plan developed by the Contractor and specified in Section 013544.

PART 2 - PRODUCTS

2.1 GENERAL

A. Provide materials complying with LEED basis of design for recycled content and regional materials contents as scheduled in Section 013546.

2.2 GYPSUM BOARD MATERIALS

A. Furnish boards of maximum permissible length for type of installation indicated, tapered edge for boards to be exposed, taped and finished; square edge for boards in concealed applications; 5/8 inch thick unless noted or specified otherwise; furnish type X for fire rated partitions.

B. Types:
   1. Standard Board, Backing Board: ASTM C1396; 5/8 inch thickness unless otherwise indicated.
   2. Water Resistant Board: ASTM C1396.
   3. Mold Resistant Gypsum Board: USG Corporation "Fiberock Aqua-Tough Interior Panels;" Georgia Pacific "DensArmor Fireguard Interior Guard", National Gypsum Co. "Gold Bond Brand XP Fire-Shield Wallboard," or approved; comply with ASTM C1396 or ASTM C1177; 5/8 inch thickness; Type "X." Back shall be resistant to mold and mildew growth; average score of not less than 8 when tested in accordance with ASTM D3273.
   4. Ceiling Board: ASTM C1395; sag resistant.

C. Interior gypsum board shall meet the testing and product requirements of the California Department of Health Service: *Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small Scale Environmental Chambers*, including 2004 Addenda.

D. To the greatest extent possible, select gypsum board products with the maximum recycled content.

2.3 ACCESSORIES

A. Resilient Channels: 25 gage x 1/2" x 2-1/2"; provide 3/8" x 3" slots at 4 inches o.c. in web; one of the following:
   1. Clark Dietrich Building Systems; “RC-1 Pro”.
   2. USG “RC-1”.
   3. Unimast Inc. "RC Deluxe Resilient Channel"; .

B. Adhesive for Laminated Construction:
   1. Recommended by the adhesive manufacturer for the application.
   2. Adhesives shall meet the requirements of SCAQMD Rule 1168. (maximum VOC content of 70 grams/liter)

C. Interior Gypsum Trim:
   1. Conform to GA 216, unless indicated or specified otherwise.
   2. Concealed flange crimp-on or tape-on type; metal; PVC not approved.
   3. Control Joint Trim: USG 093 or approved.
   4. Reveal Moldings: Fry Reglet Co., Pittcon Industries, Inc., Gordon Inc, or approved; aluminum extrusions with taping flanges; shapes as indicated.

D. Joint Tapes:
   1. Standard: ASTM C475 and GA 216.
   2. Mesh Tape for Water Resistant Backing Board: 2-1/2 inch wide glass fiber tape; 10x10 mesh; self adhesive type.

E. Joint and Finishing Compound: ASTM C475; furnish setting type joint compound for use at water resistant and exterior soffit board.

F. Screws: ASTM C1002; galvanized or polymer coated at exterior locations; maximum 1 inch length for attachment to resilient channels.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.

B. Do not begin work until unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

3.2 GYPSUM BOARD INSTALLATION

A. Install gypsum board in accordance with GA 216, and fire rated assembly requirements.

B. Resilient Channels: Install channels at 24 inches o.c. with screws through pre-punched holes into framing.

C. Erect wallboard so that edges and corners are firmly supported.

D. Use screws to fasten gypsum board to metal furring or framing. Adhesive application of gypsum board may be used if it is in accordance with the manufacturer's recommendations and meets fire rating requirements.

E. For screwing wallboard into resilient furring, use 1 inch screws. Do not drive screws into framing.

F. Double Layer Applications:
   1. Use backing board or standard board for first layer.
   2. Offset joints of second layer from joints of first layer.

G. Trim:
   1. Use longest practical lengths, with no piece less than 2 feet long for continuous runs greater than 8 feet. Securely fasten and align trim ends at joints.
   2. Place concealed flange corner beads at external corners. At angles other than 90 degrees, bend the flange to conform to the angle.
   3. Place concealed flange type L trim where gypsum board abuts dissimilar materials.
   4. Use J trim at exposed gypsum board edges, and at joints where sealant is indicated.

H. Allow a 1/2 inch gap where gypsum board extends to overhead structure and deflection provisions are incorporated into lightgage metal framing. Do not fasten gypsum board to top runner. Where the ceiling is exposed in the finished work, finish top edge with a casing bead, and caulk with acrylic sealant as specified in Section 079200.

I. Sealant Joints:
   1. Coordinate installation of firestopping and sealants at concealed joints between partitions and structure at fire rated and acoustically insulated partitions.
   2. Where sealant joints are indicated at ends or edges of wallboard, install for uniform 1/8 inch joint, unless otherwise indicated. Installation of sealant in exposed locations is specified in Section 079200.

J. Provide water resistant gypsum board as a substrate where tile is indicated to be installed over gypsum board surfaces. Cement board backing for tile surfaces is specified in Section 093000.

K. Except where mold resistant gypsum board is indicated, provide water resistant gypsum board at walls in restrooms, toilets, shower rooms, janitor closets and other areas subject to similar damp conditions. Install exterior gypsum soffit board at ceilings.

L. Install required number of layers of wallboard behind panel boards, fire extinguisher cabinets, and other recessed elements as necessary to maintain fire rating of walls.

3.3 CONTROL JOINTS

A. Discontinue gypsum board and use control joint trim at control joints.

B. Coordinate with the framing installer to ensure that framing is installed immediately on either side of each control joint.

C. Space control joints as indicated. When not indicated, locate as follows:
   1. At maximum 30 foot intervals along continuous wall planes.
   2. At maximum 50 foot intervals at continuous ceilings with perimeter relief.
   3. At maximum 30 foot intervals at continuous ceilings without perimeter relief.
   4. At locations where expansion or control joints occur in the building structure.
   5. Locate control joints to form rectangular or square sections, in "L," "U," "T," or other irregularly shaped areas.
   6. Position control joints to intersect light fixtures, air diffusers, door openings, and other areas of stress concentration.
   7. Coordinate with Section 092200 for special requirements at fire rated assemblies.

D. Verify location with the Architect prior to installation. Give the Architect a minimum of 48 hours notice.

3.4 FINISHING

A. Provide finishing in accordance with GA 214.

B. Where necessary to sand, do so without damaging the face of the gypsum board.

C. Levels of Finish:
   1. Level 5: Not Used
   2. Level 4:
      a. Typical, unless indicated or specified otherwise.
      b. Surfaces to receive acoustic plaster
   3. Level 3: Provide at the following locations:
      a. Surfaces to receive fabric wall covering.
      b. Surfaces to receive textured finishes.
   4. Level 2: Provide at the following locations:
      a. Storage rooms.
      b. Mechanical rooms.
      c. Janitor’s closets.
      d. Surfaces to receive tile or other thick finish materials applied to gypsum board surfaces.
   5. Level 1: Provide at the following locations:
      a. Surfaces of acoustical assemblies concealed form view in the finished work.
      b. Surfaces of fire rated assemblies concealed from view in the finished work (“fire-taping”) or where one side of partition is outside normal scope of Work of this Contract. Where a fire resistance rating is required for the gypsum board assembly, finish on both shall be in accordance with requirements indicated on the Drawings for rating indicated.
   6. Level 0: Provide at surfaces of non-fire rated assemblies concealed from view in the finished work, including surfaces to be covered by casework, wood paneling,

D. Level 4 finishes: Return to the site after primer is applied and touch-up surface defects.

3.5 TOLERANCES

A. Install gypsum board with 1/8 inch in 10 feet maximum variation from plane in any direction.

END OF SECTION

SECTION 093000 - TILING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Interior wall tile.
   2. Interior floor tile.
   3. Tile backing board.
   4. Reinforced waterproof membranes.
   5. Crack isolation membranes.
   6. Screeds.
   7. Sealer.

B. Related Sections:
   1. 030013 - Concrete: Substrate.
   2. 079200 - Joint Sealants: Expansion joint fillers.
   3. 092900 - Gypsum Board: Substrate.

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to work of this Section.

D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

1.2 REFERENCES

A. American National Standards Institute (ANSI):
   1. A108.1 - Ceramic Tile Installed with Portland Cement Mortar.
   2. A108.02 - General Requirements: Materials, Environmental, and Workmanship
   3. A108.5 - Installation of Ceramic Tile With Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar.
   4. A108.6 - Installation of Ceramic Tile With Chemical-Resistant, Water Cleanable Tile-Setting and Grouting Epoxy.
   5. A108.10 - Installation of Grout in Tilework.
   6. A108.13 - Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone.
   7. A118.3 - Chemical Resistant Water Cleanable Tile-Setting and Grouting Epoxy.
   8. A118.4 - Latex-Portland Cement Mortar.
   9. A118.10 - Standard for Load Bearing, Bonded, Waterproof Membranes for Thin-set Ceramic Tile and Dimension Stone Installation.

B. South Coast Air Quality Management District (SCAQMD)
   1. Rule #1168 (July 1, 2005; Amended January 7, 2005).

C. Tile Council of North America (TCNA):
   1. Handbook of for Ceramic Tile Installation, current edition.

1.3 DEFINITIONS

A. Expansion Joints: Unless otherwise detailed, expansion joints in tile fields are sealant-filled joints to accommodate expansion and contraction of tile and possible substrate movement at slab control and construction joints.

1.4 SUBMITTALS

A. Make submittals in accordance with Section 013300.

B. Product Data: Submit for each type of tile, grout, adhesive, additive, accessory, and membrane specified.

C. Shop Drawings: Indicate general layout, surrounding construction, location of expansion joints in substrates and tile fields, edge details, and special conditions.

D. Samples:
   1. Tile: Submit samples of each type and color of tile. Include representative range of colors and finishes to be expected.
   2. Grout: Submit cured samples of each grout color. Furnish 2 cured samples of approved grout colors to the expansion joint sealer installer for color matching.
   3. Screeds: Submit samples of each type and finish of screed; minimum 3 inch length.

1.5 QUALITY ASSURANCE

A. Conform to ANSI Standard Specifications for the Installation of Ceramic Tile.

1.6 DELIVERY, STORAGE, AND HANDLING

A. In accordance with Section 016000.

1.7 GUARANTY

A. In accordance with Section 017700, furnish from the tile installer, a two year written guaranty, executed to the Owner, against defects in workmanship and materials.

1.8 SEQUENCE AND SCHEDULING

A. Conform to the requirements of the Indoor Air Quality Management Plan developed by the Contractor and specified in Section 013544.

PART 2 - PRODUCTS

2.1 TILE

A. Tile Types: As follows:
   1. Ceramic Floor Tile:
      a. Manufacturer, Style, Sizes and Colors per finish schedule.
   2. Ceramic Wall Tile:
      a. Manufacturer, Style, Sizes and Colors per finish schedule.

B. Special Shapes: Unless otherwise indicated or specified, furnish special shapes as standard with the tile manufacturer for uniform transitions and concealed edges in the finished installation. Special shapes include bullnoses, double bullnoses, corner bullnoses, and cove assemblies.

2.2 ACCESSORY MATERIALS

A. Setting Mortars:
   1. Thin Bed Mortar: Latex modified; "Kerabond" with "Universal Keralastic" by Mapei Corp., "211 Crete Filler Powder" with "4237 Latex Thin-set Mortar Additive," by Laticrete International, Inc., Hydroment"Tile-Mate Premium" with "447 Flex-a-lastic" by Bostik, or approved.
   2. Medium Bed Mortar: "Grani/Rapid" by Mapei Corp., Hydroment "Medium Bed Mortar" by Bostik, or "226 Thick Bed Mortar Mix" with "3701 Latex Mortar Admix," by Laticrete International, Inc., or approved.
   3. Thick Bed Mortar:
      a. Cement: ASTM C150, Type I.
      b. Hydrated Lime: ASTM C206, Type S, or ASTM C207, Type S.
      c. Sand: ASTM C144.
      d. Water: Clean and free from amounts of matter deleterious to setting bed materials.
      e. Proportioning: In accordance with TCNA Handbook.
   4. Meet the requirements of SCAQMD Rule 1168. (maximum VOC content of 250 grams/liter for mortar.

B. Cementitious Sanded Grout:
   1. Fast Setting: "Ultra/Color" by Mapei Corp., "Floor Joint and Grout Filler" with "3701 Latex Mortar Admixture" and "101 Rapid Set Latex", by Laticrete International, Inc. (proportions as recommended by the manufacturer for the setting time required); sanded, except unsanded at joints scheduled at 1/16 inch wide.

2. Standard Grout: "Ultra/Color" by Mapei Corp., "Keracolor S" by Mapei Corp., or "1500 Series Sanded Grout" with "1776 Grout Admix Plus", by Laticrete International, Inc., Hydroment"Ceramic Tile Grout /Joint Filler" with "425 Flexible Grout Admixture" by Bostik; sanded, except unsanded at joints scheduled at 1/16 inch wide.
3. Colors: As selected by the Architect from the manufacturer's standard line.

C. Epoxy Grout:
1. Mapei "Kerapoxy," Hydroment "100% Solids Epoxy," by Bostik, Laticrete International Inc. "Spectralock Pro," or approved; colors as scheduled on the Drawings.
2. Meet the requirements of the SCAQMD Rule 1168 (maximum VOC content of 250 grams/liter for grout.

D. Tile Backing Board and Accessories:
1. Cementitious Backing Board: 1/2 inch nominal thickness aggregated portland cement panel, reinforced with glass fiber mesh; "Durock Brand Cement Board" by USG (800-874-8968, "Wonderboard" by Custom Building Products (800-272-8786), or approved.
2. Joint Tape: Open weave glass mesh joint tape, self-adhesive; 2-1/2 inches wide.
3. Fasteners: As recommended by the backing board manufacturer; thread forming self-drilling wafer head screws; polymer coated or zinc plated; USG "Durock Screws," "Rock-On," or approved.

E. Tile Waterproofing Membrane: Conform to ANSI 118.10; one of the following.
1. "NobleSeal TS," by The Noble Company; reinforced CPE sheet membrane.
2. "DalSeal TS." By Dal-Tile Corp.
3. "Mapelastic" ("PRP 315") by Mapei Corp.
4. "Laticrete 9235," by Laticrete International.
5. "RedGard Waterproofing and Crack Prevention Membrane" by Custom Building Products

F. Crack Isolation Membrane: One of the following.
1. "NobleSeal CIS," by The Noble Company; reinforced CPE sheet membrane; 36" width; NobleBond 21 adhesive.
2. "ECB Membrane," by N.A.C. Products Inc.; self bonding reinforced modified asphalt sheet membrane; 36" width.
3. Mapelastic SM by the Mapei Corp.

G. Cleavage Membrane: ANSI 108.02; #15 roofing felt.

H. Metal Screed: As manufactured by Schlüter Systems, Inc. (800/225-8902), Ceramic Tool Company, (800/236-5230), or Blanke Corporation (800/787-5055); clear anodized aluminum or stainless steel, as indicated on the Drawings; tile edging trim, types as indicated; sizes as required for installation of top of screed flush with top of tile, as detailed.

I. Reinforcing Mesh: 2" x 2" x 16/16 gage welded wire mesh or approved.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.

B. Do not begin installation until unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

C. Verify that locations of expansion joints, control joints, and construction joints in substrate correspond to tile expansion joint locations.

3.2 PREPARATION

A. Clean substrate surfaces free of grease, dirt, dust, organic impurities, and other materials which would impair bond. Where curing agents have been used mechanically abrade or shotblast substrate surface.

3.3 TILE BACKING BOARD INSTALLATION

A. Use cementitious backing board, except where gypsum backing board is indicated.

B. Install in accordance with the manufacturer's installation instructions.

C. Install units with edges firmly supported.

D. Screw attach units with 1 inch long drywall screws spaced 6 inches on center along framing.

E. Install fiberglass reinforcing tape at joints between panels. Completely embed in a thin set mortar bed. Trowel mortar smooth with adjacent surfaces.

F. Where cementitious tile backing board is indicated as substrate for wainscot, ensure that backing board has been properly shimmed to align with gypsum board above.

3.4 CRACK ISOLATION MEMBRANE

A. Install crack isolation membrane in accordance with the manufacturer's instructions, unless indicated or specified otherwise.

B. Provide crack isolation membrane at following locations:
   1. At control and construction joints in concrete floors.
   2. At changes in substrate materials.
   3. Shrinkage cracks 1/16 inch or larger in slabs as directed by the Architect.

C. Extend a minimum of 12 inches each side of crack or joint.

D. Do not apply crack isolation membrane at joints which will be reflected as expansion joints in the tile.

E. Substrate Examination:
   1. Substrates are subject to examination by the Owner and the Architect prior to installation of tile or slab leveling materials. Furnish a minimum of 14 days notice.
   2. The examination will determine the need for additional crack isolation membrane at shrinkage cracks and other special conditions.
   3. Provide additional crack isolation membrane in locations as directed, in accordance with provisions of Section 012200.

3.5 SLAB LEVELING

A. Prior to installation of floor tile, where local irregularities in the substrate surface would prevent level installation of the tile, the substrate shall be brought to plane surface with variations not to exceed 1/8 inch in 4 feet (cumulative) and 1/4 inch in 10 feet (non-cumulative). Smooth abrupt changes in plane.

B. Use thin or medium bed mortar or other filler for slab leveling. Other fillers are subject to endorsement by the setting mortar manufacturer and subject to the VOC requirements specified for the mortar. Submit manufacturer's letter of approval to the Architect, and the Owner's Representative.

C. Screed or float to appropriate thickness and specified surface tolerance. Allow to set prior to proceeding with installation. Do not exceed the maximum thicknesses for thin bed mortar as recommended by the manufacturer.

3.6 TILE WATERPROOF MEMBRANE INSTALLATION

A. Install waterproof membranes in strict accordance with manufacturer's installation instructions and in accordance with ANSI A108.13.

B. Install waterproof membranes at first and second floor bathrooms and showers where tile flooring is indicated.

C. At above grade locations, install waterproof membrane completely over floor surfaces indicated, and up the wall.

D. Where the waterproof membrane is extended up the wall, extend to one tile height. Do not expose the waterproof membrane to view.

E. Protect waterproof membrane from damage until after tile installation is complete.

F. Install waterproof membrane into clamping ring of floor drain.

3.7 INSTALLATION OF TILE

A. Interior Floor Application – Thin or Medium Bed Mortar over Concrete Substrate and Concrete Substrates with Crack Isolation Membrane or Waterproof Membrane.
   1. TCNA System: F113 or F122 at Membranes.
   2. Installation Standard: ANSI A108.5.
   3. Setting Materials:
      a. Thin bed mortar; 3/32 inch minimum thickness.
      b. Medium bed mortar: ¼ inch minimum thickness; use at large format tiles.
   4. Use epoxy grout.

B. Interior Floor Application - Thickset Over Concrete Substrate:
   1. TCNA System: F111 and F112.
   2. Installation Standard: ANSI A108.1.
   3. Install over cleavage membrane
   4. Bond Coat: Thinset mortar over thickset mortar bed; 3/32 inch minimum thickness.
   5. Slope the mortar bed evenly to the floor drains.
   6. Use epoxy grout.

C. Wall Application - Gypsum Board Substrate:
   1. TCNA System: Similar to W243.
   2. Installation Standard: ANSI A108.5.
   3. Setting Materials: Thin bed mortar.
   4. Use epoxy grout.

D. Special Requirements for Thick Mortar Bed:
   1. Apply setting and mortar beds to thicknesses required for ultimate proper alignment of tile surfaces with adjacent floor materials. At carpet, tile shall align with carpet crush line elevation. Compensate for indicated pitches, tile thicknesses, and bond coat thickness.
   2. Install reinforcing mesh at mid depth of thick mortar beds at floors and decks. At ramps formed by tapered setting beds, terminate mesh near low end of ramp; maintain 1/4 inch mortar cover.

E. Joint Pattern:
   1. Lay out tile pattern prior to commencing tile installation.
   2. Accurately locate grout joints on lines indicated; where not indicated, adjust grout joints within specified tolerances to minimize use of cut tiles at field edges.
   3. Where cut tiles are necessary, position tile such that cut tile at each edge of each rectilinear field is not less than half of a full size unit, unless indicated otherwise.

F. Tiles shall be blended as required to avoid pattern repeats and "patches" of adjoining tiles of distinctive color or character within each field area. Coordinate distribution of tiles with the Architect.

G. Tiles which exhibit directional patterns shall be set with grain direction as indicated on the shop drawings, or, if not indicated, as directed by the Architect.

H. Install tiles aligned with adjacent finishes, where indicated. Provide mortar fill as necessary for proper alignment.

I. Except as otherwise indicated, install bullnose tiles at exposed tile edges, including edges adjacent to carpet, edges of planters, external corners, and tops of bases.

J. Ceramic Tile: Install coved transition pieces to match horizontal surface tile colors in restrooms, at intersections of floor tile with walls. Install tile for square corners at vertical inside corners.

K. Clean joints of mortar to minimum depth of 1/4 inch to allow subsequent grout installation.

L. Provide temporary setting buttons and shims as necessary to maintain wall tiles in position until setting mortar has set.

M. Tolerances:
1. Joint Width Variation: Plus or minus 25% of the proposed joint width.
2. Taper: Plus or minus 25 percent from one end to the other.
3. No portion of a tile surface shall vary more than 1/16 inch above or below an adjacent tile surface.
4. Install tile fields level to within tolerance specified for finished substrate.

N. Special Requirements for Large Format Tiles (8 x 8 inch size or larger):
1. Wash backs of each tile to remove dust and soil that would compromise adhesion.
2. Dampen substrate as necessary to prevent excessive suction.
3. Key the mortar into the substrate with the flat side of the trowel.
4. Comb mortar over the previously keyed substrate in one direction using the notch side of the trowel.
5. Apply mortar to the backside of (back-butter) any tile with any single dimension over 24 inches.
6. Firmly press each tile into the mortar. Press down and move the tile back and forth perpendicularly across the ridges approximately 1/8 to 1/4 inch to flatten the ridges and fill in the valleys of the combed mortar.
7. Set tiles in accurate alignment.

O. Screed Installation:
1. Install screeds at tile field edges at the locations indicated.
2. Accurately cut to length for flush tightly butted joints. Provide miter cut angle joints. Remove burrs at field cuts.
3. Install in longest possible lengths, except that no screed section shall be longer than 12 feet or shorter than 4 feet in length for continuous runs greater than 16 feet.
4. Install screeds free from waves and variations in height, flush with top of adjacent tile surfaces.
5. Set screeds directly in setting bed as the tile installation proceeds. Comply with screed manufacturer's instructions to achieve mortar tightly compacted between screed and tile edge.
6. Grind screed joints as necessary to correct minor misalignment and to ease sharp outside corners.

P. Special Requirements for Restroom Tile:
1. Provide coved base at intersection of floor with walls. Base shall match floor tile color.
2. Provide squared vertical inside corners, with appropriate coved inside angle at base.
3. Provide bullnose at outside corners with appropriate coved outside angle at base.
4. Provide bullnose at exposed edges and top of wainscot.
5. Provide all other special shapes as required for complete and finished installation.

3.8 EXPANSION JOINTS

A. Place expansion joints at control and expansion joints in concrete slabs, and at intersections with walls and columns.

B. Joint Sizes: Set to match width of typical grouted joint; but in no case less than 1/4".

C. Leave expansion joints free of mortar.

D. Sealant materials and installation are specified in Section 079200.

3.9 GROUTING

A. Comply with provisions of ANSI A118.3.

B. Mix grouts in accordance with manufacturer's instructions.

C. Grout joints, except expansion joints, in accordance with the manufacturer's recommendations. Float joints to a slightly concave profile.

D. Remove excess grout from tile surfaces in accordance with the grout and tile manufacturer's recommendations. Do not use excess amounts of water.

E. Protect adjacent surfaces from damage caused by cleaning agents. Do not use cleaners which would damage tile or grout surfaces.

F. Do not grout joints indicated to receive sealants, including inside right angle corner joints between floors and walls of column bases. Grout joints perpendicular to expansion joints shall be finished flush with tile edges.

G. Cured grout joints shall be made free of efflorescence, prior to sealing.

3.10 CURING

A. Cure installation in accordance with the grout manufacturer's recommendations. Protect tile and grout during curing operations.

3.11 PROTECTION

A. Protect tile installations from damage, in accordance with Section 015000.

B. Replace damaged tiles.

3.12 CLEANING

A. In accordance with Section 015000 and Section 017700.

B. Coordinate final cleaning with work of Section 079200. Do not begin cleaning operations until tile expansion joints sealants are fully cured.

C. Prior to substantial completion, wash and thoroughly rinse tile. Leave tile surfaces clean.

END OF SECTION

SECTION 096500 - RESILIENT FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Resilient tile flooring.
   2. Resilient base.
   3. Acoustic underlayment.

B. Related Sections:
   1. 096800 - Carpeting.

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.

D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. D5116 - Guide for Small-Scale Environmental Chamber Determination of Organic Emissions from Indoor Materials/Products.
   2. F710 - Preparing Concrete Floors to Receive Resilient Flooring.
   3. F1066 – Standard Specification for Vinyl Composition Floor Tile.
   4. F1861 - Standard Specification for Resilient Wall Base.
   5. F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

1.3 PERFORMANCE REQUIREMENTS

A. Floor/ceiling systems separating residential units shall provide a minimum level of acoustical separation for both airborne and impact noise as indicated below:

Partition Function Between Dwellings				
Apt A		Apt B	ST	IIC
Bedroom	*above*	Bedroom	55	55
Living Room	*above*	Bedroom	57	60
Kitchen	*above*	Bedroom	58	65
Family Room	*above*	Bedroom	60	65
Corridor	*above*	Bedroom	55	65
Bedroom	*above*	Living Room	57	55
Living Room	*above*	Living Room	55	55
Kitchen	*above*	Living Room	55	60
Family Room	*above*	Living Room	58	62
Corridor	*above*	Living Room	55	60
Bedroom	*above*	Kitchen	58	52
Living Room	*above*	Kitchen	55	55
Kitchen	*above*	Kitchen	52	55
Bathroom	*above*	Kitchen	55	55
Family Room	*above*	Kitchen	55	60
Corridor	*above*	Kitchen	50	55
Bedroom	*above*	Family Room	60	50
Living Room	*above*	Family Room	58	52
Kitchen	*above*	Family Room	55	55

Bathroom	*above*	Bathroom	55	55
Corridor	*above*	Corridor	50	50

1.4 SUBMITTALS

A. Make submittals in accordance Section 013300.

B. Product Data:
1. Resilient flooring.
2. Resilient base.
3. Acoustical underlayment.
4. Accessories.

C. Shop drawings: Indicate floor pattern, color of various materials, and location of floor accessories.

D. Samples:
1. Each type and color of resilient flooring material; not less than 8"x10" in size.
2. Each type and color of resilient base scheduled; not less than 12 inches in length.
3. Submit samples, not less than 12 inches in length, of each type of transition strip required for the work.

1.5 QUALITY ASSURANCE

A. Qualifications of Installers:
1. Use only skilled and experienced resilient flooring installers for preparation of substrate and installation of resilient flooring.
2. Helpers and apprentices used for such work shall be under full and constant supervision at all times by thoroughly skilled resilient flooring installers.

1.6 DELIVERY, STORAGE, AND HANDLING

A. In accordance with Section 016000.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Maintain minimum 70 degrees F air temperature at flooring installation area for three days prior to, during, and for 24 hours after installation.

B. Store flooring materials in area of application. Allow three days for material to reach equal temperature as area.

PART 2 - PRODUCTS

2.1 RESILIENT TILE FLOORING

A. Luxury Vinyl Tile:
1. Manufacturer: “Evoke” by Metropolitan Hardwood Floors (Kent WA; 800-851-3841).
2. Product: PR 2634.254
3. Pattern: Match Interior Designer's sample.
4. Size: TBD
5. Finish: TBD

2.2 RESILIENT BASE

A. ASTM F1861, Type TS, 100 percent vulcanized rubber; 1/8 inch thick; roll stock; straight base; 4 inch height, unless otherwise indicated on the Drawings.

B. Manufacturer: One of the following, subject to Architect's approval of color:
1. Roppe Rubber Corp.
2. Flexco Inc.

2.3 ACCESSORIES

A. Subfloor Filler: Portland cement based latex filler, mixed with water to produce a self leveling underlayment, or cementitious paste, as appropriate to project requirements.

B. Adhesives:
   1. Acoustic Underlayment: EGRIP “Evolve” by ECORE International.
   2. Flooring to Concrete: Types recommended by resilient flooring and base manufacturers for specific application.
   3. Flooring at Acoustic Underlayment Locations: EGRIP “Evolve” by ECORE International.
   4. Adhesives shall meet the requirements of the Southern California South Coast Air Quality Management District (SCAQMD) Rule 1168. (maximum VOC content of 50 grams/liter for floor covering and resilient base adhesives; 60 grams/liter for rubber flooring adhesives).

C. Transition Strips: Vinyl; color as selected by the Architect from manufacturer's standard.

D. Flash Cove Accessories:
   1. Strips: Wax, wood, or plastic cove fillet strips; approximately 1 inch radius.
   2. Cap Trim: Aluminum.

E. All other materials not specifically described, but required for a complete and proper installation of resilient flooring, shall be only as recommended by the manufacturer of the material to which it is applied and shall be subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine site conditions and verify that the work of this Section may properly commence. Notify the Architect in writing of unsatisfactory conditions.

B. Moisture Testing of Concrete Slabs:
   1. Test at all concrete slabs indicated to receive resilient flooring, to determine the vapor emission rate.
   2. Perform tests in accordance with ASTM F1869.
   3. Notify the Architect if tests results show a vapor emission rate which exceeds 3 lbs per 1000 sf in a 24 hour period.
   4. Test kits are available from VAPRECISION 800-449-6194.

C. Do not begin installation until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

3.2 PREPARATION

A. Prepare floors in accordance with ASTM F710. Install subfloor filler to fill low spots, cracks, construction joints, holes and other defects, and as required to adjust level to meet adjacent finishes. Feather to maximum slope of 1/8 inch in 1 foot; float to smooth, flat, hard surface. Prohibit traffic over filler.

B. Unwrap, uncrate, or unroll all products and allow to acclimate to the room’s temperature and humidity prior to installation.

3.3 FLOORING INSTALLATION

A. Install all resilient flooring where scheduled in accordance with the manufacturer's recommendations.

B. Unless indicated otherwise, install resilient flooring with joints and seams parallel to building lines.

C. Terminate resilient flooring at centerline of door at door openings where adjacent floor finish is dissimilar, and where no threshold is indicated.

D. Install edge strips at unprotected or exposed edges where flooring terminates.

E. Scribe flooring to walls, columns, cabinets, floor outlets and other appurtenances to produce tight joints.

F. Clean substrate. Spread cement evenly in quantity recommended by manufacturer to ensure adhesion over entire area of installation. Spread only enough adhesive to permit installation of flooring before initial set.

G. Set flooring in place, press with heavy roller to ensure full adhesion.

H. Continue flooring through areas to receive moveable type partitions without interrupting floor pattern.

I. Special Requirements for Resilient Tile:
   1. Open floor tile cartons, enough to cover each area, and mix tile to ensure shade variations do not occur within any one area.
   2. Unless indicated otherwise, lay tiles parallel to building lines to produce symmetrical tile pattern.
   3. Install with minimum tile width 1/2 full size at room or area perimeter.
   4. Arrange to square grid pattern with all joints aligned, with pattern grain parallel for all units and parallel to the length of the room.

J. Seal joint between flooring and adjacent materials at restrooms, bathrooms, kitchens, and other moist areas with clear silicone sealant.

3.4 BASE INSTALLATION

A. Adhesive install base materials in accordance with the manufacturer's recommendations.

B. Install base in maximum practical lengths, with minimum number of joints in each run. Fit joints tight, vertical, and in accurate alignment.

C. Install straight style base at all walls where resilient base is scheduled in areas with carpeted floors; install cove style base at walls scheduled for resilient base abutting hard surface and resilient floors.

D. Install base to walls, columns, and to casework toe kicks in all areas where resilient base is scheduled, and where no other base finish is specifically noted or detailed.

E. Coordinate installation of base with work of Section 096800.

F. Fit joints tight and vertical, in accurate alignment. For straight runs greater than 48 inches, maintain minimum 18 inches between joints.

G. Score back of base material with grooving tool, at all outside corners; maintain minimum leg length 18 inches where wall length permits. Mount base so that scored groove is accurately aligned with corner, and with base tightly adhered to wall at both sides of corner, with no visible gaps at top of base. Where cove base is formed around outside corners, stretch toe of cove for smooth transition around corner, with toe in uniform contact with the finish flooring.

H. Miter or cope inside corners for accurate fit.

I. Scribe and fit to door frames, stairs, and other obstructions.

J. Install straight and level to maximum variation of plus or minus 1/8 inch over 10 feet.

3.5 PROTECTION

A. Unless recommended otherwise by the adhesive manufacturer, prohibit traffic from resilient flooring for 48 hours after installation.

3.6 CLEANING

A. Upon completion of the installation, immediately remove all surplus adhesive from adjacent surfaces.

B. As soon as possible after installation, and in accordance with the timing recommended by the manufacturers, clean the entire resilient flooring surface using the materials recommended for that purpose by the manufacturers of the materials being cleaned.

END OF SECTION

SECTION 096800 - CARPETING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Glue down carpeting.

B. Related Sections:
   1. 064000 – Architectural Woodwork: Wood base.
   2. 096500 - Resilient Flooring: Rubber base.

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to work of this Section.

D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

1.2 REFERENCES

A. Carpet and Rug Institute (CRI).

B. American Society for Testing and Materials (ASTM)
   1. F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

1.3 SUBMITTALS

A. Make submittals in accordance with Section 013300, unless specified otherwise.

B. Installation Instructions: 3 copies for each type of carpet provided.

C. Product Data:
   1. Carpet and Pad. Product data shall include VOC limits highlighted.
   2. Accessories.
   3. Adhesives: Include Material Safety Data Sheets with VOC limits highlighted.

D. Layout Drawings: Show field conditions, seam layout, lay of the pile, trim locations, locations and dimensions for cutouts and borders, and materials for transition to other flooring materials.

E. Samples:
   1. Submit minimum of 9 inch square samples of each carpet and pad proposed.
   2. Submit a minimum 9 inch square sample of each type of carpet seam. Include a sample of each type of seam used to join each type of carpet, and a sample of each type of seam used to join different types of carpets.
   3. Submit samples of each type of carpet edge strip, minimum 3 inches in length, proposed for the Work.

F. Contract Closeout Submittals: Submit maintenance instructions in accordance with Section 017700.

1.4 QUALITY ASSURANCE

A. Carpet Installer:
   1. Minimum of 3 years experience in carpet installations of similar size and scope. Able to show evidence of experience when requested by the Architect.
   2. Certified by CRI or the carpet manufacturer(s).

B. Pre-Installation Conference:
   1. In accordance with Section 013119.
   2. Schedule a conference a minimum of 10 calendar days prior to the installation of the carpeting.
   3. Review installation procedures, including locations and types of seams and edge details.
   4. Require in attendance, the Contractor, Architect, carpet installer, and other parties affected by this work.

1.5 DELIVERY, STORAGE, AND HANDLING

A. In accordance with Section 016000.

1.6 SITE CONDITIONS

A. Space shall be maintained at a minimum of 68 degrees F. a minimum of 72 hours prior to carpet installation.

B. HVAC system shall be permanently in operation.

1.7 GUARANTEE/WARRANTY

A. Submit guarantees and warranties in accordance with Section 017700.

B. Guarantee carpet installation for 1 year after Substantial Completion. If installation defects have caused irreparable damage to the carpet, provide new materials to match that damaged at no additional cost to the Owner. Perform guarantee work at a time convenient to the Owner.

C. Submit available manufacturer carpet warranties.

PART 2 - PRODUCTS

2.1 CARPETS AND PADS

A. Carpet:
   1. Types as indicated on the Finish Schedule.
   2. Carpet shall meet the testing and product requirements of the CRI Green Label Plus Program.

2.2 ACCESSORIES

A. Adhesives:
   1. Use adhesives as approved by the cushion and carpet manufacturers. When none is recommended, use adhesives as recommended by one of the following adhesive manufacturers for the application:
      a. Roberts, a QEP Company (Henderson, NV; 800-423-6545).
      b. Para-Chem (Simpsonville SC; 864-967-7691).
      c. WF Taylor (Fontana CA; 800-397-4583)..
      d. The W.W. Henry Company (Aliquippa, PA; 800-232-4832).
   2. Provide waterproof adhesives at entries, and other wet areas.
   3. Adhesives shall have been tested in accordance with ASTM D5116, and shall have CRI/IAQ "Green Label." for chemical emissions not to exceed the following:
      a. TVOC: 10.0 mg/m^2/hr;
      b. 2-Ethyl-1-Hexanol: 3.0 mg/m^2/hr.
      c. Formaldehyde: 0.05 mg/m^2/hr.
   4. Adhesives shall meet the requirements of the Southern California South Coast Air Quality Management District (SCAQMD) Rule 1168. (maximum VOC content of 150 grams/liter for floor covering adhesives, using the method of dividing the weight of the solvent in the adhesive by the volume of the material, less water).

B. Seam Sealer: Para-Chem "Parabond M-4263 Solvent Free Universal Seam Sealer."

C. Latex Underlayment: White premix latex filler, mixed with water to produce cementitious paste. Dependable Chemical Company, Inc., "Dependable White Skimcoat Underlayment," with "Latex Liquid" additive, or approved.

D. Hot Melt Tape: Roberts "Super GT;" Orcon "CT-3 Super Tape;" or approved.

E. Pad Tape: Non-paper tape as recommended by pad manufacturer; or approved.

F. Edge Strips: Vinyl reducer strips; size as appropriate for conditions; color as selected from the manufacturer's standard line.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence.

B. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.

C. Do not begin work until unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

D. Ensure that concrete floors are free from scaling, and exhibit acid neutrality.

E. Moisture Testing of Concrete Slabs:
   1. Test at all new concrete slabs indicated to receive glued down carpeting or pad, to determine the vapor emission rate.
   2. Perform tests in accordance with ASTM F1869.
   3. Notify the Architect if tests results show a vapor emission rate which exceeds 5 lbs per 1000 sf in a 24 hour period.
   4. Test kits are available from VAPRECISION 800-449-6194.

3.2 PREPARATION

A. Clean floors of dust, dirt, solvents, oil, grease, paint, plaster, and other substances which would be detrimental to the proper performance of adhesive and carpet.

B. Fill low spots and cracks over 1/8 inch in width with latex underlayment.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Carpet installation shall be tight and flat to the subfloor, securely fastened in position, and shall present a uniform appearance. Provide color, pattern, and texture match within each area. Seams shall be strong, tightly butted, and flat.

B. Install carpets and pads, in strict accordance with the respective manufacturer's printed instructions for the type of substrate and application indicated.

C. Unless otherwise indicated, install resilient edge strips at carpet edges where carpet meets concrete or resilient flooring. Where carpet to resilient or concrete surface flooring transition is indicated at door openings, locate to center resilient edge strip under door.

3.4 ROLL STOCK CARPET INSTALLATION

A. Carpet shall be glue mounted.

B. Perform installation using sequential rolls.

C. Apply seam sealer to cut edges of tufted loop pile and woven carpets, prior to seaming.

D. Unless recommended otherwise by the carpet manufacturer for commercial application, seam carpets mounted over pad by hand sewing or hot melt tape. With hand sewing, overcast stitching will not be permitted.

E. Install patterned carpet with exact end and side matches.

F. For carpet mounted on pad, trim carpet at tile field interfaces with allowance for tucking; tuck carpet edges into a bead of latex adhesive applied between the tack strips and tile edges.

3.5 REMNANTS

A. Upon completion of the installation, contact the Owner's Representative for selection of remnants. Carefully wrap and mark separately the selected remnants for each type of carpet, and note the type and location(s) where installed. Deliver selected remnants to a location on site as directed by the Owner's Representative. Remove and dispose of remainder at a legal off-site location.

3.6 CLEANUP

A. The premises shall be kept free from unnecessary accumulation of tools, equipment and surplus materials during the progress of the work.

B. Remove threads with sharp scissors. Remove spots with manufacturer's recommended spot remover.

C. Immediately after laying, thoroughly power vacuum entire surface using equipment with motor driven brushes.

3.7 PROTECTION

A. Protect carpet from damage during remainder of construction and move-in period.

END OF SECTION

SECTION 098100 - ACOUSTIC INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Acoustical insulation in walls and ceilings.
   2. Acoustical sealant.

B. Related Sections:
   1. 072100 - Thermal Insulation: Thermal batt and blanket insulation.
   2. 078400 - Firestopping: Fire rated penetration seals.
   3. 078500 - Fire Rated Joint Assemblies: Fire rated joint assemblies at acoustical construction.
   4. 092200 – Lightgage Metal Support Framing: Support framing.
   5. 092116 - Gypsum Board Shaft Wall Assemblies: Acoustical performance requirements for shaft wall assemblies.

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.

D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. C665 - Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
   2. E84 - Test Method for Surface Burning Characteristics of Building Materials.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Acoustical Insulation: ASTM C665, Type I; unfaced glass fiber batts, blankets, or rolls; minimum fire hazard classification rating of 25/50 per ASTM E84; minimum 3-1/2-inch thick, unless required otherwise to meet the STC requirements indicated or specified; formaldehyde free.
   1. For Installation in Stud Walls: Widths to friction-fit between studs
   2. For Installation at Partition Head Tracks and Acoustically Insulated Door Frames: Continuous strips, full width of partition or frame, as detailed.

B. Acoustical Sealant: Non-hardening, low-shrinkage; for use in conjunction with gypsum board; similar to USG "Sheetrock Brand Acoustical Sealant, “Acoustical Sealant 30CTG” by Tremco,”790 Silicone Building Sealant” by Dow Corning, "QuietSeal QS-350" by Quiet Solution (Sunnyvale CA; 408-541-8000), or approved; maximum VOC content 250g/L.

C. Accessories: Furnish other accessories such as fasteners and retainers, not specifically described, but required for a complete installation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence.

B. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.

C. Do not begin work until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

3.2 PREPARATION

A. Verify that adjacent materials are secure, properly spaced, dry, and ready to receive installation.

B. Verify that mechanical and electrical services within spaces to be insulated have been installed and tested.

C. Furnish acoustical insulation to hollow metal installer for installation in hollow metal frames in acoustical partitions.

3.3 INSTALLATION

A. Install insulation in stud cavities in accordance with manufacturer's instructions, and as indicated. Coordinate with other trades as necessary to complete acoustical barriers at wall penetrations.

B. Install insulation without gaps or voids.

C. Trim insulation neatly to fit spaces. Use insulation materials free of damage.

D. Sealant:
   1. Install acoustical sealant continuously around perimeter of all acoustically insulated partitions; one continuous bead at each side of framing member interface with substrate.
   2. Where double layer of gypsum board is indicated, stagger all joints between the first layer and the second layer and provide sealant at butt joints between adjacent sheet edges at the outermost layer of gypsum board, including corner joints, and additional bead at perimeter of base layer prior to installation of finish layer.
   3. Except for penetrations in fire rated construction to receive firestopping or fire rated construction joint assemblies, seal all penetrations through acoustical assemblies, including cutouts for lighting fixtures, cabinets, pipes and plumbing, HVAC ducts, and electrical boxes.

END OF SECTION

GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Site applied paint coatings, except as otherwise noted.

B. Related Sections:
   1. 055000 - Metal Fabrications: Shop finished fabrications.
   2. 064000 – Architectural Woodwork: Shop finished materials.
   3. 081113 - Hollow Metal Doors and Frames: Preprimed metal surfaces.
   4. 081400 - Wood Doors: Prefinished doors; alternate for site finishing of doors.

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.

D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

1.2 REFERENCES

A. Master Painters Institute (MPI): Architectural Painting Specification Manual

B. Steel Structures Painting Council (SSPC).

1.3 DEFINITIONS:

A. Sheen: Degree of luster of the dried paint film. Where terms such as "gloss," "semi-gloss," "low-gloss," "matte," "satin," "eggshell," or "flat," are used, it shall be subject to the Architect's interpretation, regardless of manufacturer's nomenclature for any particular sheen level. The Architect reserves the right to select from any of manufacturer's published sheen levels for each paint system, if sheen of initial paint finish sample is not approved.

1.4 SUBMITTALS

A. Make submittals in accordance with Section 013300.

B. Materials List: Organize to indicate painting systems to be used with each substrate. Include proposed dft for each coat and manufacturer's product data as required to verify compliance with the specified requirements.

C. Samples:
   1. Paint Samples:
      a. Submit three samples of each paint finish on an 8"x10" card. Reference manufacturer, type of paint, color, sheen, substrate, and application.
      b. Furnish additional samples until all paint finishes are approved.
   2. Transparent Finish Samples:
      a. Submit samples of each wood species and transparent finish combination.
      b. If, in the judgment of the Contractor, the wood species or finish method selected indicate that color variations may be inevitable, submit samples in sets of 3 or more illustrating the possible range of these variations.
      c. When approved, the finished sample or sets shall become the standard for approval.

D. Contract Closeout Submittals: Record Paint Samples: In accordance with Section 017700, submit three 8"x10" samples of each paint and color used, indicating paint manufacturer and formula number; bind in identical sets. Deliver to on site location as directed.

1.5 QUALITY ASSURANCE

A. Applicator: Company specializing in commercial painting and finishing with a minimum of three years documented experience.

B. Environmental Requirements for Solvent Based Paints: Comply with the Environmental Protection Agency (EPA) requirements for volatile solvents content limitations, as applicable to each classification of coating.

C. Mock-ups:
   1. Provide mock-ups in accordance with 014500.
   2. Where directed, provide a minimum 100 square foot mock-up of each application listed below. Mock-up shall be representative of color, sheen, texture, materials, and workmanship proposed for the finished work.
      a. P-1 color painted gypsum wallboard.

D. Visual Standards: Each distinct area of the finished work shall be free of variations in color and sheen, orange peel, runs, sags, blistering, checking, cracking, scratches, dust, dirt, bugs, and other contaminants.

1.6 DELIVERY, STORAGE, AND HANDLING

A. In accordance with Section 016000.

B. Delivery: Deliver paint materials to the jobsite in sealed, original, labeled containers, each bearing manufacturer's name, type of paint, brand name, color designation, and instructions for mixing and/or reducing.

C. Storage: Store paint materials at a minimum ambient temperature of 45 degrees F. in a well ventilated area.

D. Toxic, acidic, and combustible materials: Take all necessary precautionary safety measures as recommended by the material manufacturers and governing regulations.

E. Place cotton waste, cloths, and material which may constitute a fire hazard in closed metal containers and daily remove from the site.

1.7 SITE CONDITIONS

A. Weather Conditions:
   1. Do no exterior work on unprotected surfaces when raining, or other moisture is present or expected, or before applied paints can dry or attain proper cure.
   2. Allow wetted surfaces to dry and attain temperatures and condition specified hereinafter before proceeding with previously started work.

B. Temperature:
   1. Do no painting work when surface and air temperatures are below 40 degrees F or below those temperatures recommended by the manufacturer for the material type used.
   2. Minimum temperatures for latex finishes: 45 degrees F for interior work and 50 degrees F. for exterior work, unless approved otherwise.

C. Lighting: Maintain a lighting level of minimum 50 foot-candles on the surfaces to be painted or finished.

D. Ventilation: Provide adequate continuous ventilation.

PART 2 - PRODUCTS

2.1 PRODUCTS

A. Products scheduled by manufacturer and product name are indicated for purposes of establishing level of quality, color, and sheen. Alternate products listed within these specifications may be submitted for substitution in compliance with Section 016000. All proposed alternate products shall be demonstrated to match design and performance requirements, shall be manufactured by one of the following, and shall be that manufacturer's highest grade product for that coating application.
   1. Benjamin Moore Paint Company.
   2. Pittsburgh Paints.
   3. Pratt & Lambert.
   4. The Sherwin-Williams Company.

5. ICI Paints North America.
6. As otherwise listed in this Section.

B. Interior Latex Paint System – Gypsum Board Substrate: One of the following.
   1. Manufacturer: ICI Devoe
      a. Primer: DR3160 "Wonderpure Primer."
      b. Finish: DR3249 "Wonderpure Eggshell."
   2. Manufacturer: ICI Dulux
      a. Primer: LM9116 "Lifemaster 2000" primer."
      b. Finish: LM9300 "Lifemaster 2000" Eggshell."
   3. Manufacturer: Sherwin-Williams
      a. Primer: Harmony Primer 0 VOC B11W900
      b. Finish: Harmony 0 VOC B9 Series; Eggshell sheen
   4. Manufacturer: Benjamin Moore Paint Company
      a. Primer: Eco-Spec Interior Latex Primer Sealer (231)
      b. Finish: Eco-Spec Latex Eggshell Enamel (223)
   5. Manufacturer: Parker Paint Mfg. Co., Inc.
      a. Primer: #1849 "Premium Great Northwest, Klean-Air Coating", Interior Latex Primer/Sealer.
      b. Finish: #4350 "Premium Great Northwest, Klean-Air Coating", Eggshell Latex Enamel.

C. Interior Trim Systems – Metal Substrate: One of the following.
   1. Manufacturer: ICI Devoe
      a. Metal Primer: "Mirrolac" DP 8502 WB; DTM waterborne primer.
      b. Finish: DR3349 "Wonderpure SG."
   2. Manufacturer: ICI Dulux
      a. Metal Primer: "Devflex" 4020 DTM waterborne primer.
      b. Finish: LM9200 "Lifemaster 2000" S.G.
   3. Manufacturer: Sherwin-Williams
      a. Metal Primer: DTM Acrylic Primer B66-W1; 2.5 – 5.0 mils dft 138 g/l VOC
      b. Finish: Pro Classic Waterborne Semi-gloss dft 157 g/l VOC
   4. Manufacturer: Benjamin Moore Paint Company
      a. Metal Primer: (DTM waterborne). IMC Acrylic Semi-Gloss DTM Coating (M29)
      b. Finish: (Semi-Gloss) Impervex 309.
   5. Manufacturer: Ameron International.
      a. Metal Primer: "Amercoat 148," Waterborne Acrylic Primer.
      b. Finish: "Amercoat 220," Waterborne Acrylic Topcoat; semigloss.

D. Interior Trim Systems – Opaque Finish Wood Substrate: One of the following.
   1. Manufacturer: ICI Devoe
      a. Primer: DR3160 "Wonderpure Primer."
      b. Finish: DR3349 "Wonderpure SG."
   2. Manufacturer: ICI Dulux
      a. Primer: LM9116 "Lifemaster 2000" primer."
      b. Finish: LM9200 "Lifemaster 2000" S.G.
   3. Manufacturer: Sherwin-Williams
      a. Primer: Harmony Primer 0 VOC B11W900
      b. Finish: Pro Classic Waterborne Semi-gloss dft 157 g/l VOC
   4. Manufacturer: Benjamin Moore Paint Company
      a. Primer: Ultra Spec 500 Zero VOC Interior Latex Primer (N534)
      b. Finish: Ultra Spec 500 Zero VOC Interior Semi-Gloss Finish (N539)

E. Interior Wood Transparent Finish:
   1. Stains:
      a. Kelly-Moore: “1281 Modern Wood Finish”.
      b. Minwax: “Water Based Wood Stain”.
      c. Duron: “Interior Penetrating Oil Wood Stain”
      d. Glidden/ICI Paints: “Water-Based Finishing Stain/Satin (1700V)”
      e. Sherwin Williams: “Wood Classics System”.

2. Varnish:
   a. Diamond Vogel: 'Old Masters' H2O Acrylic Varnish Satin DW-0522
   b. Minwax: "Water Based Oil-Modified Polyurethane."
   c. General Paint: 'Fletco Diamond Elite' 96 Line
   d. Glidden/ICI Paints: 'Woodpride' Interior Aquacrylic Satin Varnish 1902
   e. Cloverdale Paint: 'Timberlox' Acrylic Urethane Varnish Satin 42 Series
   f. Columbia Paint: 'Wood Finishes' Clear Acrylic Urethane Int Eggshell 10-675-XX

F. Interior Latex Dry-Fall System: One of the following; color matches as scheduled.
   1. Manufacturer: Benjamin Moore Paint Company
      a. Finish: M53S "Sweep-Up Spray Latex Semi-Gloss."
   2. Manufacturer: ICI Devoe
      a. Finish: "Devflex 4206 Interior/Exterior Waterborne Acrylic Semi-Gloss Enamel."
   3. Manufacturer: Sherwin-Williams
      a. Finish: "Waterborne Acrlic Dryfall (B42 Series)" Egg-Shell finish.

G. Finish Coats for Ferrous Fabrications Primed under Other Sections: Acrylic/Polyurethane System (Low VOC):
   1. Acrylic Primer: Tnemec "Series 1029 Enduratone"; single component self-crosslinking acrylic primer; color similar but not identical to finish coat.
   2. Finish: Tnemec "Series 1081 Endura-Shield W.B." 2-component, high-performance, waterborne acrylic polyurethane finish, formulated for application as part of total finish system; semi-gloss sheen; color match as scheduled.

H. Materials not specifically noted and otherwise required for the work, such as linseed oil, shellac, thinners and the like shall be of a quality not less than that required by manufacturers of the finish materials used in the work.

I. Products for each general purpose shall be compatible. Each system shall be products of one manufacturer where ever possible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to starting work, inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence. Perform adhesion tests on factory primed items. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.

B. Do not begin installation until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

3.2 MOISTURE CHECK

A. Check for excess moisture using an electronic moisture meter. Do not paint materials with moisture levels which would impair the bonding of finish coatings.

3.3 PROTECTION

A. Adequately protect surfaces not to be painted, from spills, drips, over painting, and other damage caused by this work. Include surfaces within the paint storage and preparation areas.

B. Hardware and Miscellaneous Items:
   1. Remove electrical outlet and switch plates, mechanical diffusers, escutcheons, surface hardware, and fittings prior to starting work.
   2. Store, clean and reinstall these items upon completion of work in each area. Use materials and techniques as necessary to prevent damage to finishes on such items.

3.4 SURFACE PREPARATION

A. Prepare surfaces by removing dirt, dust, grease, oil, moisture, and other contaminants which would impair finish adhesion.

B. Ferrous Metal Shop Primed under other Sections: Solvent clean to remove oil and grease. Remove loose rust, and blistered and peeling paint to bare metal by scraping, sanding, and wire brushing in accordance with SSPC-SP2 and SP3. Immediately retouch damaged or abraded surfaces with compatible primer. Lightly sand all shop prime painted surfaces to receive paint finish.

C. Unprimed Ferrous Metal:
   1. Solvent clean in accordance with SSPC SP-1.
   2. Commercial blast per SSPC SP6.

D. Wood
   1. Transparent Finish: Fill all exposed finish nail holes and cracks with matching color filler after prime coat is applied. Sand filler smooth and level with adjacent surfaces. Sand factory primed or factory-sealed wood surfaces prior to staining or finishing.
   2. Opaque Finish: Spot coat knots, pitch streaks, and sappy sections with sealer. Fill all nail holes and cracks. Sand filler smooth and level with wood surface. Sand factory primed or factory-sealed wood surfaces prior to staining or finishing.

E. Concrete and Concrete Masonry Units: Remove all contaminants by washing and wire brushing. Sandblast if necessary.

3.5 GENERAL APPLICATION REQUIREMENTS

A. Unless specified or indicated otherwise, follow paint manufacturer's label directions for general application procedures and coverage rates.

B. Do not apply finishes on surfaces that are not sufficiently dry. Make sure each coat of finish is dry and hard before a following coat is applied unless the manufacturer's directions state otherwise.

C. Tint filler to match stain when clear finishes are specified; work filler well into grain and, before it has set, working perpendicularly to the grain, wipe the excess from the surface.

D. Opaque Finishes:
   1. Apply number of coats scheduled for each application, except that additional finish coats shall be applied as necessary for complete hiding of substrate colors.
   2. Apply primer coats untinted. Where more than one coat of paint is required, tint each succeeding coat up to the final coat similar in tint, but slightly lighter in value (shade).
   3. Sand lightly between coats if necessary to achieve required finish. Sand between all coats applied to wood substrates.

E. Rollers for application and backrolling of latex paints shall have a nap of 3/8 inch or less.

F. Where roller texture is scheduled for application to gypsum board surfaces, finish coats may be roller-applied, or spray applied and backrolled at Contractor's option.

G. Factory Primed Surfaces: Apply scheduled finish system, less primer coat, except as necessary for patching damage to factory prime coating.

H. Epoxy/Urethane Systems: Brush or roller apply.

3.6 EXTERIOR AND INTERIOR PAINTING AND FINISHING SYSTEMS

A. Gypsum Board - Latex System:
   1. System: Two coats - first coat latex primer sealer (untinted), second coat latex paint.
   2. Sheen: Roller texture, satin sheen, except provide flat sheen at light coves, ceilings, skylight areas, clerestory areas, interior fascias, and other light sensitive surfaces. Verify locations of each sheen with Architect before proceeding with work.
   3. Application:
      a. Use on all exposed gypsum board surfaces, including the exposed portions of wall surfaces between adjacent fabric covered panels and mirrors.

b. Provide prime coat only behind permanently mounted mechanically anchored mirrors, fabric panels, and similar elements.
c. Do not apply primer or paint coatings to surfaces to receive adhesively mounted mirrors or tile.

B. Gypsum Board - Surfaces to Receive Wall covering: Apply one coat of acrylic wall size.

C. Wood - Opaque Finish Latex System:
1. System: Three coats; first coat latex wood primer, and second and third coat latex enamel.
2. Sheen: Semi-gloss, unless indicated otherwise.
3. Application: Use on wood doors indicated for opaque finishes, when allowed by Alternate.

D. Wood - Stain & Varnish Transparent Finish System:
1. System: Four coats; first coat sanding sealer, second coat stain, and third and fourth coats varnish. Sanding sealer may be omitted when factory-applied.
2. Sand with 220 grit sandpaper between coats. Filler need not be used for open grain woods.
3. Sheen: Semi-gloss, unless indicated otherwise.
4. Application: Use on wood door scheduled for transparent finish, as specified in 081400 when allowed by Alternate.

E. Ferrous Metal and Galvanized - Acrylic System:
1. System: Three coats; first coat acrylic DTM primer; second and third coats latex finish. The primer may be omitted at factory primed surfaces, except as necessary to recoat damaged or abraded preprimed surfaces.
2. Sheen: Semi-gloss, unless indicated otherwise.
3. Application: Interior ferrous metal surfaces including hollow steel metal doors and frames, pipe steel hand and guard rails, overhead doors and frames, access doors and panels, and fire extinguisher cabinets.

F. Special Coatings at Ferrous Metals – Acrylic/Polyurethane System:
1. System: Retouch welds and damaged primer coatings with shop primer; apply one coat acrylic primer, and two acrylic/polyurethane finish coats in accordance with the manufacturer's recommendations. Verify compatibility with shop applied primer. Apply acrylic primer over all shop applied primers, unless the specified primer was shop applied.
2. Sheen: Semi-gloss or satin, unless indicated otherwise.
3. Application: Special indicated ferrous metal surfaces.

G. Concrete Masonry Units - Latex System:
1. System: 2 coats - first coat alkyd or latex primer or block filler, second coat exterior latex.
2. Sheen: Semi-gloss sheen, unless indicated otherwise.
3. Application: Interior exposed CMU walls, except as specified otherwise.

3.7 CLEANUP

A. As the work proceeds and on completion of the work, promptly remove all sealers, primers, paints and finishes where spilled, splashed or splattered in a manner not to damage the surface from which it is removed.

B. Remove masking.

C. Clean, or replace with new, all lamps and electrical fixtures damaged by overspray; replace with new identical components all lighting fixture louvers and reflectors damaged by overspray.

3.8 COLOR SCHEDULE

A. Provide paint colors to match those indicated on the drawings. Where a paint color is listed from a specific manufacturer, paint products from other approved manufacturers may be used, provided the color exactly matches the specified color, and the paint system meets the specified requirements. Where no paint color is indicated, provide color and sheen as selected by the Architect.

END OF SECTION

SECTION 099743 – CONCRETE FLOOR STAIN

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Hardener and special finishing requirements for cast-in-place concrete floor toppings.
   2. Stain for cast-in-place concrete floor toppings and cementitious overlay.

B. Related Sections:
   1. 033013 - Concrete: Concrete topping.
   2. 035300 - Concrete Topping

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.

D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM): C979 - Pigments for Integrally Colored Concrete.

1.3 SUBMITTALS

A. Make submittals in accordance with Section 013300.

B. Samples: Minimum of three samples of concrete stain proposed for the work, each applied to a minimum 6" x 6" precast concrete tile prepared under provisions of Sections 030000 and 035300.

C. Installation Instructions: Manufacturer's complete installation instructions. Include descriptions of all special procedures as necessary for complete description of proposed field installation techniques.

1.4 QUALITY ASSURANCE

A. Mock-up:
   1. Furnish mock-ups in accordance with Section 014500.
   2. Stained Concrete Overlay.
      a. Coordinate with Section 035300.
      b. Stain mock-up as directed, using techniques as proposed for the finished work.
      c. Remove unacceptable mock-up; removal of approved mock-up after completion of the work is specified in Section 035300.
   3. Interior Stained Concrete Overlay.
      a. Coordinate with Section 033000.
      b. Finish with hardener and stain mock-up as directed, using techniques as proposed for the finished work.
      c. Remove unacceptable mock-up; acceptable mock-up may be incorporated into the work.

B. Pre-Installation Conference:
   1. In accordance with Section 013119.
   2. Schedule and administer a meeting to review the work of this Section, a minimum of 14 days prior to starting painting work.
   3. Require in attendance the General Contractor, Architect, stain applicator and all other parties affected by this work.
   4. Review scheduling of mock-up installation and mock-up lighting requirements, preparatory work, masking, treatment of screeds, colors, application rates, and protection of finished application.

1.5 PROJECT/SITE CONDITIONS

A. Provide adequate ventilation

B. Provide uniform and sufficient lighting in areas of installation.

C. Keep traffic out of area in which stain and sealer system is being applied until system is fully cured.

1.6 GUARANTEE

A. In accordance with Section 017700, submit guarantee of work of this Section for a period of 2 years from substantial completion.

PART 2 - PRODUCTS

2.1 STAIN MATERIALS

A. Manufacturer: L.M. Scofield Company (Los Angeles CA, 213-720-3000).

B. Color Hardener: " Lithochrome Color Hardener"; dry shake aggregated cementitious powder with pigments in compliance with ASTM C979; custom color derived from manufacturer's standard with application techniques and concentrations to match approved mock-up; similar to Architect's sample
C-1: Match Architect's sample.
C-2: Match Architect's sample.

C. Stain: "Lithochrome Chemstain"; penetrating acidic stain formulated for coloring cured concrete; custom color derived from manufacturer's standard with application techniques and concentrations to match approved mock-up; similar to Architect's sample.

2.2 SEALING COMPOUND

A. L.M. Scofield Company "Cementone"; water based clear acrylic sealer formulated for sealing cured traffic surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence, and that surfaces are free of conditions which would prevent smooth and even stain finish. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.

B. Perform calcium chloride moisture test as necessary to verify that concrete is sufficiently dry for successful application of stain system.

C. Do not begin installation until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of conditions as satisfactory.

3.2 PREPARATION

A. Protect adjacent surfaces not to be stained from damage.

3.3 INSTALLATION

A. Hardener: In accordance with the manufacturer's installation instructions and as follows:
1. After placement and initial float finishing, broadcast at two thirds final coverage rate by hand or by using a mechanical spreader; float hardener into concrete surface.
2. Broadcast remaining third of material over concrete and float into concrete surface.
3. Light steel trowel finish concrete surface and cure in accordance with manufacturer's recommendations for concrete to receive subsequent stain finish. Do not use film-forming curing compounds.

B. Stain: Apply concrete stain in accordance with the manufacturer's installation instructions to match the approved mock-up. After completion of staining process, scrub surface to remove and neutralize residues. Control runoff as required. Allow to dry thoroughly.

C. Spray apply two coats of sealing compound at rate as determined by mock-up. Include all cementitious overlay and interior stair treads and landings. Base bid on application rate of 1 gallon per 400 square feet per coat.

END OF SECTION

SECTION 101419 – DIMENSIONAL LETTER SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Individual illuminated, reverse-pan channel, rear "halo" letters.

B. Related Sections:
   1. Division 26 - Electrical.

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 01 specification sections apply to all work of this Section.

D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. B209 - Aluminum and Aluminum Alloy Sheet and Plate.
   2. B221 - Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.

1.3 SYSTEM DESCRIPTION

A. Design:
   1. Fabrication and installation of signage shall be based on graphics furnished by the Owner on computer disk, format as mutually agreed between the Owner and the fabricator.
   2. Letter style, size, and spacing shall be true to design; hand rendered interpretations will not be acceptable.

B. Individual letters shall be internally lighted with uniform light level ~~of~~ creating the desired “halo” effect behind each letter and without perceptible variations in light level between letters.

1.4 SUBMITTALS

A. Make submittals in accordance with Section 013300.

B. Product Literature: Submit for transformers, including identification of each size and type of transformer proposed for the work.

C. Shop Drawings:
   1. Indicate kinds and quantities of material, methods of joining and anchoring, gaskets and sealants, field dimensions as appropriate, and relationship to adjoining materials.
   2. Indicate requirements for sleeves, cutting, and blocking required to facilitate installation of the work.
   3. Show transformer locations, mounting details, and access requirements.
   4. Show full size sections of all extrusions, corners, retainers, complex details, and connections, clearly indicating fabrication and erection techniques.
   5. Indicate colors and finishes of all exposed surfaces.
   6. Indicate neon size and color temperature.
   7. Indicate transformer type and model number.

D. Samples:
   1. Submit one sample of an exterior letter.
   2. Show all elements of construction, including fasteners, retainers and conduit penetration. Provide illumination to simulate appearance and quality of illumination proposed for the illuminated sign letters.
   3. Indicate surface textures, color range, thickness, welding, and any other fabrication or installation details that affect the appearance and rigidity of the work.
   4. Deliver the full size samples to the jobsite.
   5. Submittal will be reviewed for construction, workmanship, appearance, and conformance to scale requirements.

E. Templates:
   1. Submit 2 complete full-size templates for each size of sign.
   2. Include sign outline, neon layout, transformer location, and layout of electrical poke-thru's.
   3. Fabricators who have previously submitted approved templates are exempt from this requirement.

1.5 QUALITY ASSURANCE

A. Approved Fabricators:
   1. Chandler Signs, Inc.; (Dallas, TX; 760/967-7003).
   2. Neosource, (Denver, CO; 303/820-2022).
   3. Nordquist Sign Company Inc., (Minneapolis, MN; 612-823-7291).
   4. RiteLite Signs, Inc.; (Concord, NC; 704-788-7097).
   5. Advance Sign Group, (Columbus, OH; 614-429-2079).

B. Installer Qualifications:
   1. Skilled and experienced in the installation of illuminated signs similar to those required for the work.
   2. Helpers and apprentices shall be supervised at all times by thoroughly skilled installers.

C. Pre-Installation Meeting:
   1. Comply with provisions of Section 013119.
   2. Schedule and administer a meeting to review and discuss the installation a minimum of one week (7 calendar days) prior to commencement of work of this Section.
   3. Require in attendance the following parties:
      a. Owner.
      b. Architect.
      c. General Contractor.
      d. Fabricator.
      e. Installer.
   4. Agenda: Review scheduling, installation details and procedures, transformer requirements, electrical service and connections, and other items as appropriate.

D. Electrical components shall be UL approved for intended use.

1.6 DELIVERY, STORAGE, AND HANDLING

A. In accordance with Section 016000.

B. Provide protective covering and packaging to prevent damage to finishes and components.

1.7 COORDINATION

A. Cutting and Patching:
   1. Coordinate cutting, patching, core drilling, installation of sleeves, and sealing required for installation of this work.
   2. Furnish other trades with accurate instructions, layout drawings and/or templates to accommodate work to be installed.
   3. Do no cutting of structural members without the Architect's approval.
   4. Openings in concrete shall be saw cut or core drilled.
   5. Take such precautions as necessary to ensure the protection of other construction at the site.

1.8 SUBCONTRACTOR'S GUARANTY

A. Submit in accordance with Section 017700.

B. Furnish one year unconditional Subcontractor guaranty against defects in material, workmanship and installation from date of Store Opening. Include all components provided under this Section.

C. Covered defects shall include failure of finish integrity and appearance, failure to remain watertight, and failure to present uniform illumination.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Channel Aluminum:
   1. Sheet Material for Signs Less Than 5 Feet in Height: 0.090 inch aluminum sheet for face and 0.080 inch for return.
   2. Sheet Material for Signs Greater Than 5 Feet in Height: 0.125 inch aluminum sheet for face and 0.090 inch for return.

B. Reverse Face: Clear acrylic polycarbonate.
   1. Provide sheet material not less than ¼ inch thick for signs 5 feet in height or less.
   2. Provide sheet material not less than 3/8 inch for exterior letters greater than 5 feet in height.

C. Illumination: 6500K, white neon tubes as required for even/uniform light distribution.
   1. Tube Size/Type for Interior Signs: 10mm, 30ma.
   2. Tube Size/Type for Exterior Signs: 15mm, 60ma.

D. Transformers: As manufactured by ~~France~~ Ventex Technology, Inc., Riviera Beach, FL (800) 510-5400; no substitutions.
   1. Provide 30ma, 120V units for interior signs.
   2. Provide 60ma, 120V units for exterior signs.

E. Disconnect Switch: Located near top of each letter, out of public view.

2.2 FABRICATION

A. General:
   1. Fabricate letter bodies to dimensions and depths as indicated on the Drawings.
   2. Position labels and seams out of public view. No sign company graphics shall be allowed. Paint-out UL labels.
   3. Details of fabrication and materials may be varied from that indicated subject to approval by the Architect, and compliance with design intent.

B. Design:
   1. Fabricate letter housings with outside dimensions based on approved templates.
   2. Neon Tubes: Not less than one tube for each 3 inches of letter stroke width, or fraction thereof; distribution as required for even lighting.

C. Workmanship:
   1. Bends, twists, open joints, misalignments at intersections will not be allowed in any finished members.
   2. Provide proper reinforcement for hardware and other items as necessary for a complete and durable installation.
   3. Exposed connections shall be neat, straight hairline joints.

D. Sign Face: Letter size and configuration indicated on Drawings.

E. Conduit: Rigid for through-wall construction, flexible or rigid at other locations; type and sizes as recommended by fabricator.

F. Finish:
   1. Exterior Surfaces of Letters: Face and return, two coats of polyurethane paint over one coat epoxy primer; color as selected by Architect.
   2. Interior Surfaces of Letters: White enamel paint.

G. Fastening:
   1. Conceal all joints wherever possible.
   2. Use fasteners of same material as parts to be fastened; where not possible, use chemically and electrolytically compatible materials.

H. Mounting:
   1. Fabricate reverse-pan channel letters with studs and 2 inch spacers required for attachment to wall construction.

2. Locate mounting pins to avoid casting shadows from neon lighting; with fasteners concealed from view.

I. Accurately fabricate all work to correct sizes as determined by field measurement.

J. Provide gaskets or coatings as appropriate to prevent galvanic action between dissimilar materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to installation of illuminated signs, verify that installed work of other trades is complete to a point where work of this Section may properly commence.

B. Do not begin installation until all unsatisfactory conditions have been resolved. Beginning work constitutes acceptance of the conditions.

3.2 INSTALLATION

A. General:
1. Prior to installation on building, verify locations with Architect.
2. Install plumb, level, true to line and grade. Curved surfaces shall be true uniform curves; flat surfaces true planes.
3. Rigidly support work and anchor in place.
4. Open joints, except where intended for expansion and contraction, not permitted.
5. Seal penetrations through building exterior wall weather-tight with clear/translucent silicone sealant.
6. Replace all letters displaying distortion, "oil-canning," or other damage.

END OF SECTION

SECTION 102216 - CHAIN LINK PARTITIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Interior chain link partitions.

B. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.

C. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. A428 - Tests for Weight of Coating on Aluminum Coated Iron or Steel Articles.
   2. A491 - Standard Specification for Aluminum Coated Steel Chain Link Fence Fabric.
   3. A824 - Standard Specifications for Metallic-Coated Steel Marcelled Tension Wire for use with Chain Link Fence.
   4. F567 - Practice for Installation of Chain-Link Fence.
   5. F669 - Standard Specifications for Strength Requirements for Metal Posts and Rails For Industrial Chain Link Fence.

1.3 SUBMITTALS

A. Make submittals in accordance with Section 013300.

B. Product Data.

C. Shop Drawings: Include plan layout, grid, spacing of components, accessories, fittings, and anchorages.

1.4 QUALITY ASSURANCE

A. Manufacturer: Company specializing in commercial quality chain link fencing with minimum two years experience.

PART 2 - PRODUCTS

2.1 COMPONENTS

A. Framework: ASTM F669, Table 3 (Light Industrial).

B. Finish: 0.40 oz per sq. ft. aluminum coating when determined in accordance with ASTM A428.

C. Chain Link Fabric:
   1. 2 inch diamond mesh; 9 gage wire; knuckled top selvage; knuckled bottom selvage; height as indicated.
   2. Finish: Aluminized steel fabric in accordance with ASTM A491; 0.40 oz per sq. ft. aluminum coating when determined in accordance with ASTM A428

D. Sleeves, Brackets, Bands, Clips, Rail Ends, Fasteners and Fittings: Steel; galvanized finish.

E. Caps: Cast steel or malleable iron, galvanized; sized to post dimension, set screw retained.

F. Tension Wire: 7 gage aluminized steel in accordance with ASTM A824, type I.

2.2 FABRICATION

A. Fabricate components based on field dimensions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.

B. Do not begin installation until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

3.2 INSTALLATION

A. Install framework, fabric, accessories and gates in accordance with ASTM F567, unless indicated or specified otherwise.

B. Provide pipe top rail between fence posts.

C. Position bottom of fabric 1 inch above concrete slab.

D. Fasten fence fabric to rails, posts, and braces with wire ties maximum 15 inches on center.

E. Finished installation shall have no gaps or openings in excess of 2 inches.

END OF SECTION

SECTION 104416 – FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Fire extinguisher cabinets.
   2. Fire extinguishers.

B. Related Sections:
   1. 092200 – Lightgage Metal Support Framing: Blocking and framing for cabinets.
   2. 092900 - Gypsum Board: Coordination.
   3. 099000 - Painting and Coating: Field painting at exterior surface of fire extinguisher cabinets.

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.

D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

1.2 SUBMITTALS

A. Make submittals in accordance with Section 013300.

B. Product Data: Submit product literature for fire extinguisher brackets, fire extinguisher cabinets, and each type of extinguisher proposed for the work.

1.3 SUBCONTRACTOR GUARANTEE

A. Furnish Subcontractor Guarantees in accordance with Section 017700.

1.4 DELIVERY, STORAGE, AND HANDLING

A. In accordance with Section 016000.

PART 2 - PRODUCTS

2.1 FIRE EXTINGUISHER CABINETS

A. Surface Mounted and Semi-Recessed Cabinets:
   1. For Non-Rated Installation: Potter-Roemer, Inc. Model “Alta 7032-B;” similar products by Larsen’s Manufacturing Company will be considered by Substitution Request.
   2. Type: Clear lacquered aluminum finish, full break glass with lock, and equipped with manufacturer's standard continuous hinge.

2.2 FIRE EXTINGUISHERS

A. Dry Chemical - ABC Multi-Purpose Type:
   1. Type FE: Amerex “#10 Tall”, UL rated 4A:80B:C, approximately 5 inch diameter x 20 inch high, polyester coated steel shell.
   2. Similar products by Larsen’s Manufacturing or Potter-Roemer, as approved.
   3. Agent: Ammonium phosphate base.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed. Verify appropriate rough opening dimensions and blocking locations.

3.2 INSTALLATION

A. Coordinate with other trades to ensure proper and adequate provision for interface with the work of this Section.

B. Install cabinets properly shimmed, and secured to the framing, in proper alignment with plane of wall finish materials, as applicable.

C. Install fire extinguisher in each fire extinguisher cabinet by brackets mounted at back of cabinet.

D. Where fire extinguishers are indicated for wall mounting, secure bracket to wall through finish to framing or blocking.

E. Fire extinguishers shall be installed, charged, tagged, and dated, not more than 30 days prior to building turnover.

END OF SECTION

SECTION 142123 - ELECTRIC TRACTION PASSENGER ELEVATORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Passenger elevators

B. Related Sections:
1. 015000 - Temporary Facilities and Controls: Temporary power supply.
2. 030013 - Concrete: Foundations and elevator shaft construction.
3. 051200 - Structural Steel Framing: Divider beams, and hoistway supports.
4. 055000 - Metal Fabrications: Building-in steel angle sill supports; pit ladder; grout at sills.
5. 092116 - Gypsum Board Shaft Wall Assemblies.
6. Division 26:
    a. Electrical feeders for normal and standby mainline power through fused disconnect devices to elevator controllers.
    b. Neutral delay standby/normal power transfer switch.
    c. Electrical feeders and disconnect devices for normal and standby car lighting and ventilation power.
    d. Pair of conductors carrying standby power to the elevator machine room to signal the loss of normal power and the presence of standby power.
    e. Electrical outlets and lighting for machine room and elevator pit.
    f. Telephone service for each elevator cab.
    g. Fire alarm signal lines to elevator controller cabinet.
    h. Empty conduit to elevator equipment devices remote from elevator machine room or hoistways.
    i. Fireman's command center panel and empty conduit between panel and controller cabinet.
    j. Furnishing of car speaker installed in this section.

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.

D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

1.2 REFERENCES

A. American National Standards Institute (ANSI)
1. A1- Safety Code for Elevators and Escalators.

B. American Society for Testing and Materials (ASTM)
1. A36 - Structural Steel.
2. A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
3. A366 - Steel Sheet, Carbon, Cold-Rolled, Commercial Quality.
4. B221 - Aluminum and Aluminum-Alloy Extruded Bar, Rod, Wire, Shape, and Tube.

C. ANSI/IEEE C2 - National Electrical Safety Code.

D. Federal Specifications (FS)
1. TT-P-641 - Primer Coating, Zinc Dust / Zinc Oxide (for Galvanized Surfaces).
2. TT-P-645 - Primer, Paint, Zinc Chromate, Alkyd Type.

1.3 SYSTEM DESCRIPTION

A. Equipment Description: Gen2® gearless elevator where the controller resides in a machine room.

B. Equipment Control: Elevonic® Control System.

C. Drive: Regenerative

D. Quantity of Elevators: 2

E. Elevator Stop Designations:
1. Front- All floors

F. Stops: 4

G. Openings: Front

H. Travel: As indicated.

I. Rated Capacity: 3500 lbs. (1588 kg)

J. Rated Speed: 200 fpm (1.02 mps)

K. Platform Size: 6’-6 3/4” W x 6’-8 3/16” D

L. Clear Inside Dimensions: 6’-5 9/16” W x 5’-6 1/8” D

M. Cab Height: 9’-9” (2972 mm)

N. Clear Cab Height: 9’-9” (2972 mm)

O. Entrance Type and Width: Center-Opening Doors- 42” (1067 mm)

P. Entrance Height: 7’-0” (2134 mm)

Q. Main Power Supply: 208 volts □ 5% of normal, three-phase, with a separate equipment grounding conductor.

R. Car Lighting Power Supply: 120 volts, single-phase, 15 amps, 60 Hz.

S. Machine Location: Inside and at the top of the hoistway.

T. Signal Fixtures: Manufacturer’s standard with metal button targets.

U. Controller Location: In a machine room.

V. Performance:
1. Car Speed: □ 3 % of contract speed under any loading condition or direction of travel.
2. Car Capacity: Safely lower, stop and hold up to 120% of rated load (code required).
3. Ride Quality:
   a. Vertical Vibration (maximum): 20 milli-g
   b. Horizontal Vibration (maximum): 12 milli-g
   c. Vertical Jerk (maximum): 4.59 □ 1.0 ft./ sec3 (1.4 □ 0.3 m/ sec3)
   d. Acceleration/Deceleration (maximum): 2.62 ft./ sec2 (0.8 m/ sec2)
   e. In Car Noise: 55 – 60 dB(A)
   f. Stopping Accuracy: □ 0.375 in. (□ 10 mm) max, □ 0.25 in. (□ 6 mm) Typical
   g. Re-leveling Distance: □ 0.5 in. (□ 12 mm)

W. Operation: Duplex Collective: Using a microprocessor-based controller, the operation shall be automatic by means of the car and hall buttons. In the absence of system activity, one car can be made to park at the pre-selected main landing. The other (free) car shall remain at the last landing served. Only one car shall respond to a hall call. If either car is removed from service, the other car shall immediately answer all hall calls, as well as its own car calls.

X. Operation Features
1. Full Collective Operation
2. Anti-nuisance
3. Fan and Light Protection
4. Load Weighing Bypass
5. Independent Service
6. Firefighters' Service Phase I and Phase II
7. Top of Car Inspection
8. Zoned Car Parking
9. Relative System Response Dispatching
10. MRO Manual Rescue Operation
11. Zoned Access at Bottom Landing
12. Zoned Access at Upper Landing
13. Car Secure Access
14. Provision for Card Reader in Car (Card Reader provided and Installed by others).

Y. Door Control Features:
   1. Door control to open doors automatically when car arrives at a landing in response to a normal hall or car call.
   2. Elevator doors shall be provided with a reopening device that will stop and reopen the car door(s) and hoistway door(s) automatically should the door(s) become obstructed by an object or person.
   3. Door protection shall consist of a two dimensional, multi-beam array projecting across the car door opening.
   4. Door nudging operation to occur if doors are prevented from closing for an adjustable period of time.

Z. Provide equipment according to seismic zone: Seismic Zone 3

1.4 OPERATIONAL REQUIREMENTS

A. Independent Service Operation: Provide a keyed switch in the car operating panel which, when activated, cancels all previously registered car calls, disconnects the elevator from the hall buttons, and allows operation from the car buttons only.

B. Emergency Power Operation:
   1. When emergency power is activated the elevators shall return automatically to the main floor non-stop at the full rated speed, one at a time. A car that is out of service shall be bypassed and another car shall be selected.
   2. Manual selection switches shall be provided at the Fire Control Rooms on the lower level for the south group and the first floor for the north group. The selection switch shall permit one elevator to be selected to remain on emergency power or provide power to an elevator that had been out of service when the elevators were being returned automatically.

C. Automatic Firefighter's Operation:
   1. Provide automatic Phase I and II firefighter's operation in accordance with ANSI A17.1, and City of Seattle requirements.
   2. When activated by the fire and smoke alarm system, the system shall return the elevators non-stop to their assigned floor. The south group elevators shall be assigned to the lower level, and the north group shall be assigned to the first floor.
   3. If the fire and smoke alarm system is activated on an assigned floor, the elevators in the group assigned to that floor shall travel to an alternate assigned floor. The south group elevators shall go to the second floor. The North group elevators shall go to the third floor.
   4. Provide contacts in the elevator controllers to receive signals from the fire and smoke alarm system.
   5. If an elevator is on independent service when the elevators are recalled on Phase I operation, a buzzer shall sound in the car and a jewel shall be illuminated.
   6. A key switch shall be provided in each car for in-car control of each elevator when on Phase II of Special Emergency Service.
   7. Do not permit sensing devices to restore normal service.

D. Fire Command Operations:
   1. Provide fire command operations in a control panel as specified in another section, and located in the Fire Control Center Rooms.
   2. Each fire command panel shall control both the south and north elevator group.
   3. Fire command operations shall include, without limitation:
      a. Car disconnect switches.
      b. Emergency power operation switches.
      c. Car position and travel direction indicators.
      d. Emergency power operation indicator.
      e. Car operating light
      f. All other functions as required by code.

E. Door Operation:
   1. Program doors to open automatically when car arrives at floor, remain open for a predetermined period of time, and than close.

2. Include door protective devices consisting of a noiseless safety edge, and two photo-electric light rays which operate within invisible infrared light range. Provide photo electric disconnect feature in the elevator car panel.
3. Program door operating sequence to minimize car and hall door open and close times. Provide independently adjustable door open times.
4. Program controls to minimize delays and the return of car to service, should doors be prevented from closing for a predetermined time.
5. If doors are prevented from closing for approximately ten seconds because of an activated obstruction safety device, automatically disconnect door control device, allow doors to close more slowly, and recycle until obstruction is cleared. Sound buzzer.
6. Render "Door Close" signal inoperative when car is standing at dispatching terminal with doors open unless that elevator is operating on independent service.
7. Provide car door interlock provision to prevent elevator from operating unless the doors are closed or within code tolerances.

F. Automatic Self Leveling Operation: Provide provision for bringing the elevator level with floor landings regardless of load or direction of travel. The self-leveling provision shall correct for undertravel, overtravel, and rope stretch.

G. Emergency Car Exit Operation: Provide provision to immediately stop elevator when car emergency exit is opened.

H. Car Safety Feature: Provide car mounted flexible guide safety clamps to stop the car on the rails should the car attain excessive descending speeds.

I. Motor Generator Requirements:
1. When the demand for service ceases for all cars within a group for a specific time period, the motor generator sets on all cars in that group shall simultaneously shutdown.
2. When all motor generator sets are shut down, allow only a single set to start up at a time.

J. Load Bypass Operation: Provide a load weighing device which shall be set to operate at a predetermined fixed percentage of the load in the car. The car shall bypass hall calls when this device is actuated.

1.5 QUALITY ASSURANCE

A. Manufacturer: Elevator Systems by Otis are approved, subject to the specified requirements. Elevator systems by Montgomery, Dover, and Fujitec complying with design and performance requirements may be submitted for approval. Substitutions shall be in accordance with 016000.

B. Installer: Elevators shall be installed by the manufacturer.

C. All electrical components shall be Underwriters Laboratories (UL) approved.

D. Welding shall be performed in accordance with AWS D1.1.

E. Regulatory Tests:
1. Obtain required permits to perform tests.
2. Perform tests required by regulatory agencies.
3. Schedule tests with authority having jurisdiction and request Architect's presence. Give 48 hours notice.

F. Regulatory Requirements:
1. Handicapped Requirements: Conform to WAC chapter 296.
2. Conform to ANSI A17.1 - American Standard Safety Code for Elevators, and ANSI/IEEE C2.
3. City of Seattle Requirements.

1.6 SUBMITTALS

A. Make submittals in accordance with 013300, unless otherwise indicated.

B. Submit shop drawings and product data. Indicate the following minimum information on shop drawings:
1. Driving machine, controller, motor generator, selector, governor, and other component locations.

2. Car, counterweight, sheaves, supporting beams, guide rails, buffers, and other components in hoistway.
3. Rail bracket spacing and maximum loads on guide rails.
4. Reactions at points of support.
5. Weights of principal components.
6. Top and bottom clearance and overtravel of car and counterweight.
7. Location of circuit breaker, switchboard panel or disconnect switch, light switch, and feeder extension points in machine room.
8. Locations in hoistway and machine room of traveling cables and connections for car light and telephone.
9. Location and size of trap doors and access doors.
10. Loads on hoisting beams.
11. Expected heat dissipation of elevator equipment in machine room.
12. Elevator control functions and operational description.
13. Special signal fixtures and panel layouts. Provide layout for elevator functions related to fireman's command center panel provided in other sections.

C. Provide product data on the following items:
1. Signal and operating fixtures, operating panels, and indicators.
2. Cab design and components.
3. Door and frame details.

D. Operation and Maintenance Data: under provisions of Section 017700.
1. Include description of elevator system's method of operation and control, including, motor control system, door operation, signals, firefighter's service, emergency power operation, and other features specified.
2. Provide parts catalogs with complete list of equipment replacement parts with equipment description and identifying numbers.
3. Provide legible schematic wiring diagrams covering electrical equipment installed, including changes made in final work, with symbols listed corresponding to identity or markings on both machine room and hoistway apparatus.
4. Provide one copy of master schematic, behind plastic or glass glazing, in metal frame, mounted on machine room wall.
5. Provide one copy of lubrication chart, behind plastic or glass glazing, in metal frame, mounted on machine room wall.

1.7 PREINSTALLATION CONFERENCE

A. Convene a preinstallation conference one week prior to commencing work of this Section, under provisions of Section 013119.

B. Require attendance of persons directly involved with the work of this Section, and the Architect.

C. Review schedule of installation, installation procedures and conditions, and coordination with related work.

D. Review temporary use of an elevator, hours of use, scheduling of its use, cleanliness of cab, employment of operator, and maintenance of system.

1.8 GUARANTEE

A. In accordance with Section 017700, the General Contractor shall guarantee the materials and workmanship of the elevator systems, and shall make good any defects, not due to ordinary wear and tear, which may develop within the system for a period of 1 year from Substantial Completion.

1.9 MAINTENANCE SERVICE

A. Furnish complete service and maintenance of elevator system and components for 3 months after substantial completion of the Work.

B. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original equipment. Replace wire ropes when necessary to maintain the required factor of safety.

C. Perform work without removing cars from service during peak traffic periods.

D. Provide emergency call back service during working hours for this maintenance period.

E. Maintain locally, an adequate stock of parts for replacement or emergency purposes, and have qualified installation personnel available to ensure the fulfillment of this maintenance service without unreasonable loss of time.

F. Perform maintenance work using competent personnel, under the supervision and in the direct employ of the elevator installer.

G. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Structural Shapes, Rods, and Plate: ASTM A36.

B. Sheet Steel: ASTM A366

C. Stainless Steel: ASTM A167; Type 304 with No. 4 finish 150 grit. Grain of belting in longest direction.

D. Aluminum: Extrusions ASTM B221; plate ASTM B209.

E. Primer: FS TT-P-641 for Galvanized Surfaces; FS TT-P-645 for plain steel surfaces.

2.2 MANUFACTURER

A. Manufacturer: Design based upon Otis Elevator's Gen2™ machine room-less elevator system.

2.3 DESIGN AND SPECIFICATIONS

A. Provide Gen2™ traction passenger elevators from Otis Elevator Company. The control system and car design based on materials and systems manufactured by Otis Elevator Company. Specifically, the system shall consist of the following components:
   1. Controller located in a machine room.
   2. An AC gearless machine using embedded permanent magnets mounted at the top of the hoistway.
   3. Polyurethane Coated-Steel Belts for elevator hoisting purposes.
   4. Regenerative drive that captures normally wasted energy and feeds clean power back into the building's power grid.
   5. LED lighting standard in ceiling lights and elevator fixtures.
   6. Sleep mode operation for LED ceiling lights and car fan.

B. Approved Installer: Otis Elevator Company

2.4 EQUIPMENT: CONTROLLER COMPONENTS

A. Controller: A microcomputer based control system shall be provided to perform all of the functions of safe elevator operation. The system shall also perform car and group operational control.
   1. All high voltage (110V or above) contact points inside the controller shall be protected from accidental contact when the controller doors are open.
   2. Controller shall be separated into two distinct halves; Motor Drive side and Control side. High voltage motor power conductors shall be routed so as to be physically segregated from the rest of the controller.
   3. Field conductor terminations points shall be segregated; high voltage (>30 volts DC and 110 VAC,) and low voltage (< 30 volts DC)
   4. Controllers shall be designed and tested for Electromagnetic Interference (EMI) immunity according to the EN 12016 (May 1998): "EMC Product Family Standards for lifts, escalators, and passenger conveyors Part 2 – immunity"
   5. Controller located inside a control room.
   6. Drive: A Variable Voltage Variable Frequency AC drive system shall be provided. The drive shall be set up for regeneration of AC power back to the building grid.

2.5 EQUIPMENT: HOISTWAY COMPONENTS

A. Machine: AC gearless machine, with a synchronous permanent-magnet motor, dual solenoid service and emergency disc brakes, mounted at the top of the hoistway.

B. Governor: The governor shall be a tension type car-mounted governor.

C. Buffers, Car, and Counterweight: Polyurethane type buffers shall be used for speeds of 150 and 200 feet per minute. Oil buffers shall be used for a speed of 350 feet per minute.

D. Hoistway Operating Devices:
   1. Emergency stop switch in the pit.
   2. Terminal stopping switches.

E. Positioning System: Consists of an encoder, reader box, and door zone vanes.

F. Guide Rails and Attachments: Guide rails shall be Tee-section steel rails with brackets and fasteners. Side counterweight arrangements shall have a dual-purpose bracket that combines both counterweight guide rails, and one of the car guide rails to building fastening.

G. Coated-Steel Belts: Polyurethane coated belts with high-tensile-grade, zinc-plated steel cords and a flat profile on the running surface and the backside of the belt. All driving sheaves and deflector sheaves should have a crowned profile to ensure center tracking of the belts. A continuous 24/7 monitoring system using resistance based technology has to be installed to continuously monitor the integrity of the coated steel belts and provide advanced notice of belt wear.

H. Governor Rope: The Governor rope shall be steel and shall consist of at least eight strands wound about a sisal core center.

I. Fascia: Galvanized sheet steel shall be provided at the front of the hoistway.

J. Hoistway Entrances:
   1. Frames: Entrance frames shall be of bolted construction for complete one-piece unit assembly. All frames shall be securely fastened to fixing angles mounted in the hoistway and shall be of UL fire rated steel.
   2. Sills Shall Be:
      a. Duplex 5F, 1R - Unit 1- Extruded Aluminum Sills at:
         1) Front- 1, 2, 3, 4, 5
         2) Rear- G
      b. Duplex 5F, 1R - Unit 2- Extruded Aluminum Sills at:
         1) Front- 1, 2, 3, 4, 5
         2) Rear- G
   3. Doors: Entrance doors shall be of metal construction with vertical channel reinforcements.
   4. Fire Rating: Entrance and doors shall be UL fire rated for 1-1/2 hour
   5. Frame and Entrance Finishes:
      a. Duplex 5F, 1R - Unit 1
         1) Painted* Frames and Entrances at:
         2) Front- 1, 2, 3, 4, 5
         3) Rear- G
      b. Duplex 5F, 1R - Unit 2
         1) Painted* Frames and Entrances at:
         2) Front- 1, 2, 3, 4, 5
         3) Rear- G
   6. Entrance Marking Plates: Entrance jambs shall be marked with 4” x 4” (102 mm x 102 mm) plates having raised floor markings with Braille located adjacent to the floor marking. Marking plates shall be provided on both sides of the entrance.
   7. Sight Guards: Sight guards will be furnished with all doors painted to match with painted doors, painted black for stainless steel doors.

2.6 EQUIPMENT: CAR COMPONENTS

A. Car Frame and Safety: A car frame fabricated from formed or structural steel members shall be provided with adequate bracing to support the platform and car enclosures. The car safety shall be integral to the car frame and shall be Type "B", flexible guide clamp type.

B. Cab:
   1. Duplex 5F, 1R - Unit 1- Premium, Steel Shell Cab with raised laminate wall panels
   2. Duplex 5F, 1R - Unit 2- Premium, Steel Shell Cab with raised laminate wall panels

C. Car Front Finish: Satin Stainless Steel.

D. Car Door Finish: Satin Stainless Steel.

E. Ceiling Type:
   1. Duplex 5F, 1R - Unit 1- Flat Ceiling with 4 LED Lights
   2. Duplex 5F, 1R - Unit 2- Flat Ceiling with 4 LED Lights

F. Ceiling Finish:
   1. Duplex 5F, 1R - Unit 1- Brushed Steel Finish
   2. Duplex 5F, 1R - Unit 2- Brushed Steel Finish

G. Fan: A two-speed 120 VAC fan will be mounted to the ceiling to facilitate in-car air circulation, meeting A17.1 code requirements. The fan shall be rubber mounted to prevent the transmission of structural vibration and will include a baffle to diffuse audible noise. A switch shall be provided in the car-operating panel to control the fan. A variable speed fan will be available when Glassback cab option is selected.

H. Handrail:
   1. Duplex 5F, 1R - Unit 1
   2. 1 ½” diameter (38.1 mm) Round Bars with Brushed Steel Finished handrails shall be provided on the side walls.
   3. Duplex 5F, 1R - Unit 2
   4. 1 ½” diameter (38.1 mm) Round Bars with Brushed Steel Finished handrails shall be provided on the side walls.

I. Threshold:
   1. Duplex 5F, 1R - Unit 1- Extruded Aluminum
   2. Duplex 5F, 1R - Unit 2- Extruded Aluminum

J. Emergency Exit Contact: An electrical contact shall be provided on the car-top exit.

K. Guides: The car shall have 3” diameter roller guides at top and bottom and the counterweight shall have slide type guides at the top and the bottom. Optional counterweight guides available.

L. Platform: The car platform shall be constructed of metal. Load weighing device shall be mounted on the belts at the top of the hoistway.

M. The LED ceiling lights and the fan should automatically shut off when the system is not in use and be powered back up after a passenger calls the elevator and pushes a hall button.

2.7 EQUIPMENT: SIGNAL DEVICES AND FIXTURES

A. Car Operating Panel: A car operating panel shall be provided which contains all push buttons, key switches, and message indicators for elevator operation. The car operating panel shall have a satin stainless steel finish. (An optional Luxury Swing COP is available. A second COP is available)
   1. A car operating panel shall be furnished. It shall contain a bank of round stainless steel, mechanical LED illuminated buttons. Flush mounted to the panel and marked to correspond to the landings served. All buttons to have raised numerals and Braille markings.
   2. The car operating panel shall be equipped with the following features:
      a. Raised markings and Braille to the left hand side of each push-button.
      b. Car Position Indicator at the top of and integral to the car operating panel.
      c. Door open and door close buttons.
      d. Inspection key-switch.

e. Elevator Data Plate marked with elevator capacity and car number.
f. Help Button: The help button shall initiate two-way communication between the car and a location inside the building, switching over to another location if the call is unanswered, where personnel are available who can take the appropriate action. Visual indicators are provided for call initiation and call acknowledgement.
g. Landing Passing Signal: A chime bell shall sound in the car to signal that the car is either stopping at or passing a floor served by the elevator. Car Position Indicator is at the top of and integral to the car operating panel.
h. In car stop switch (toggle or key unless local code prohibits use)
i. Firefighter's hat
j. Firefighter's Phase II Key-switch
k. Call Cancel Button
l. Firefighter's Phase II Emergency In-Car Operating Instructions: worded according to A17.1 2000, Article 2.27.7.2. - Optional
m. Please Exit Symbol: provided with emergency hospital service, Seismic Zones ≥2 or express priority in the hall. - Optional

B. Car Position Indicator: A digital, LED car position indicator shall be integral to the car operating panel.

C. Hall Fixtures: Hall fixtures shall be provided with necessary push buttons and key switches for elevator operation. All Hall fixtures shall have a Brushed Stainless Steel Finish.
1. Integral Hall fixtures shall feature round stainless steel, mechanical buttons marked to correspond to the landings. Hall fixtures to be located in the entrance frame face or the wall. Buttons shall be in vertically mounted fixture. Fixture shall be satin stainless steel finish.
2. Hall Buttons: Flat Flush Mounted satin stainless steel button with blue or white LED illuminating halo

D. Car Lantern and Chime: A directional lantern visible from the corridor shall be provided in the car entrance. When the car stops and the doors are opening, the lantern shall indicate the direction in which the car is to travel and a chime will sound.

E. Access key-switch at top floor in entrance jamb.

F. Access key-switch at lowest floor in entrance jamb.

G. Card Reader Provisions.

PART 3 - EXECUTION

3.1 INSPECTION

A. Verify that hoistway, pit, and machine room are ready for work of this Section.

B. Verify shaft and openings are of correct size and within tolerances.

C. Verify location and size of machine foundation and position of machine foundation bolts.

D. Confirm electrical power is available and of correct characteristics.

E. Report defects or deficiencies in writing.

F. Beginning of installation means acceptance of conditions.

3.2 PREPARATION

A. Arrange for temporary electrical power to be available for installation work and testing of elevator components.

3.3 INSTALLATION

A. Install in accordance with ANSI A17.1.

B. Install hoistway and machine room components. Connect equipment to building utilities.

C. Provide conduit, boxes, wiring, and accessories within machine room, hoistway, and signal outlets.

D. Mount machine on vibration and acoustic isolators, on bed plate and concrete pad. Place machine on structural supports and bearing plates. Securely fasten to building supports. Prevent lateral displacement.

E. Arrange equipment in machine room so rotating elements, sheaves, and other equipment can be removed for repairs or replaced without dismantling or removing other equipment components. Arrange equipment for clear passage to access door. Accommodate equipment in space indicated.

F. Install guide rails using threaded bolts with metal shims and lockwashers under nuts. Compensate for expansion and contraction movement of guide rails. Weld joints and file smooth.

G. Accurately machine and align guide rails. Form smooth joints with machined splice plates.

H. Secure brackets directly to structure.

I. Field Welds: Chip and clean away oxidation and residue; wire brush weld; prime two coats.

J. Coordinate installation of hoistway wall construction.

K. Install hoistway door sills, frames, and headers in hoistway walls. Grout sills in place. Set entrances in vertical alignment with car openings and aligned with plumb hoistway lines.

L. Fill hoistway door frames solid with grout.

M. Adjust equipment for smooth and quiet operation.

3.4 TOLERANCES

A. Guide Rail Alignment: Plumb and parallel to each other within 1/16 inch in 100 feet.

B. Cab Movement on Aligned Guide Rails: Smooth movement, with no perceptible lateral or oscillating movement or vibration.

3.5 FIELD QUALITY CONTROL

A. Perform and meet tests required by ANSI A17.1.

B. Supply instruments and execute specific tests.

C. Furnish test and approval certificates issued by jurisdictional authorities.

D. Provide two weeks written notice of date and time of tests to the Architect.

3.6 CLEANING

A. Remove protective coverings from finished surfaces.

B. Clean surfaces and components ready for inspection.

3.7 ADJUSTING

A. Adjust for smooth acceleration and deceleration of car to provide passenger comfort.

B. Adjust automatic floor leveling feature at each floor to achieve an alignment of cab floor and landing floor within 3/8 inch from flush.

3.8 PROTECTION

A. Protect finished installation under provisions of Section 015000.

END OF SECTION