PROJECT MANUAL

FOR

West Tualatin View Elementary School Roof Replacement

Beaverton School District
16500 SW Merlo Road
Beaverton, OR 97003

Bid Documents
February 22, 2019

Dull Olson Weekes - IBI Group Architects, Inc.

SET NO. _____

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FOR:

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Beaverton School District
16500 SW Merlo Road
Beaverton, OR 97003

(ARCHITECT)
Dull Olson Weekes - IBI Group Architects
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February 22, 2019

TABLE OF CONTENTS

END OF TABLE OF CONTENTS

SECTION 01 10 00
SUMMARY

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. General Requirements.

B. Work Covered by Contract Documents.

C. Delegated Design Requirements.

D. Contractor Use of Premises.

1.02 GENERAL REQUIREMENTS

A. TIME OF COMPLETION
   1. The work of this Contract shall be commenced on the date of written notice to proceed and shall be completed by the dates established in the Owner/Contractor Agreement, and as stipulated in the General Conditions of the Contract for Construction.

B. LIQUIDATED DAMAGES
   1. The Contractor acknowledges and agrees to abide by all provisions of the General Conditions of the Contract regarding Liquidated Damages as it pertains to all work under this Contract.

C. ASBESTOS FREE CERTIFICATION
   1. Absolutely no materials containing asbestos are to be furnished or installed as part of this Project. Ensure that no subcontractor or any of the Contractor's own forces installs any materials containing asbestos. At final closeout of the Project, provide to the Owner certification that no materials containing asbestos have been installed in the Project, and that the Project is asbestos-free as required by the State in which the Project is located.

D. COORDINATION
   1. The Contractor is responsible for overall coordination of the Project.
   2. The Drawings and Specifications are arranged for convenience only and do not necessarily determine which trades perform the various portions of the Work.
   3. Coordinate sequence of work to accommodate agreed-upon Owner occupancy.
   4. Perform all necessary work to receive and/or join the work of all trades.
   5. Verify location of existing utilities and protect from damage.

E. PERMITS AND FEES
   1. The Owner will be responsible for filing and paying for building permits and all fees associated with the building permit, system development charges, impact fees, etc. The Contractor will be responsible for picking up all Project permits and will have full responsibility for requirements of and payments for all trade permits (i.e. electrical, plumbing, mechanical) as a direct expense.

F. REQUIREMENTS FOR CONTRACTOR, SUBCONTRACTORS, AND MATERIAL SUPPLIERS
   1. Ensure that all persons performing the Work comply with Owner's tobacco policy. Copies made available upon request.
   2. Contractor and Subcontractors shall refrain from contact with staff and students at all times.
   3. Neither the Contractor nor any of its Subcontractors of any tier shall utilize any employee at the site who has pled guilty to or been convicted of any felony crime involving the physical neglect of a child, physical injury to or death of a child, sexual offenses against or sexual exploitation of a child, child prostitution, or other similar offenses as defined by the most current State Statutes, or similar laws of another jurisdiction. Remove from the work and work site any employee who has engaged in such actions, or who the Owner reasonable considers objectionable.
      a. All personnel under the employment of the Contractor and its Subcontractors that travel to, or spend time at, the project site are to wear photo ID badges while on the

work site. Individuals not wearing badges will be removed from the project work site. ID badges are to contain:
1) Individual's full name (no nicknames).
2) Individual's company affiliation.
3) Recent photograph of the individual; taken within the last 4 years.

b. All personnel under the employment of the Contractor and its Subcontractors that spend time at the project site, must be run through formal background screening by the Contractor and pass that screening review, before being allowed on the work site. Background screening is to be done by a professional screening firm meeting the following qualifications:
1) Must have a minimum of five years of screening experience specifically for construction industry clients.
2) Must have a minimum of fifteen employees.
3) Must be able to provide access to an internet based screening management software system which has a feature to allow access by the District to view the pass-no pass result for each screened Contractor/Subcontractor employee working on a District project.
4) Must be accredited by the National Association of Professional Background Screeners (NAPBS).

c. Each individual will be screened for having committed any crime as listed in ORS 342.142, most recent edition.

4. Without limiting the generality of the foregoing, ensure by appropriate provision in each subcontract agreement that the Contractor may remove from the work and work site any Subcontractor or Subcontractor's employee who has engaged in such action. At no change to the Contract Sum or Contract Time, remove from the work and work site any employee or other person pursuant to this Section. Failure to comply with these requirements is grounds for immediate termination of the Agreement for cause.

1.03 WORK COVERED BY CONTRACT DOCUMENTS

A. Work of this Contract comprises all required demolition, general renovation construction, and re-roofing work for the West Tualatin View Elementary School Roof Replacement Project located at 880 SW Leahy Rd., Portland, OR 97225.

1. Base Bid Scope of Work encompasses all Work indicated for roof assembly removal and replacement at Roof Areas A and B, including, but not limited to the following: Removal of existing gravel surfaced built-up roof assembly down to existing sheathing, repair of existing damaged sheathing as necessary to establish acceptable substrate conditions, removal of abandoned roof top curbed units and closing of existing sheathing openings, installation of 2-ply hot asphalt applied vapor barrier / temporary roof with glaze coating over base sheet and sheathing paper, perimeter wood nailer installations, plywood substrate board installation, modification of roof top penetrations and curbs to accommodate increased insulation heights, installation of deck level rigid insulation and cover board, installation of fully adhered 90-mil EPDM single ply roofing membrane, removal and replacement of roof related sheet metal flashings and trim, removal and replacement of exterior hanging gutters and downspouts, installation of fall protection anchors for fall restraint, new access roof access hatch, and access ladders.
2. Alternate Bid Scope of Work encompasses all Work indicated for roof assembly removal and replacement at Roof Areas C, D, E, and F including, but not limited to the following: Removal of existing gravel surfaced built-up roof assembly down to existing sheathing, repair of existing damaged sheathing as necessary to establish acceptable substrate conditions, installation of 2-ply hot asphalt applied vapor barrier / temporary roof with glaze coating over base sheet and sheathing paper, perimeter wood nailer installations plywood substrate board installation, wood framed parapet and dividing wall extensions, modification of roof top penetrations and curbs to accommodate increased insulation heights, installation of deck level rigid insulation and cover board, installation of fully adhered 90-mil EPDM single ply roofing membrane, removal and replacement of roof related sheet metal flashings and trim, installation of fall protection anchors for fall

restraint, removal and replacement of existing metal wall panels, removal and replacement roof access hatch, installation of access ladders and guardrails.

1.04 DELEGATED DESIGN REQUIREMENTS

A. Certain components of the Work under this project are Delegated Design. It is the Contractor's responsibility to coordinate and assume or assign to subcontractors the complete responsibilities for the design, calculation, submittals, fabrication, transportation and installation of the Delegated Design portions or components as required. Delegated Design components of the Work are defined as complete operational systems, provided for their intended use.

B. Owner shall not be responsible to pay for any delays, additional products, additional hours of work or overtime, restocking or rework required due to failure by the Contractor or the subcontractor to coordinate their work with the work of the other trades on the project or to provide the Delegated Design portion or component in a timely manner to meet the schedule of the project.

1.05 CONTRACTOR USE OF PREMISES

A. Work Sequence:
   1. Perform Work in a manner required to accommodate School District use of premises during the Contract Period. Coordinate Work schedules and operations with Owner's use requirements.
   2. Provide access to and from site as required by law and by Owner:
      a. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
   3. Do not obstruct roadways, sidewalks, or other public ways without permit.

B. Limitations on Use:
   1. Owner intends to occupy and conduct school in the existing building during portions of the construction period. The existing building during times of Owner occupancy is a limited Contractor access area. Coordinate access to the existing building.
   2. Complete and exclusive use of the construction area except as outlined above will be permitted from Notice to Proceed until Substantial Completion of the Project. Coordinate areas available for early occupancy (if any) with Owner.
   3. During times of Owner's occupancy there may be down days during the Contract Period when occupied areas will be closed. Request from the District a list of down days that may occur during the Contract Period. Notify the District at least 48 hours in advance of down days during which time the Contractor intends to work. The District will pay for employee time during such down days when the building is required to be open for Contractor use.
   4. Smoking or open fires will not be permitted within the building enclosure or on the premises.
   5. Do not encumber the site with materials or equipment. Confine stockpiling of materials and location of storage sheds to the areas indicated or coordinated with Owner.
   6. Move any stored products under Contractor's control which interfere with operations of Owner or separate contractors.

C. Contractor's Site Conduct:
   1. Identifying name tags will be worn at all times.
   2. No loitering in the school buildings or unsupervised/unauthorized entry.
   3. Site is tobacco-free. This means no smoking or chewing on any school property.
   4. Beyond courtesy, there should be no interaction between staff and faculty.
   5. Keep project free of pop cans, lunch wrappers and similar debris.
   6. Review with the Owner the scheduling of any work that is excessively noisy or has the potential to disrupt activities of Owner or neighbors.
   7. Be considerate of the client, the students and faculty.
   8. Always consider, prior to an act, the safety of students, faculty and other co-workers.
   9. Profanity is not acceptable.

10. The wearing of clothing with logos displaying alcohol, tobacco, illegal substances or suggestive themes is not acceptable attire.

D. Non-Interference with School:
   1. Perform work operations upon areas adjacent to existing Owner-occupied areas and/or structures in such manner as to not interfere with continued free and comfortable use of such areas.
   2. During normal school hours, keep building exits safe, protected, and restricted from remainder of construction site and clear of obstructions at all times. If closure of an exit is required by the Work, notify the school Principal and allow ample time for an alternate exit plan to be executed.
   3. Work shall not be performed in Owner-occupied areas or rooms during normal school hours when such spaces are required for school use. Such Work shall be performed after normal school hours up to 10:00 PM or as agreed upon with Owner, and if no night time school activities are planned. Work may be performed during weekends and vacation periods when school is normally closed if coordinated in advance with school administration. All Work required in rooms or spaces being utilized for school purposes must be closely scheduled with the District such that rooms or spaces may be safely used for school purposes when classes resume.

E. Non-Interference with Serving Utilities:
   1. Do not interrupt electric, gas, water, or other services to existing Owner-occupied structures without prior notice to the District and then only at a definite time and for a definite duration approved by Owner.
      a. Disruption of utilities must be approved by the Owner. Requests must be made 72 hours prior to disruption and a plan detailing a definite start time and duration provided.
   2. Schedule demolition, remodel, and new construction to accommodate Owner's continued use of existing and/or new mechanical, electrical, and plumbing services as required for Owner's continued occupancy and beneficial use of designated areas.
   3. Consult with public and private utility companies for location and extent of all utilities before commencing work.
   4. Provide services of a utilities locator to investigate and mark underground utilities in the vicinity of exterior work; and for interior below-slab utilities in areas which will be partially demolished prior to commencing work. Ensure that utilities are identified prior to saw cutting interior floor slabs.
   5. Provide all services required. Protect and maintain existing utilities, active electrical conductors, sewers, pipes, and other active lines either on project site or in offsite street excavations.
   6. Arrange for and pay cost of disconnecting, removing, relocating, capping, replacing, or abandoning of public and private utilities in the way of construction operations in accordance with serving utilities policies, local regulations and governing codes. Utilities, pipes, sewers, electrical conductors and the like to be abandoned shall be capped in accordance with instructions of governing authority or as directed.

F. Protections - Exterior Components:
   1. Protect sidewalks, asphalt paving, concrete, plantings, and lawn areas at all times from spillage of materials used in carrying out the Work. Exercise care to preclude materials from clogging catch basins and yard drains. Leave all drainage items clean and in proper working condition.
   2. Clean, repair, resurface, or restore existing surfaces to their original condition, or completely replace such surfaces to match existing where damaged by construction operations.
   3. Whenever it is necessary to cut and remove fences and/or power lines (whether on private or public property), restore such demolished work to condition at minimum equal to that which existed prior to such demolition.

4. Damage to property adjacent to Owner's property shall be restored to the satisfaction of respective property owners.

G. Protections - Interior Components:
1. Contractor is responsible for protection of completed portions of the Work. Provide protection as required such that items are not soiled or damaged during the progression of the Work. Maintain all such protections for the entire duration of the construction until acceptance by Owner.
a. Provide a weathertight condition throughout the Work. Clean, repair, resurface or restore building and site components required to be protected to their original condition, or completely replace items to match existing undamaged portions of Work, where damaged by construction operations.
2. Whenever it is required and/or necessary to demolish portions of work, take all precautions to protect adjacent portions of the work which remain from damage.
3. Keep public areas such as hallways, stairs, elevator lobbies and toilet rooms free from accumulation of waste material, rubbish or construction debris.
4. Gather and shroud all existing furnishings to the extent needed to provide protection from construction dust.
5. Clean, repair, resurface, or restore such items above required to be protected to their original condition, or completely replace items to match existing undamaged portions of work, where damaged by construction operations.

H. Protections: Vegetation and Plantings:
1. Protect all existing trees to remain on-site from foliage, trunk, branch, and root damage.
2. Provide barricades and maintain same around all trees, plantings, and other landscaped areas adjacent to work of this Contract to protect such areas from damage of any nature caused by construction operations.
3. Replace any plantings damaged or destroyed with plants of equivalent type, size, quantity, and nature as approved by Architect.

I. Security:
1. Provide security and facilities to protect the Work and Owner's operations from unauthorized entry, vandalism, and theft.
2. Provide temporary barriers, doors, and locks at all openings after building is enclosed.
3. Lock automotive vehicles and other mechanized or motorized construction equipment when parked and unattended. Do not leave vehicles or equipment unattended with the motor running or ignition key in place.
4. Coordinate with Owner's building security provider and program.

J. Removal of Equipment and Materials:
1. Clear site and surrounding street areas of all equipment, apparatus, appliances, tools, unused materials, and similar items immediately as they cease to be necessary to carry out the Work.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 13 31

CERTIFICATE OF COMPLIANCE

No final payment shall be made until the Contractor provides to the Owner, prior to acceptance of the work, a notarized certification of compliance in following form:

The Contractor does hereby certify that all work has been performed and materials supplied in accordance with the drawings, specifications and Contract Documents for the above Work, and that:

No less than the prevailing rates of wages as ascertained by the governing body of the Contracting agency has been paid to laborers, workmen and mechanics employed on this Work;

There have been no unauthorized substitutes of Subcontractors; nor have any subcontracts been entered into without the names of the Subcontractors having been submitted to the Owner prior to the start of such subcontracted work;

No subcontract was assigned or transferred or performed by any Subcontractor other than the original Subcontractor, without prior notice having been submitted to the Owner together with the names of all Subcontractors;

All claims for material and labor and other service performed in connection with these specifications have been paid;

In WITNESS WHEREOF, the undersigned has signed and sealed this instrument this

_____ day of_____, _____

Firm Name: _____

Signature: _____

Title: _____

Attest _____
(Seal if Bidder is a Corporation)

As determined necessary, evidence of compliance may be required to be submitted with and made a part of this Certificate of Compliance.

END OF SECTION

SECTION 01 13 32

CERTIFICATE OF NO HAZARDOUS MATERIALS

No final payment shall be made until the Contractor shall file with the Owner, prior to acceptance of the work, a notarized certificate of no hazardous materials in the following form:

"To the best of my knowledge no hazardous material, including, but not limited to: asbestos, polychlorinated biphenyls (pcb's) and lead based products, is used in the construction of this project. Material safety data sheets will be provided as requested by the Owner for all materials which may be questioned in the future."

In WITNESS WHEREOF, the undersigned has signed and sealed this instrument this

_____day of_____, _____

Firm name: _____

Signature: _____

Title: _____

Attest: _____

(Seal if Bidder is a Corporation)

As determined necessary, evidence of compliance may be required to be submitted with and made a part of this certificate.

END OF SECTION

SECTION 01 20 00
PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Procedures for preparation and submittal of applications for progress payments.

B. Procedures for preparation and submittal of application for final payment.

1.02 RELATED REQUIREMENTS

A. Section 01 22 00 - Unit Prices: Payment and modification procedures relating to unit prices.

B. Section 01 77 00 - Closeout Procedures: Substantial Completion and Final Payment.

1.03 SCHEDULE OF VALUES

A. Form to be used: AIA G703 Continuation Sheets.

B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Architect for approval.

C. Forms filled out by hand will not be accepted.

D. Submit Schedule of Values at times indicated in Section 01 30 00 - Administrative Requirements.

E. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification Section. Identify site mobilization and bonds and insurance. Provide closeout and punchlist line items.

F. For items on which progress payments will be requested for stored materials, break down the cost into:
   1. The cost of materials (only), delivered and unloaded, with taxes and the like, paid.
   2. Remainder of installed value (labor, temporary facilities/equipment needed, etc.).
   3. Failure to provide this breakdown prior to materials being delivered voids Contractors right to be paid for affected materials until they are installed.

G. For each line item of installed value exceeding $20,000, show breakdown by major products or operations under each item.

H. Round-off figures to nearest dollar amount for the original breakdown only.

I. Make sum of total scheduled costs equal to Contract Sum.

J. Revise schedule to list approved Change Orders, with each Application For Payment.

1.04 SUBCONTRACTOR AND SUPPLIER LISTING

A. Subcontractor and Supplier Listing: Follow Project Manual Table of Contents as a format for listing name of Subcontractors, including lower-tier Subcontractors and suppliers.
   1. Identify by section number and title the company, address, telephone number and contact person.
   2. Adjacent to Subcontractor list its lower-tier Subcontractor(s) and/or supplier(s).

1.05 APPLICATIONS FOR PROGRESS PAYMENTS

A. Submit a preliminary copy of the Payment Application to Architect for comment prior to formal submittal.

B. Payment Period: Submit at intervals stipulated in the Agreement.
   1. Contractor is encouraged to review the payment application draft during the progress meeting that occurs during the last week of the month.

C. Form to be used: AIA G702 and G703.

D. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.

E. Forms filled out by hand will not be accepted.

F. Execute certification by signature of authorized officer.
   1. Notarized Affidavit: After the first request for payment, each subsequent request shall be accompanied by notarized affidavit stating that all subcontractors have been paid less earned retainage as their interests appeared in the last payment received. No application for payment by the Contractor shall be processed unless accompanied by such Contractor's affidavit.
   2. In addition, the Owner may require that any requests for payment shall also be accompanied by a receipt with original signature from the Principal Subcontractors, and others as required by the Owner, of the dollar amount they received for the previous month's work (less earned retention), and an affidavit by such Subcontractors stating that all sub-subcontractors, suppliers, wages, fringes, and taxes arising out of such subcontract have been paid in full as their interest appeared in the last payment received.

G. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.
   1. For applications for stored materials include:
      a. Project.
      b. Application number and date.
         1) Item number and identification as shown on application and description of specific material or product.
         2) Material stored off-site: Record of quantities and bonding/insurance of storage facility.
         3) Must be within 75 driving miles of the site and open to Architect's and Owner's inspections and inventory during regular business hours.
      c. Verification of stored materials and partial payment for such materials do not constitute acceptance on the part of the District. In the event that materials stored are found to be unsuitable for installation or incorporation into the Work for any reason, Contractor shall bear full responsibility for any and all corrections needed.
      d. District shall not be responsible for any additional costs incurred for storage of materials unless such storage is the result of and a part of an approved Change Order where the District is found to be responsible for such costs.

H. List each authorized Change Order as a separate line item, listing Change Order number, description and dollar amount as for an original item of Work. Provide a breakdown by major products or operation for amounts in excess of $20,000.

I. Submit one electronic copy of each Application for Payment through e-Builder.

J. Include the following with the application:
   1. Construction progress schedule, revised and current as specified in Section 01 32 00 - Construction Progress Documentation.
   2. Partial release of liens from major Subcontractors and vendors.
   3. Affidavits attesting to off-site stored products.

K. Current Record Documents: Prior to acting on processing each monthly request for payment, Contractor is required to present for review to Architect and consultants, a current set of record documents indicating any revisions.

L. Certified Statements of Intent to Pay Prevailing Wage for each trade shall be on file with the Architect and Owner prior to applying for payment of work of that trade. Where such Certified Statements are not provided, that category of work will not be paid until appropriate documentation is filed.

M. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

1.06 SPECIAL CONDITIONS OF INITIAL PAYMENT

A. Prior to initial payment, the Contractor must have delivered all required insurance, bonds and contracts; acceptable Schedule of Values, Sub-Contractors/Suppliers List, Contractor Construction Schedule.

1.07 APPLICATION FOR FINAL PAYMENT

A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.
   1. Submit Application for Final Payment at time indicated in Section 01 30 00 - Administrative Requirements.

B. All Project Closeout activities must be complete; all liens and claims settled; all project record documents transmitted in final approved form; removal of temporary services, facilities and all debris/materials/ equipment. All permit drawings, sign-off sheets and Certificates of Occupancy transmitted.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 22 00
UNIT PRICES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. List of unit prices, for use in preparing Bids.

B. Measurement and payment criteria applicable to Work performed under a unit price payment method.

1.02 RELATED REQUIREMENTS

A. Bid Form: Listing of Unit Prices on the Bid Form.

1.03 COSTS INCLUDED

A. Unit Prices included on the Bid Form shall include full compensation for all required labor, products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work; overhead and profit.

1.04 UNIT QUANTITIES SPECIFIED

A. Quantities indicated in the Bid Form are for bidding and contract purposes only. Quantities and measurements of actual Work will determine the payment amount.

1.05 MEASUREMENT OF QUANTITIES

A. Measurement methods delineated in the individual specification sections complement the criteria of this section. In the event of conflict, the requirements of the individual specification section govern.

B. Take all measurements and compute quantities. Measurements and quantities will be verified by Architect.

C. Assist by providing necessary equipment, workers, and survey personnel as required.

1.06 PAYMENT

A. Payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities of Work that is incorporated in or made necessary by the Work and accepted by the Architect, multiplied by the unit price.

B. Payment will not be made for any of the following:
   1. Products wasted or disposed of in a manner that is not acceptable.
   2. Products determined as unacceptable before or after placement.
   3. Products not completely unloaded from the transporting vehicle.
   4. Products placed beyond the lines and levels of the required Work.
   5. Products remaining on hand after completion of the Work.
   6. Loading, hauling, and disposing of rejected Products.
   7. Products furnished or installed contrary to Contract Documents.

1.07 SCHEDULE OF UNIT PRICES

A. Unit Price No. 1: Removal and replacement of existing shiplap sheathing (price per SF). Base bid to include replacement of 20% of total roof area.

B. Unit Price No. 2: Removal and replacement of existing damaged 1/2” plywood sheathing (price per SF). Base bid to include replacement of 20% of total roof area.

C. Unit Price No. 3: Removal and replacement of existing damaged 5/8” plywood sheathing (price per SF).

D. Unit Price No. 4: Removal and replacement of existing dimensional 2x4 lumber (price per LF).

E. Unit Price No. 5: Removal and replacement of existing dimensional 2x6 lumber (price per LF).

F. Unit Price No. 6: Removal and replacement of existing dimensional 2x8 lumber (price per LF).

G. Unit Price No. 7: Progress Meetings: Base bid includes a total of (8) eight progress meetings. Provide cost per meeting for additional progress meetings beyond the required eight.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 23 00
ALTERNATES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Description of Alternates.

1.02 DEFINITIONS

A. Base Bid: Includes all work shown on Drawings and as specified, with the exception of the Work specifically included in Additive or Deductive Alternates listed herein.

B. Alternate Bid: Amount proposed by bidders and stated on the Bid Form that will be either Added To or Deducted From the Base Bid amount if the Owner decides to accept a change in either scope of work or in products, materials, equipment, systems, or other installation methods as described in the Contract Documents.

1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate the alternate into the Work. No other adjustments are made to the Contract Sum.

1.03 ACCEPTANCE OF ALTERNATES

A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in the Owner-Contractor Agreement.

1. Evaluation of Alternate: Bid evaluation will be based on lowest total of base bid modified by Owner accepted alternates.

B. Owner reserves the right to select any or all of the Alternates up to 90 days after award of Contract. If Owner so selects, the time for Substantial Completion will be correspondingly adjusted for those selected items only. Immediately following Award of Contract the Contractor shall prepare and distribute to each party involved notification of the status of each Alternate.

C. Coordinate related work and modify surrounding work to integrate the Work of each Alternate.

D. Notification: Immediately following award of Contract, prepare and distribute to each party involved notification of the status of each alternate. Indicate whether alternates have been accepted, rejected or deferred for consideration at a later date.

1.04 PROCEDURES

A. Alternates shall conform to the requirements of each Section of the Specifications which pertain to the scope of work contained within the Alternate.

B. Refer to Drawings for details and other information related to the construction of Alternates where such construction is required by scope.

C. Include as part of each Alternate miscellaneous devices, accessory objects and similar items incidental to or required for a complete installation, whether or not specifically mentioned as part of the Alternate.

1.05 SCHEDULE OF ALTERNATES

A. Alternate No. 1 (Additive) - Roof Areas C, D, E, and F.

1. All scope of work indicated in the documents for roof areas C, D, E, and F.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 26 00
CONTRACT MODIFICATION PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Procedures for processing contract modifications and Change Orders.

1.02 RELATED REQUIREMENTS

A. Section 01 20 00 - Price and Payment Procedures: Applications for payment and Schedule of Values.

B. Section 01 22 00 - Unit Prices: Descriptions of unit price items, administrative requirements.

C. Section 01 78 00 - Closeout Submittals: Project record documents, operation and maintenance (O&M) data, warranties and bonds.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Submit name of individual authorized to accept changes, and to be responsible for informing others in Contractor's employ of changes in the Work.

1.04 GENERAL REQUIREMENTS

A. No additional work shall be undertaken without Owner's and Architect's written approval.

B. Written approval authorizing Contractor to undertake additional Work does not authorize automatic extension of Contract Completion time.

1.05 DEFINITIONS

A. Change Order (CO): This document signed by Owner, Contractor and Architect formally changes the Contract Sum or Contract Time and may incorporate Proposal Requests and/or Construction Change Directives.

B. Proposal Request (PR): This document initiated by the Architect is to be priced by the Contractor. Upon authorization by the Owner it becomes a directive to the Contractor to modify the scope of the Contract for inclusion in a future Change Order.

C. Architect's Supplemental Instructions (ASI): This form is a written order comprising instructions or interpretations, signed by Architect making minor changes in the Work not involving a change in Contract Sum or Contract Time. If the Contractor considers that the ASI constitutes a Change in the Work, it must notify the Owner in accordance with the Contract Documents.

D. Construction Change Directive (CCD): A written order to the Contractor, signed by the Owner and Architect, amending Contract Documents as described. This order directs Contractor to proceed with Work that may alter Contract Sum and/or Contract Time, and is intended to be included in a subsequent Change Order pending agreement on changes in the Contract Sum and/or Contract Time.

1.06 SIGNATURES

A. All signatures on Change Orders and Construction Change Directives shall be original; no photocopies, unless electronic signatures are acceptable to all parties. Facsimile signatures shall be followed immediately by mail and/or delivery of originals.

1.07 MODIFICATION PROCEDURES

A. For minor changes not involving an adjustment to the Contract Sum or Contract Time, Architect will issue instructions directly to Contractor.
   1. Form for Minor Changes in the Work: Architect's "Architect's Supplemental Instructions" form.
   2. If Contractor determines that an Architect's Supplemental Instruction involves adjustments to the Contract Sum or Contract Time, Contractor shall prepare and issue a Proposal

Request to the Architect for approval prior to proceeding with the Architect's Supplemental Instruction.

1.08 DOCUMENTATION OF CHANGE IN CONTRACT SUM AND CONTRACT TIME

A. Maintain detailed records of work performed on a time and materials basis. Provide complete information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.

B. Document each quotation for a change in cost or time with sufficient data to allow evaluation of the quotation.

C. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.

D. On request, provide additional data to support computations including:
   1. Quantities of products, labor, and equipment.
   2. Taxes, insurance, and bonds.
   3. Overhead and profit.
   4. Justification for any change in Contract Time.
   5. Credit for deletions from Contract, similarly documented.

E. Support each claim for additional costs, and for work performed on a time and materials basis with the following information:
   1. Origin and date of claim.
   2. Dates and times work was performed, and by whom.
   3. Time records and wage rates paid.
   4. Invoices and receipts for products, equipment, and subcontracts, similarly documented.

1.09 PROPOSED CHANGE PROCEDURES

A. For changes for which advance pricing is desired, Architect will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within 14 days.
   1. Form for Proposal Requests: Architect's "Proposal Request" form.
   2. Form for Fixed Price Quotation: Electronically submitted PDF.

B. If latent or unforeseen condition require modifications to the Contract, or if an RFI response or an Architect's Supplemental Instruction is determined to have cost or schedule impacts, Contractor may propose a change by submitting a request for change to Architect, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation and a statement describing the effect on Work by separate or other contractors. Document any requested substitutions in accordance with Section 01 60 00.
   1. Form for Proposal Requests: Architect's "Proposal Request" form.
   2. Form for Fixed Price Quotation: Electronically submitted PDF.

C. Proposal Request Log: Maintain a current log of all Proposal Requests and submit same at each project meeting and with each Application for Payment. Each Proposal Request shall have a unique number for tracking purposes.
   1. The log shall, at a minimum, show the Proposal Request number, date initiated, brief description, reference (e.g., RFI or supplemental instruction) estimated cost, estimated time, status and reason for the Proposal Request.

1.10 APPROVAL OR REJECTION OF PROPOSAL

A. When a proposed change is initiated through a Proposal Request:
   1. Submit the following in writing within seven (7) days of date on Proposal Request:
      a. All direct and indirect costs.
      b. Schedule of Values and Unit Prices including basis for costs.

c. Impact on other Work not described. Describe and include all direct and indirect costs of changes to other Work not specified in the PR.
d. Quotation will be guaranteed for period specified in the PR beginning from signing of proposal, but, as a minimum, 30 days. If no period is specified, quotation shall be guaranteed for sixty (60) days from signing.
e. Proposal shall be signed by authorized person.
f. Failure of the Contractor to respond with pricing in a timely manner shall not be justification for claims by the Contractor of delay of the project associated with the Change.

2. Architect and Owner will review proposal and respond in writing by one of the following:
   a. Authorizing.
   b. Requesting additional information.
   c. Rejecting.
3. Authorization to proceed with Change through a recommendation by the Architect to the Owner and written authorization by the Owner directs Contractor to undertake Work.

B. When Change is initiated by Contractor:
1. Architect and Owner review and respond in writing by one of the following:
   a. Processing a Change Order or Proposal.
   b. Requesting additional information.
   c. Rejecting.
2. If Owner responds by processing a Proposal Request, follow procedure outlined above.
3. If additional information is requested by Owner, respond in writing within seven days of Owner's request.

1.11 DOCUMENTATION OF PROPOSALS AND CLAIMS

A. Support each lump sum proposal quotation and each unit price (not previously established) with detailed substantiating data. Clearly cross reference tracking numbers of CCDs, RFIs, PRs, etc. to allow easy identification of costs origins
1. Include as separate line items any changes related to credits to Contract Sum or Contract Time associated with not performing the originally specified Work.

B. On request, provide additional data to support time and cost computations:
1. Labor hours, number of workers, time cards and hourly rate cost justification
2. Equipment hours, make and model, number of pieces required, rental agreements and hourly rate justification.
3. Products required.
   a. Recommended source of purchase and unit cost.
   b. Quantities required.
4. Documented credit for Work deleted from Contract.
5. Justification citing specifics of critical path impacts per current CPM for any change in Contract Time.

C. Support each claim for additional costs, and time-and-material/force account work with documentation, as required for lump-sum proposal. Include additional information:
1. Name of Owner's authorized agent who ordered work, and date of order.
2. Dates and times work was performed and by whom.
3. Time record, summary of hours worked and wage rates paid.
4. Receipts and invoices for:
   a. Equipment used, listing dates and times of use.
   b. Products used, listing of quantities.
   c. Subcontracts.

1.12 CONSTRUCTION CHANGE DIRECTIVES

A. For changes that involve an adjustment to the Contract Sum or Contract Time, Architect will issue a document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
   1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
   2. Promptly execute the change.
   3. Form for Construction Change Directives: Architect's "Construction Change Directive" form.

1.13 FIXED PRICE CHANGE ORDER

A. Base upon Architect's Proposal Request and Contractor's fixed price quotation; or Contractor's request for Change Order as approved by Architect and Owner.

B. Change Order describes Work changes, additions and deletions, with attachments of authorized Proposal Requests, agreed Construction Change Directives and/or previously agreed upon change pricing or Contract Time modifications.

C. Change Order provides accounting of any Contract Sum and Contract Time adjustment.

1.14 UNIT PRICE CHANGE ORDER

A. For pre-determined unit prices and quantities, Change Order will be executed on a fixed price basis.

B. For unit costs or quantities of units of work which are not predetermined, execute Work under a Construction Change Directive. Changes in Contract Sum or Contract Time will be computed as specified for a time and material Change Order.

1.15 TIME AND MATERIAL CHANGE ORDER

A. Submit itemized account and supporting data after completion of change, within time limits specified in General Conditions of the Contract.

B. Architect will determine the change allowable in Contract Sum and Contract Time as provided in the General Conditions of the Contract.

C. Maintain and provide detailed records of work done on a time and materials basis.

1.16 EXECUTION OF CHANGE ORDERS

A. Architect will issue Change Orders for signatures of parties as provided in General Conditions of the Contract.
   1. Form for Change Orders: Architect's "Change Order" form.

B. Proper signatures (original and dated) on CCD or Change Order authorize Contractor to proceed with Change.

C. Promptly sign and date Change Order or provide detailed written and signed statement detailing reasons if refusing to sign. If the Contractor does not sign and return the Change Order, all aspects will be considered disputed, and Contractor shall not be paid on any Work on it.

1.17 DISTRIBUTION

A. Architect will distribute one electronic copy to Owner and Contractor for review.

B. Change Orders: Upon authorization, all parties will sign originals with original signatures, unless electronic signatures are acceptable to all parties.
   1. Project procedures for distribution will be discussed and agreed upon at the preconstruction meeting.
   2. All parties will receive signed copies of the Change Order for record.

C. Construction Change Directives: Upon authorization, Architect will issue one electronic copy to Owner and Contractor.
   1. Directive describes Work Change additions or deletions, with attachments of revised Contract Documents.

2. Owner will sign and date as directive to proceed with Change.
3. Promptly sign, date and return to the Architect. If Contractor does not agree with terms, it will proceed with changed Work and follow procedures noted in the General Conditions while still returning one copy to the Architect.

1.18 CREDIT AMOUNT TO CONTRACT SUM - INSURANCE

A. If a Change Order or Construction Change Directive results in a reduction of the Contract Sum, the Owner shall be entitled to a credit that includes the amount of the value of bond premium, amounts charged for additives for insurance premium.

1.19 CORRELATION OF CONTRACTOR SUBMITTALS

A. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item. Adjust Contract Sum as shown on Change Order.

B. Promptly revise Progress Schedule to reflect any changes in Contract Time, revise subschedules to adjust times for other items of work affected by the change, and resubmit.

C. Promptly enter changes in Project Record Documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 30 00
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project coordination.
B. Electronic document submittal service.
C. Preconstruction meeting.
D. Progress meetings.
E. Preinstallation conferences.
F. Project closeout conference.
G. Requests for information (RFI).
H. Submittals for review, information, and project closeout.
I. Number of copies of submittals.
J. Submittal procedures.
K. Product submittals - detailed requirements.
L. Timing of submittals.
M. Construction progress schedule.
N. Schedule of values.

1.02 RELATED REQUIREMENTS

A. Section 01 10 00 - Summary: Delegated design requirements.
B. Section 01 22 00 – Unit Prices: Additional progress meetings.
C. Section 01 31 23 - Project Management Database (PMD).
D. Section 01 32 00 - Construction Progress Documentation: Form, content and administration of schedules.
E. Section 01 60 00 - Product Requirements: Contractor's list of Products.
F. Section 01 78 00 - Closeout Submittals: Project record documents.

1.03 PROJECT COORDINATION

A. Coordinate Work of all personnel, requirements and Work specified throughout the Contract Documents, including Work performed by subcontractors and suppliers.
B. Coordinate scheduling, submittals, and the work of the various Sections of the Specifications to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
C. Contractor's work and responsibilities include, but are not limited to, the following:
    1. Provide all labor, materials, equipment, delivery, tools, machines, facilities, and services necessary for the proper execution of the Work.
    2. Coordinate scheduling, submittals and Work of the various Sections of Specifications to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
    3. Ensure that notification to and inspections by permitting agencies are completed in a timely fashion.
    4. Coordinate utility outages with a minimum of 48 hours advance notice to Owner.
    5. Store, protect, and secure materials, on and off site.
    6. Supervise and coordinate after hours work.
D. The separation of portions of the Work into particular divisions of the specifications or sections of the drawings may not in every case conform to the categories of work typically subcontracted

to particular crafts or trades. Inform bidders, subcontractors, crafts and trades that work assigned to them may be contained in sections other than customary. In every case, provide and coordinate at no additional cost to Owner, all work required in the Contract Documents.

E. Coordinate completion and cleanup of Work of separate Sections in preparation for Substantial Completion.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 ELECTRONIC DOCUMENT SUBMITTAL SERVICE

A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF) format and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.
   1. Besides submittals for review, information, and closeout, this procedure applies to submittal schedule, requests for information (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, proposal requests, change orders, construction change directives), applications for payment, field reports and meeting minutes, substitution requests and any other document any participant wishes to make part of the project record.
   2. Contractor and Architect are required to use this service.
   3. It is Contractor's responsibility to submit documents in PDF format.
      a. Limit PDF size to 10MB, unless otherwise authorized by Architect.
      b. Name PDF's for product submittals as indicated under "Product Submittals - Detailed Requirements" Article.
   4. Subcontractors, suppliers, Architect, and Architect's consultants are to be permitted to use the service at no extra charge.
   5. Users of the service need an email address, Internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, www.adobe.com, or Bluebeam PDF Revu, www.bluebeam.com), unless such software capability is provided by the service provider.
   6. Paper document transmittals will not be reviewed; emailed PDF documents will not be reviewed.
   7. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.

B. Submittal Service: The selected service is:
   1. e-Builder.
      a. Refer to Section 01 31 23 - Project Management Database (PMD) for additional information.

C. Training: One, one-hour training session will be arranged for all participants, with representatives of Architect, Architect's Consultants and Contractor participating; further training is the responsibility of the user of the service.

D. Project Closeout: Coordinate with Architect and Owner to verify that archive documents have been saved and remain accessible to Architect and Owner prior to terminating the service for the project.

3.02 PRECONSTRUCTION MEETING

A. The Owner will schedule a preconstruction conference before the start of construction, at a time convenient to the Owner, Contractor and the Architect, but no later than 10 days after execution of the Agreement. The conference will be held at the Project Site or another convenient location. The meeting shall be conducted to review general issues of responsibilities, communications, and contract administration procedures.

B. Attendance Required:
   1. Owner.

2. Architect.
3. Contractor.
4. Contractor's Superintendent.
5. Major Subcontractors.
6. Major Suppliers when requested; others as appropriate.

C. Agenda:
1. Status of the Contract, bonds, insurance or other contract requirements.
2. Status/timing of Notice to Proceed.
3. Distribution of Contract Documents.
4. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
5. Designation of personnel representing the parties to Contract and Architect.
6. Contract administration responsibilities, communications and procedures.
7. Project management communications and electronic submittal service requirements.
8. Tentative Contractor's construction schedule.
9. Procedures and processing of field decisions, submittals, substitutions, applications for payments, BOLI requirements, proposal request, Change Orders, and Contract closeout procedures.
10. Scheduling.
11. Use of premises and ongoing facility operations.
12. Review of existing conditions.
13. Owner's requirements.
14. Working hours, site access and parking.
15. Contractor's site mobilization and storage areas.
16. Material and equipment deliveries.
17. Maintaining good neighborhood relations and limiting noise, store water, erosion and dust control.
18. Construction facilities and controls.
19. Temporary storage.
20. Security and housekeeping procedures.
21. Special inspection, testing and quality control, including procedures for testing.
22. Procedures for maintaining record documents.
23. Status of permits.
24. Progress meeting schedule date and time.
25. Review of Contract Documents and outstanding questions related thereto.

D. Architect will record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

3.03 PROGRESS MEETINGS

A. Progress meetings will be conducted at the Project Site on a weekly basis, or at intervals otherwise agreed to. Base bid to include a total of (8) progress meetings. Reference Section 01 22 00 – Unit Prices for additional meetings. The schedule of the meetings shall be established by mutual consent of the Owner, Architect and Contractor. No changes to said schedule shall be made without mutual consent of the same parties. Coordinate preparation of the payment request with dates of meetings.
1. Notify subcontractors and other representatives of scheduled meetings where their attendance is requested.

B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

C. Attendees: In addition to representatives of the Contractor, Owner and the Architect, other individuals concerned with current progress or coordination may be represented at these meetings. Participation by Subcontractors shall be limited to attendance only when required by

the Architect or when a prearranged topic relating to the specific trade or supplier requires their attendance at the meeting.

1. Persons designated by the Contractor to attend and participate shall have all required authority to commit the Contractor to solutions as agreed upon in the meeting.

D. Agenda:
1. Review minutes of previous meetings.
2. Review of Work progress.
3. Field observations, problems, and decisions.
4. Identification of problems that impede, or will impede, planned progress.
5. Review of submittals schedule and status of submittals.
6. Status of RFIs, ASIs, Proposal Requests, CCDs and Change Orders.
7. Review of off-site fabrication and delivery schedules.
8. Site access, utilization and parking.
9. Problems from or affecting occupants or neighbors.
10. Permitting and agency issues.
11. Quality/inspection issues.
12. Maintenance of progress schedule.
    a. Review progress since the last meeting;
    b. Distribute Contractor's three-week look ahead schedule.
    c. Evaluate current activity is in relation to the Contractor's Schedule.
    d. Identify in advance potential delays involving: submittals, material / equipment procurement; approvals.
    e. Determine how construction behind schedule will be expedited; securing commitments from parties involved to do so.
    f. Determine whether a recovery schedule is required for the Contractor's Construction Schedule to insure completion within the contract time.
13. Coordination of projected progress.
14. Maintenance of quality and work standards.
15. Effect of proposed changes on progress schedule and coordination.
16. Pay Application review at monthly interval.
17. Review of Project Record Documents.
18. Other business relating to Work.

E. Architect will record minutes and distribute copies within two days after meeting to participants, with one copy to Architect, Owner, participants, and those affected by decisions made.
1. Minutes shall number topics in a manner that reflects when each topic was first raised.
2. Each topic shall reflect who is responsible for acting on the topic and date by which resolution is required.
3. No topic shall be dropped from the minutes until the method of resolution is recorded.

3.04 PREINSTALLATION CONFERENCES

A. When required in individual Specification Sections, convene a preinstallation conference at work site prior to commencing work of the Section.
1. Additional conferences may be conducted as required for performance of the Work.

B. Attendees: The Installer and representatives of manufacturers and fabricators, sub-contractors, Contractor, Owner's representative and Owner's special inspector involved in or affected by the installation, and its coordination or integration with other materials and installations, shall attend the meeting. Advise the Architect of scheduled meeting dates.

C. Notify Architect and Owner minimum four days in advance of meeting date.

D. Agenda: Review the progress of related construction activities, including drawing and specification requirements for the following:
1. Shop Drawings, Product Data, and quality-control samples and other required submittals.
2. Time schedules,
3. Weather limitations.

4. Manufacturer's recommendations.
5. Warranty requirements.
6. Acceptability of substrates.
7. Quality, inspection, and testing requirements.

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

F. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.

G. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.

H. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

3.05 PROJECT CLOSEOUT CONFERENCE

A. Request a meeting to discuss the requirements for project closeout.

B. Attendees: In addition to representatives of the Contractor, Owner and the Architect, other individuals concerned with project closeout may be represented at these meetings.

C. Agenda:
1. Preparation of record documents.
2. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
3. Submittal of written warranties.
4. Requirements for preparing operations and maintenance data.
5. Requirements for demonstration and training.
6. Preparation of Contractor's punch list.
7. Completion time for correcting deficiencies.
8. Inspections by authorities having jurisdiction.
9. Certificate of occupancy and transfer of insurance responsibilities.
10. Partial release of retainage.
11. Preparation for final field observation.
12. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
13. Submittal procedures.
    a. Project Record Documents.
    b. Operating and maintenance documents.
    c. Warranties and bonds.
    d. Affidavits.
    e. Turnover of extra materials and spare parts.
14. Owner's partial occupancy requirements.
15. Responsibility for removing temporary facilities and controls.
16. Final cleaning.
17. Contractor's demobilization of site.
18. Maintenance.

D. Architect will record meeting minutes.

3.06 REQUESTS FOR INFORMATION (RFIS)

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, prepare and submit an RFI in the form specified.
1. RFIs shall originate with Contractor. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
2. Limit topics on each RFI to a single topic to expedite response.

3. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
4. If Contractor disagrees with Architect's response to Contractor's RFI, Contractor shall notify Architect within seven days of receipt of response. Lack of such notification shall be understood to mean that Contractor agrees with response.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Project name.
2. Date.
3. Name of Contractor.
4. RFI number, numbered sequentially.
5. RFI subject.
6. Specification Section number and title and related paragraphs, as appropriate.
7. Drawing number and detail references, as appropriate.
8. Field dimensions and conditions, as appropriate.
9. Contractor's suggested resolution. If proposed solution impacts the Contract Time or the Contract Sum, state impact in the RFI.
10. The following statement:
    a. "This reply is not an authorization to proceed with work involving additional cost, time or both. If any reply requires a change to the Contract Documents, a Change Order or Construction Change Directive must be executed in accordance with the Contract Documents prior to implementation of the reply. Proceeding with the Work in accordance with this RFI response indicates Contractor's acknowledgement that there will be no change in the Contract Sum or Contract Time."
11. Contractor's signature.
12. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings and other information necessary to fully describe items needing interpretation.

C. RFI Forms: Contractor's software-generated form with the content specified and as acceptable to the Architect.

D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
1. The following RFIs will be returned without action:
    a. Requests for approval of substitutions.
    b. Requests for adjustments in the Contract Time or the Contract Sum.
    c. Requests for interpretation of Architect's actions on submittals.
    d. Incomplete RFIs or inaccurately prepared RFIs.
2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Proposal Request according to Section 01 26 00 - Contract Modification Procedures.
    a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.
    b. A response to an RFI is not direction or approval of a change to either Contract Time or Contract Sum.
    c. Proceeding with the Work in accordance with an RFI response, without such written notification and an approved Change Order or Construction Change Directive, indicates Contractor's acknowledgement that there is no change to the Contract Time or the Contract Sum.

E. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.

F. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number using electronic document submittal service. Submit log at each Progress Meeting. Include the following:
   1. Project name.
   2. RFI number including RFIs that were dropped and not submitted.
   3. RFI description.
   4. Date the RFI was submitted.
   5. Date Architect's response was received.
   6. Identification of related Minor Change in the Work, Construction Change Directive, Change Order and Proposal Request, as appropriate.

3.07 SUBMITTALS FOR REVIEW

A. When the following are specified in individual sections, submit them for review:
   1. Product data.
   2. Shop drawings.
   3. Samples for selection.
   4. Samples for verification.

B. Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

C. Samples will be reviewed only for aesthetic, color, or finish selection.

D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 78 00 - Closeout Submittals.

3.08 SUBMITTALS FOR INFORMATION

A. When the following are specified in individual sections, submit them for information:
   1. Design data.
   2. Certificates.
   3. Test reports.
   4. Inspection reports.
   5. Manufacturer's instructions.
   6. Manufacturer's field reports.
   7. Other types indicated.

B. Submit for Architect's knowledge as contract administrator for Owner. No action will be taken.

3.09 SUBMITTALS FOR PROJECT CLOSEOUT

A. Submit Correction Punch List for Substantial Completion.

B. Submit Final Correction Punch List for Substantial Completion.

C. When the following are specified in individual sections, submit them at project closeout:
   1. Project record documents.
   2. Operation and maintenance data.
   3. Warranties.
   4. Bonds.
   5. Other types as indicated.

D. Submit for Owner's benefit during and after project completion.

3.10 NUMBER OF COPIES OF SUBMITTALS

A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.

B. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
   1. After review, produce duplicates.
   2. Retained samples will not be returned to Contractor unless specifically so stated.

3.11 SUBMITTAL PROCEDURES

A. Shop Drawing Procedures:
   1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related Work.
   2. Do not reproduce the Contract Documents to create shop drawings.
   3. Generic, non-project specific information submitted as shop drawings do not meet the requirements for shop drawings.

B. Submit Schedule of all shop drawings, product data, and samples as specified in each individual Section of the Project Manual. Include submittal and installation dates of each product and assembly. Coordinate with construction schedule and allow ample time, but in no case fewer than 14 days, for Architect's review. Allow time for possible disapproval, correction, and resubmittal.

C. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
   1. Provide a separate PDF for each submittal element (Product Data, Shop Drawings, etc.) for each specification Section.
      a. Submit all elements for any Section as a single submittal at the same time.
      b. Do not combine submittals for multiple specification Sections, unless previously approved by the Architect.
   2. Number submittals as indicated in Product Submittals - Detailed Requirements Article.
   3. No secure PDFs allowed.
   4. Incomplete submittals are not acceptable, will be considered nonresponsive, and will be returned without review.

D. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.

E. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents prior to submission.
   1. Architect will not accept or process submittals which do not have Contractor's signed stamp that reflects Contractor's review and approval.
   2. Submission of submittal by Contractor represents that Contractor has fully reviewed and certified acceptance.

F. Submit submittals to Architect as indicated in Electronic Document Submittal Service Article above.

G. Schedule submittals to expedite the Project, and coordinate submission of related items.

H. Do not fabricate products or begin work which requires submittals prior to return of submittal with Architect acceptance.

I. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.
   1. Contractor's responsibility for deviations in submittals from requirements of Contract Documents is not relieved by Architect's review of submittals, unless Contractor notates specific deviations and the deviations are specifically approved by the Architect.

J. Provide space for Contractor and Architect review stamps.

K. When revised for resubmission, identify all changes made since previous submission.

L. Submittals not requested will be returned without review.

M. Contractor is responsible for timely and efficient submittals and the correctness of the documentation submitted. Costs associated with multiple reviews of submittal information beyond one re-submittal (if any) shall be the responsibility of the Contractor.

N. The Contractor is responsible for timely submittals of any required deferred submittals to the governing agencies.

3.12 PRODUCT SUBMITTALS - DETAILED REQUIREMENTS

A. Present in a clear and thorough manner. Title each drawing with Project Name.

B. Identify field-verified dimensions; show relation to adjacent or critical features of Work or products.

C. Number submittals by submittal section number, followed by a two letter designation for the type of submittal and a number which sequentially numbers submittals in order submitted to Architect. For example, the initial submittal of Joint Sealers 07 92 00 Product Data would be designated 079200-PD-1. If the submittal must be resubmitted it shall be identified as 079200-PD-1R1 and subsequent resubmittal shall be sequentially numbered in order as resubmitted.

D. Shop Drawings (SD):
   1. Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproduction of the Contract Documents or standard printed data.
   2. Fully illustrate requirements in the Contract Documents including, but not limited to:
      a. Identification of products.
      b. Compliance with specified standards.
      c. Notation of coordination requirements.
      d. Notation of dimensions established by field measurement.
      e. Relationship and attachment to adjoining materials or assemblies, relevant field conditions and all necessary dimensions.

E. Product Data (PD):
   1. Submit only pages which are pertinent; mark each copy of standard printed data to identify pertinent products, referenced to Specification Section and Article number.
   2. Modify manufacturer's standard schematic drawings and diagrams to supplement standard information and to provide information specifically applicable to the Work. Delete information not applicable.
   3. Product data that has not been marked to indicate the applicable information will be returned without review.
   4. Contractor shall assemble Product Data required for maintenance manuals and submit to Architect in accordance with Section 01 78 00 - Closeout Submittals.

F. Samples (SA):
   1. Samples for Initial Selection: Submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected. Architect will retain selected sample for confirmation of subsequent submittals.
   2. Submit samples to illustrate functional characteristics of products, including parts and attachments.
   3. Approved samples which may be used in the Work are indicated in the individual Specification Sections.
   4. Label each sample with identification required for transmittal letter.
   5. Verification Samples: Submit the number of samples specified in individual Specification Sections. One of which will be retained by the Architect.
      a. Submit three copies if no number is indicated.
      b. Submit additional samples when copies will be required for distribution to other subcontractors or fabricators for matching or preparation of finish samples.
   6. Provide field samples of finishes at project site, at location acceptable to Architect, as required by individual Specifications Section. Install each sample complete and finished. Acceptable finishes in place may be retained in completed work if approved by Architect.

G. Manufacturer's Instructions (MI):
   1. Provide at Minimum: Manufacturer's instructions for storage, preparation, assembly, installation, and finishing in accordance with Section 01 40 00 - Quality Requirements.

H. Manufacturer's Certificates (MC):
   1. When specified in individual Specification Sections, submit manufacturers' certificate to Architect/Engineer for review, in quantities specified herein.
   2. Indicate material or product in conformance with or exceeding specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
   3. Certificates may be recent or previous test results on material or Product, but must be acceptable to Architect.

3.13 TIMING OF SUBMITTALS

A. General:
   1. The listing of submittals hereinafter is set forth as a checklist for Contractor's convenience and is general in nature.
   2. Architect reserves the right to add to this list in case of omission of any submittals specified in other Sections but not listed hereinafter.

B. Submittals - Required Within Seven Days Postbid:
   1. Contractor's Qualification Statement.
   2. Letter from Insurance Company - insurance required effective upon Contract.
   3. Letter from Surety - bonds required effective upon Contract.
   4. Breakdown of bid (if requested).
   5. Names of proposed suppliers for each of the principal portions of the Work.
   6. Contractor's Construction Management Personnel: Project Manager - minimum 3 years experience; Field Superintendent - minimum 5 years experience.
   7. Responsibility of Subcontractors.
   8. A designation of the Work to be performed by the Contractor by his own forces.

C. Submittals - Required Within Seven Days After Notice of Intent to Award Contract (Prior to Execution of Contract):
   1. Final List of Subcontractors and major material suppliers for principal portions of the Work.
   2. Evidence of bondability (Performance Bond and Payment Bond).
   3. Certificates of Insurance (on AIA Document G705 or equivalent).
   4. Actual costs (%) of the Contractor's liability insurance.
   5. Endorsements for additional insured.
   6. Statements of State Worker's Compensation coverage.
   7. Project Organizational Chart.
   8. Key Staff Resumes with telephone and contact information.
   9. Summary of Warranties included in Bid, including duration and start time of each. Itemize any deviations from Bid Document requirements.
   10. Other documents required by Contract Documents.

D. Submittals - Prior to Notice to Proceed:
   1. Executed Agreement.
   2. Certified copies of Contractor's Liability Insurance Policies (AIA Document G705).

E. Submittals - Within Seven Days Following Contract Execution and Prior to Commencing Work:
   1. Deliver Bonds to Owner with copy to Architect.
   2. Performance and Labor & Material Payment Bonds per the State in which the Project is located Law with certified copy of Power of Attorney from Attorney-in-Fact executing bonds.
   3. Certified Schedule of Prevailing Wage Rates (attach to executed contract).

F. Submittals - Within Thirty Days Following Notice to Proceed and Prior to First Payment Application:
   1. Schedule of values - submit at least 14-days in advance of application.
   2. Schedule of submittals.

3. Copies of acquired and unacquired building permit licenses etc. to complete the Work of the Contract. Submit copies of any remaining permits as they are acquired.
4. Construction schedule.

G. Submittals - Prior to Each Month's Progress Payment:
1. Submit 10 days in advance of date established for progress payment.
2. Application and Certificate for Payment (AIA Document G702 and G703).
3. Notarized affidavit of payments to all subcontractors and major material suppliers (see application for payment).
4. Updated Construction Schedule.
5. Public Works Contractor Wage Certification per the State in which the Project is located Law.

H. Submittals - Prior to request for Substantial Completion:
1. Notification to Architect that Work of the Project is substantially complete.
2. Itemized listing of items of work to be completed or corrected.
3. Submit Certificate of Occupancy or Occupancy Permit issued by the Local Building Department for the entire Project.
4. Draft Operations and Maintenance Manuals and draft warranties.

I. Submittals - Prior to request for Final Completion:
1. Certified copy of punchlist items completed.
2. Submit final Application for Payment.
3. Demonstration and Training training reports.
4. Final complete and correct Operations and Maintenance Manuals.
5. Record Drawings of Contract Documents with all changes indicated.
6. Final dated and signed Warranties.

3.14 CONSTRUCTION PROGRESS SCHEDULE

A. Submit initial progress schedule as required in Section 01 32 00 - Construction Progress Documentation.

B. Revise and resubmit as required.

C. Review revised schedules with each Application for Payment, identifying changes since previous version.

D. See Section 01 32 00 for specific requirements.

3.15 SCHEDULE OF VALUES

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

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

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

D. Comply with requirements in Section 01 20 00 - Price and Payment Procedures.

END OF SECTION

SECTION 01 31 23
PROJECT MANAGEMENT DATABASE (PMD)

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Summary.

B. General Requirements.

C. System Requirements.

D. System Access.

E. System Use.

1.02 SUMMARY

A. Project Management Communications: The Owner, Contractor and Architect shall use the Internet web based project management communications tool, e-Builder® software, and protocols included in that software during this project. The use of project management communications as herein described does not replace or change any contractual responsibilities of the participants.

B. Purpose: The intent of using e-Builder® is to improve project work efforts by promoting timely initial communications and responses and to reduce the number of paper documents while providing improved record keeping by creation of electronic document files

1.03 GENERAL REQUIREMENTS

A. Project management communications is available through e-Builder® as provided by "e-Builder®" in the form and manner required by the Owner.

B. The project communications database is on-line and fully functional. User registration, electronic and computer equipment, and Internet connections are the responsibility of each project participant. The sharing of user accounts is prohibited.

C. Support: e-Builder® will provide on-going support through on-line help files.

D. Authorized Users: Access to the web site will be by individuals who are licensed users as required by the Owner.

E. Licenses Granted by Owner: Owner shall pay for and provide licenses for the following members of the project team:
   1. Lead member of Architect's design team responsible.
   2. Two Contractors representatives.
   3. Owner's project manager or representative.
   4. Others as deemed appropriate by Owner.

1.04 SYSTEM REQUIREMENTS

A. System configuration:
   1. PC system 500 MHz Intel Pentium III or equivalent AMD processor
   2. 128 MB Ram
   3. Display capable of SVGA (1024 x 768 pixels) 256 colors display
   4. 101 key Keyboard
   5. Mouse or other pointing device.

B. Operating system and software configuration
   1. All software shall be properly licensed with vendors or developers. Use of “e-Builder” does not convey any rights or licensure for use of any software, hardware or internet service provider.
   2. Software configuration:
      a. Most current version of Microsoft Internet Explorer (current version is a free distribution for download). This specification is not intended to restrict the host server

or client computers provided that industry standard HTTP clients may access the published content.

b. Most current version of Adobe Acrobat Reader (current version is a free distribution for download).

c. Other plug-ins specified by e-Builder® as applicable to the system (current versions are a free distribution for download from www.e-builder.net)

d. Users are recommended to have properly licensed versions of the standard Microsoft Office Suite (current version must be purchased) or the equivalent.

1.05 SYSTEM ACCESS

A. Minimum Equipment and Internet Connection: In addition to other requirements specified in this Section, the Contractor shall be responsible for providing suitable computer systems for each licensed user at the users normal work location with high-speed Internet access, i.e. DSL, local cable company's Internet connection, or T1 connection.

B. Authorized users will be contacted directly by the web site provider, e-Builder®, who will assign the temporary user password.

C. Individuals shall be responsible for the proper use of their passwords and access to data as agents of the company in which they are employed.

1.06 SYSTEM USE

A. Owner's Administrative Users: Owner administrative users have access and control of user licenses and all posted items. DO NOT POST PRIVATE OR YOUR COMPANY CONFIDENTIAL ITEMS IN THE DATABASE!

B. Improper or abusive language toward any party or repeated posting of items intended to deceive or disrupt the work of the project will not be tolerated and will result in deletion of the offensive items and revocation of user license at the sole discretion of the Administrative User(s). Costs incurred or associated with such issues shall be the financial responsibility of the party responsible for the transgression.

C. Communications: Communication for this project for the items listed below shall be solely through e-Builder®:

1. Applications for Payment.
2. Meeting minutes.
3. RFI, Requests for Information.
4. Contract Modifications.
5. Architect's Supplemental Instructions.
6. Submittals.
7. Substitution requests.
8. Record document submission.
9. Test results.
10. O&M Manuals (electronic format).
11. Formal letters and notices between the District and the Contractor.
12. Calendar of Events (meetings, events, open houses, public site tours, etc.).
13. All other communication shall be conducted in an industry standard manner.

D. Document Integrity and Revisions:

1. Documents, comments, drawings and other records posted to the system shall remain for the project record. The authorship time and date shall be recorded for each document submitted to the system. Submitting a new document or record with a unique ID, authorship, and time stamp shall be the method used to make modifications or corrections.
2. The system shall identify revised or superseded documents and their predecessors.
3. Server or Client side software enhancements during the life of the project shall not alter or restrict the content of data published by the system. System upgrades shall not affect access to older documents or software.

E. Document Security:
   1. The system shall provide a method for communication of documents. Documents shall allow security group assignment to respect the contractual parties' communication except for Administrative Users.

F. Document Integration:
   1. Documents of various types shall be logically related to one another and discoverable.

G. Notifications and Distribution:
   1. Document distribution to project members shall be accomplished both within the extranet system and via email as appropriate. Project document distribution to parties outside of the project communication system shall be accomplished by secure email of outgoing documents and attachments, readable by a standard email client.

H. Ownership of Documents and Information:
   1. All documents, files or other information posted on the system shall become the property of the Owner.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 32 00
CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preliminary schedule.

B. Construction progress schedule, with network analysis diagrams and reports.

C. Material location reports.

D. Field condition reports.

E. Special reports.

1.02 REFERENCES

A. AGC (CPSM) - Construction Planning and Scheduling Manual.

B. M-H (CPM) - CPM in Construction Management - Project Management with CPM; O'Brien.

1.03 SUBMITTALS

A. Preliminary Schedule: Within 10 days after date of Owner's Notice of Intent to Award the Contract, submit preliminary schedule defining planned operations for the first 30 days of Work, with a general outline for remainder of Work.
   1. Submit minimum two hard copies to Architect for review.
   2. If preliminary schedule requires revision after review, submit revised schedule within 10 days.

B. Construction Schedule: Within 14 days after date established in Notice to Proceed, submit draft of proposed complete schedule for review.
   1. Include written certification that major Subcontractors have reviewed and accepted proposed schedule.
   2. Not less than 10 percent of the initial Application for Payment may be withheld until a complete Construction Progress Schedule has been submitted in a form acceptable to Architect and Owner.
   3. Neither Owner nor Architect shall be responsible for review of the entire substance of the Progress Schedule.
   4. Within 30 days after dated established in Notice to Proceed, submit complete schedule.
   5. Submit updated schedule with each Application for Payment.
   6. At each progress meeting, submit the following:
      a. Updated schedule incorporating revisions to the construction schedule.
      b. A three-week look-ahead schedule listing current and upcoming activities by trade, including anticipated start and complete dates as applicable.

C. Submit the number of opaque reproductions that Contractor requires, plus two copies that will be retained by Architect.

D. Material Location Reports: Submit at monthly intervals.

E. Field Condition Reports: Submit at time of discovery of differing conditions.

F. Special Reports: Submit at time of unusual event.

1.04 QUALITY ASSURANCE

A. Scheduler: Contractor's personnel or specialist Consultant specializing in CPM scheduling with one year minimum experience in scheduling construction work of a complexity comparable to this Project, and having use of computer facilities capable of delivering a detailed graphic printout within 48 hours of request.

1.05 SCHEDULE FORMAT

A. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number.

B. Diagram Sheet Size: Maximum 30 x 42 inches or width required.

C. Scale and Spacing: To allow for notations and revisions.

PART 2 PRODUCTS

2.01 PRELIMINARY SCHEDULE

A. Prepare preliminary schedule in the form of a preliminary network diagram.

B. Content
   1. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
   2. Identify each item by specification section number.
   3. Identify work of separate stages and other logically grouped activities.
   4. Include conferences and meetings in schedule.
   5. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
   6. Show product and installation dates for major products.
   7. Provide separate schedule of submittal dates for shop drawings, product data, and samples, and dates reviewed submittals will be required from Architect. Indicate decision dates for selection of finishes.
   8. Include a line item for Project Closeout.
   9. Coordinate content with schedule of values specified in Section 01 20 00 - Price and Payment Procedures.
   10. Include not more than 30 days for punch list and final completion, unless otherwise indicated.
   11. Provide legend for symbols and abbreviations used.

2.02 NETWORK ANALYSIS

A. Prepare network analysis diagrams and supporting mathematical analyses using the Critical Path Method.

B. Schedule shall include date of Notice to Proceed, date of Substantial Completion, and date of Final Completion in accordance with Contract Documents.
   1. Critical Path shall be clearly indicated on Schedule.
   2. Not more than 20 percent of the progress activities shall be on the Critical Path at any one time.
   3. Not more than 5 percent of the total individual activities may exceed $50,000 or 20 calendar days (per activity) without prior approval.

C. Illustrate order and interdependence of activities and sequence of work; how start of a given activity depends on completion of preceding activities, and how completion of the activity may restrain start of subsequent activities.

D. Mathematical Analysis: Tabulate each activity of detailed network diagrams, using calendar dates, and identify for each activity:
   1. Preceding and following event numbers.
   2. Activity description.
   3. Estimated duration of activity, in maximum 20 day intervals.
   4. Earliest start date.
   5. Earliest finish date.
   6. Actual start date.
   7. Actual finish date.
   8. Latest start date.
   9. Latest finish date.
   10. Total and free float; float time shall accrue to Owner and to Owner's benefit.
   11. Monetary value of activity, keyed to Schedule of Values.
   12. Percentage of activity completed.
   13. Responsibility.

E. Analysis Program: Capable of compiling monetary value of completed and partially completed activities, accepting revised completion dates, and recomputation of all dates and float.

F. Milestone completion dates shall be clearly shown on the Schedule.

G. If abbreviations are used on the Schedule, a legend shall be provided to define all abbreviations.

H. Required Reports: List activities in sorts or groups:
   1. By preceding work item or event number from lowest to highest.
   2. By amount of float, then in order of early start.

I. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

2.03 THREE-WEEK WORK SCHEDULE

A. Each week, prepare and present an updated schedule showing the planned activities for the next three weeks and one week prior. The schedule shall be coordinated with the master schedule and accurately portray activities completed and activities planned for the upcoming weeks. Present this schedule at the weekly progress meeting.

2.04 SCHEDULE - DRIVEN REQUIREMENTS

A. A schedule for the purchase, delivery, and receipt of critical items required for performance of the Work, showing lead times between purchase order placement and delivery dates, shall be integrated with the Construction Progress Schedule. Neither the Architect nor the Owner shall be deemed to have approved or accepted any such material, or its schedule, nor deemed to have waived this requirement if some or all of the material is not received.

B. Should the Contractor fail to meet any scheduled date as shown on the current Construction Progress Schedule, the Contractor shall, if requested, be required at its own expense to submit within ten days of the request an updated Construction Progress Schedule. If the Contractor's progress indicates to the Owner that the Work will not be Substantially Completed within the Contract Time, the Contractor shall, at its own expense, increase its work force and/or working hours to bring the actual completion dates of the activities into conformance with the Construction Progress Schedule and Substantial Completion within the Contract Time. The Contractor shall reschedule and also submit a revised Construction Progress Schedule at its own expense within ten days of notice from the Architect that the sequence of work varies significantly from that shown on the current Schedule showing work to complete on original Contract Time with approved extensions. Neither the Owner nor the Architect will, however, be obligated to review the substance or sequence of the Construction Progress Schedule or otherwise determine whether it is correct, appropriate or attainable.

C. Schedule Float Utilization:
   1. Any float time to activities not on the critical path shall belong to the Project, and may be used by the Project to optimize its construction process. Any float time between the end of the final construction activity and the final completion date shall belong to the Owner, and may be used by the Owner in determining if additional contract days are to be awarded for changes in the contract or for delays to the contract caused by the Owner. The Contractor will not be entitled to any adjustment in the Contract Time, the Construction Schedule, or the Contract Sum, or to any additional payment of any sort by reason of the Owner's use of float time between the end of the final construction activity and the final completion date or by reason of the loss or use of any float time, including time between the Contractor's anticipated completion date and end of the Contract Time, whether or not the float time is described as such on the Construction Progress Schedule.

D. Closeout: In the Contractor's Construction Schedule provide key activities required under Sections 01 77 00 - Closeout Procedures and 01 78 00 - Closeout Submittals. These activities will be cost-loaded to a cumulative total of not less than 2 percent of the contract value.

2.05 REPORTS

A. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site.

B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.06 SPECIAL REPORTS

A. General: Submit special reports directly to Owner within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.

B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 EXECUTION

3.01 REVIEW AND EVALUATION OF SCHEDULE

A. Participate in joint review and evaluation of schedule with Architect at each submittal.

B. Evaluate project status to determine work behind schedule and work ahead of schedule.

3.02 UPDATING SCHEDULE

A. Maintain schedules to record actual start and finish dates of completed activities.

B. Indicate progress of each activity to date of revision, with projected completion date of each activity.

C. Update diagram to graphically depict current status of Work.

D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.

E. Indicate changes required to maintain Date of Substantial Completion.

F. Submit reports required to support recommended changes.

3.03 DISTRIBUTION OF SCHEDULE

A. Distribute copies of updated schedules to Contractor's project site file, to Subcontractors, suppliers, Architect, Owner, and other concerned parties.

B. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

END OF SECTION

SECTION 01 32 33
PHOTOGRAPHIC DOCUMENTATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preconstruction photographs.

B. Periodic construction photographs.

C. Periodic aerial construction photographs.

D. Final completion construction photographs.

1.02 RELATED REQUIREMENTS

A. Section 01 30 00 - Administrative Requirements: Submittal requirements.

B. Section 02 41 19 - Selective Structure Demolition.

1.03 SUBMITTALS

A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Include same information as corresponding photographic documentation.

B. Digital Photographs: Submit image files within three days of taking photographs.

1.04 USAGE RIGHTS

A. Obtain and transfer copyright usage rights from photographer to Owner for unlimited reproduction of photographic documentation.

B. Do not display photographs in publications without permission of Owner.

PART 2 PRODUCTS

2.01 PHOTOGRAPHIC MEDIA

A. Digital Images: Provide images in JPG format, produced by a digital camera with minimum sensor size of 8 megapixels, and at an image resolution of not less than 1600 by 1200 pixels and 400 dpi.

PART 3 EXECUTION

3.01 CONSTRUCTION PHOTOGRAPHS

A. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.
   1. Maintain key plan with each set of construction photographs that identifies each photographic location.

B. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
   1. Date and Time: Include date and time in file name for each image.
   2. Key Plan: Include digital copy of key plan with each electronic submittal; include point of view identification in each photo file name.
   3. Field Office Images: Maintain one set of images accessible in the field office at Project site, available at all times for reference. Identify images in the same manner as those submitted to Architect.

C. Preconstruction Photographs: Before commencement of demolition, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect.
   1. Take minimum 20 photographs of existing buildings to accurately record physical conditions at start of construction.
   2. Take additional photographs as required of existing conditions of exterior and interior surfaces that might be misconstrued as having been damaged by re-roofing operations.

3. Take preconstruction aerial photographs from a minimum of 2 vantage points around the site. Determine best altitude or altitudes to depict site and scope of project.

D. Periodic Construction Photographs: Take minimum 20 photographs monthly, coinciding with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.

E. Periodic Aerial Construction Photographs: Take monthly aerial photographs from a minimum of 2 vantage points around the site. Determine best altitude or altitudes to depict site and scope of project.
   1. Coordinate with Owner and Architect prior to flying site to determine sufficient progress between flights and any special vantage point locations.

F. Final Completion Construction Photographs: Take 20 color photographs after date of Substantial Completion for submission as project record documents. Architect will inform photographer of desired vantage points.
   1. Do not include date stamp.

END OF SECTION

SECTION 01 40 00
QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Submittals.

B. References and standards.

C. Inspection agencies and services.

D. Control of installation.

E. Tolerances.

F. Manufacturers' field services.

G. Defect Assessment.

1.02 RELATED REQUIREMENTS

A. Section 01 30 00 - Administrative Requirements: Submittal procedures.

B. Section 01 42 16 - Definitions.

C. Section 01 60 00 - Product Requirements: Requirements for material and product quality.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
   1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
   2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.

C. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

D. Manufacturer's Field Reports: Submit reports in quantities specified for Product Data.
   1. Submit report within 15 days of observation to Architect for information.
   2. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

E. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.04 DEFINITIONS

A. Preconstruction Testing: Tests and inspections performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.

B. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.05 CONFLICTING REQUIREMENTS

A. Metal Thickness: Where thickness of metals is designated in both gage and thickness in inches, the thickness in inches shall govern. Gages are provided for convenience only. Specified submittals for metals shall indicate thicknesses in inches.

1.06 REFERENCES AND STANDARDS

A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.

C. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.

1.07 INSPECTION AGENCIES AND SERVICES

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified inspection agency to perform these services.
   1. Owner will furnish Contractor with names, addresses, and telephone numbers of inspecting agencies engaged and a description of types of inspecting they are engaged to perform.
   2. Costs for reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.

B. Contractor Responsibilities: Inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
   1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
   2. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
   3. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
   4. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

1.08 MANUFACTURER'S FIELD SERVICES

A. Manufacturer's Field Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

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

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Have Work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

3.03 INSPECTION

A. See individual specification sections for inspection required.

B. Inspection Agency Duties:
   1. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
   2. Promptly notify Architect and Contractor of observed irregularities or non-conformance of Work or products.
   3. Perform additional inspections required by Architect.
   4. Submit reports of all inspections specified.
      a. One copy of all inspection reports shall be promptly sent directly to the Contractor, Architect, Owner, Structural Engineer, Building Department, unless otherwise directed.
      b. In addition to written reports, immediately notify by telephone Architect, Owner and Contractor of any portions of the work found to be in non-compliance with the Contract Documents.

C. Limits on Inspection Agency Authority:
   1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
   2. Agency may not approve or accept any portion of the Work.
   3. Agency may not assume any duties of Contractor.
   4. Agency has no authority to stop the Work.

D. Contractor Responsibilities:
   1. Provide access to the Work.
   2. Provide incidental labor and facilities:
      a. To provide access to Work to be inspected.
      b. To facilitate inspections.
   3. Notify Architect and inspection agency 24 hours prior to expected time for operations requiring inspection services.
      a. When inspections cannot be performed, through the fault of the Contractor, reimburse the Owner for the additional costs incurred.
      b. Schedule inspection so that the services of inspection personnel will be as continuous and brief as possible.
   4. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
      a. When tests or inspections cannot be performed, through the fault of the Contractor, reimburse the Owner for the additional costs incurred.
   5. Arrange with Owner's agency and pay for additional inspections required by Contractor beyond specified requirements.
      a. Schedule inspection so that the services of inspection personnel will be as continuous and brief as possible.

E. Contractor shall be responsible for coordinating inspecting services so as to insure that inspections are performed and reports delivered in a manner not to cause delays to the Work. Allow adequate time for inspection and any needed corrections before proceeding to the next construction stage.

F. Furnish records, drawings, certificates, and similar data as may be required by the inspecting personnel to assure compliance with the Contract Documents.

G. Re-inspection required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Architect.

H. Re-inspection required because of non-conformance to specified requirements shall be paid for by Contractor.

3.04 INSPECTION REPORTS

A. The inspecting agency will perform and furnish the following:
   1. Field Inspection Reports: Furnish field inspection reports for each site visit documenting activities, observations, and inspections of work being inspected include:
      a. Date issued.
      b. Project title and number.
      c. Inspecting agency or engineering firm name, address, and telephone number.
      d. Name and signature of representative.
      e. Observations on weather and climatic conditions.
      f. Time and date
      g. Conditions and/or status of the work being inspected.
      h. Actions taken.
      i. Recommendations or evaluation of the work.
   2. Reports will be submitted to Owner and Architect in duplicate giving observations and results of inspections, indicating compliance or non-compliance with specified standards and with Contract Documents.

3.05 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, as applicable, and to initiate instructions when necessary.

B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

C. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
   1. Name, address, and telephone number of technical representative making report.
   2. Statement on condition of substrates and their acceptability for installation of product.
   3. Statement that products at Project site comply with requirements.
   4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
   5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
   6. Statement whether conditions, products, and installation will affect warranty.
   7. Other required items indicated in individual Specification Sections.

3.06 DEFECT ASSESSMENT

A. When inspections indicate non-compliance with the Contract Documents, subsequent re-inspection occasioned by such noncompliance shall be performed by the same personnel as performed the initial inspections, and the additional cost shall be paid by the contractor as stipulated under the Conditions of the Contract.

B. Contractor shall remove and replace any work found defective or not in compliance with the Contract Documents at no additional cost to Owner, and furnish notice for re-inspecting as specified herein above.

C. Replace Work or portions of the Work not conforming to specified requirements.

3.07 REPAIR AND PROTECTION

A. General: On completion of inspecting and similar services, repair damaged construction and restore substrates and finishes.

B. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION

SECTION 01 40 05
CUTTING AND PATCHING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Requirements and limitations for cutting and patching of the Work.

1.02 RELATED REQUIREMENTS

A. Section 01 60 00 - Product Requirements: Fundamental product requirements, substitutions and product options, delivery, storage, and handling.

B. Section 01 70 00 - Execution: Examination, preparation, and general installation procedures.

C. Section 02 41 19 - Selective Structure Demolition.

D. Section 07 01 50.19 - Preparation for Re-Roofing.

E. Section 07 53 00 - Elastomeric Membrane Roofing.

1.03 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

B. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

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

C. Include in request:
   1. Identification of Project.
   2. Location and description of affected work.
   3. Necessity for cutting or alteration.
   4. Description of proposed work, and products to be used.
   5. Alternatives to cutting and patching.
   6. Date and time work will be executed.

PART 2 PRODUCTS

2.01 MATERIALS

A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

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

PART 3 EXECUTION

3.01 GENERAL

A. Execute cutting, fitting, patching and finishing including excavation and fill, to complete Work, and to:
   1. Fit the several parts together, to integrate with other work.
   2. Uncover work to install ill-timed work.
   3. Match work that has been cut to adjacent work.
   4. Repair areas adjacent to cuts to required condition.
   5. Repair new work damaged by subsequent work.

6. Remove and replace defective and non-conforming work.
7. Provide finished appearance of surfaces and to match adjacent surfaces (unless otherwise noted) affected by the Work.

3.02 INSPECTION

A. Inspect existing conditions, including elements subject to damage or movement during cutting and patching.

B. After uncovering, inspect conditions affecting performance of work.

C. Beginning of cutting or patching means acceptance of existing conditions.

3.03 PREPARATION

A. Provide supports to assure structural integrity of surroundings; devices and methods to protect other portions of Project from damage.

B. Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations. Maintain excavations free of water.

C. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.

3.04 PERFORMANCE

A. Execute work by methods to avoid damage to other work, and which will provide proper surfaces to receive patching and finishing.

B. Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.

C. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
   1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
   2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
   3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
   4. Roofing: At locations where existing roofing must be removed to accommodate new construction, remove roofing, including insulation as necessary. Provide a temporary cutoff in strict accordance with roofing manufacturer's recommendations, to provide a 100 percent watertight seal.
      a. If any water is allowed to enter under the existing roofing, the affected area shall be removed and replaced at Contractor's expense.

D. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
   1. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.
   2. Match color, texture, and appearance.
   3. At locations where interior finishes are damaged to accommodate modifications to or relocation of roof ladders, patch and repair gypsum board finishes and touch up paint so that no evidence of patch remains in the finished work.
      a. Coordinate with Owner to match paint materials, color and sheen.

4. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.
5. Replacement of defective work will not create new seams or joint lines.
6. Restore work with new products in accordance with requirements of Contract Documents.
7. Fit work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

E. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.05 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements. Materials subject to testing and inspection in the specifications shall be retested after cutting and patching operations are completed.

END OF SECTION

SECTION 01 42 16
DEFINITIONS

PART 1 GENERAL

1.01 SUMMARY

A. This section supplements the definitions contained in the General Conditions.

B. Other definitions are included in individual specification sections.

1.02 SPECIFICATION EXPLANATION

A. The specifications are divided into Divisions and Sections for the convenience of writing and using. The titles of these are not intended to imply a particular meaning nor to fully describe the work of each division or section, and are not an integral part of the text which specifies the requirements. The Architect is not bound to define the limits of any subcontract, and will not enter into disputes between the Contractor and its employees, including subcontractors.

B. These specifications are of the abbreviated, or "streamlined" type, and include incomplete sentences. Words and meanings shall be interpreted as appropriate. Words that are implied, but not stated, shall be interpolated as the sense requires. Singular words will be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.

C. Omissions of words or phrases shall be supplied by inference in the same manner as they are when a "note" occurs on the drawings.

D. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

1.03 DEFINITIONS

A. The definitions in this Section are not necessarily complete or exclusive but, generally, apply to all portions of the Work. Some contractual definitions appear in the General Conditions. Definitions of words of a special nature which relate to Work covered in one or two Sections of the Specifications are included in such Sections. Terms used throughout the Contract Documents are defined in this Section.

B. Approve: Where used in conjunction with the Architect's or Engineer's response to submittals, requests, applications, inquiries, reports, and claims by the Contractor, the meaning of the term "approved" will be held to the limitations of the Architect's responsibilities and duties as specified in the General and Supplementary Conditions. In no case will "approval" by the Architect be interpreted as an assurance to the Contractor that the requirements of the Contract Documents have been fulfilled. The term “or approved” used in conjunction with specified materials means “properly submitted and approved substitution request.”

C. Coordinate: The term "coordinate" means satisfactorily combine the work of all trades for a complete and operating installation.

D. Directed, Requested, etc.: Unless otherwise explained, terms such as "directed", "requested", "authorized", "selected", "approved", "required", "accepted", and "permitted" mean "directed by the Architect", "requested by the Architect", etc. However, no such implied meaning will be interpreted to extend the Architect's responsibility into the Contractor's area of construction supervision.

E. Furnish: Except as otherwise defined in greater detail, the term "furnish" is used to mean supply and deliver to the project site, ready for unloading, unpacking, assembly, installation and similar operations.

F. General Requirements: The provisions or requirements of Divisions 01 Sections apply to entire work of Contract and, where so indicated, to the other elements of work which are included in the Project.

G. Guarantee and Warranty: "Warranty" is generally used in conjunction with products manufactured or fabricated away from the project site, and "guarantee" is generally used in

conjunction with units of work which require both products and substantial amounts of labor at the project site. The resulting difference is that warranties are frequently issued by manufacturers and frequently supported (partially) by product guarantees from contractors and/or installers.

H. Indicated: A cross reference to details, notes or schedules on the Drawings, to other paragraphs or schedules in the Specifications, and to similar means of recording requirements in the Contract Documents. Where terms such as “shown”, “noted”, “scheduled”, and “specified” are used in lieu of “indicated”, it is for purpose of helping reader locate cross-reference, and no limitation of location is intended except as specifically noted.

I. Install: Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

J. Installer: The person or entity engaged by the Contractor or his Subcontractor or Sub-subcontractor for the performance of a particular unit of work at the project site, including installation, erection, application and similar required operations. It is a general requirement that Installers be recognized experts in the work they are engaged to perform.

K. Product: The term "product" as used in the Project Manual includes materials, systems, and equipment provided by the Contractor for use in the Work.

L. Project Manual: The term "Project Manual" is the volume which includes the Bidding Requirements, Conditions of the Contract, and the Specifications, Divisions 01 through 33 inclusive, as applicable, and as listed in the Table of Contents bound therein.

M. Provide: Except to the extent further defined, the term "provide" means to furnish and install, complete and ready for the intended use.

N. Selected: The term "selected" means "selected by the Architect and Owner"; the Architect shall be the sole judge of the acceptability of a product or an installation.

O. Site: Space available to the Contractor for performing the Work under this Contract, either exclusively or in conjunction with other contractors as part of the overall Project. The Site may be unimproved vacant land, an existing building or space within an existing building. The extent of the Site is shown on the Drawings.

P. Specification Language: Imperative language is used, generally, throughout the Specifications. Requirements expressed imperatively are to be performed by the Contractor. For clarity at certain locations, contrasting subjective language is used to describe responsibilities which must be performed by the Contractor or, when so noted, will be performed by others.

Q. Trades: Using terms such as carpentry is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as carpenter. It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary utility installation.

B. Support facilities installation.

C. Security and protection installation.

D. Mold and moisture control.

E. Removal of temporary utilities, facilities and controls.

1.02 RELATED REQUIREMENTS

A. Section 01 70 00 - Execution: For Progress cleaning.

B. Section 01 74 19 - Construction Waste Management and Disposal.

1.03 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design.

B. ICC A117.1 - Accessible and Usable Buildings and Facilities.

C. NFPA 70 - National Electrical Code.

1.04 SUBMITTALS

A. Staging: Submit a detailed staging and logistics plan and site specific safety plan on Project Site Plan to Architect, Owner and governing authorities for review and approval prior to commencement of Work.

B. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage, including delivery, handling, and storage provisions for materials subject to water absorption or water damage, discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water damaged Work.

1. Indicate sequencing of work that requires water and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.

1.05 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

C. Accessible Temporary Egress: Comply with applicable provisions in the ADA Standards and ICC A117.1.

PART 2 PRODUCTS

2.01 TEMPORARY FACILITIES

A. Utility Usage Charges: Owner will pay for utility usage charges.

1. Owner will furnish reasonable quantities of water and electricity to the Contractor without charge. Contractor shall be responsible for both temporary utility connections and disconnects, and shall obtain permission of the Owner prior to accomplishing either.

B. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

C. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Architect, and construction personnel office activities and to accommodate project meetings specified in

Section 01 30 00 - Administrative Requirements. Keep office clean and orderly. Furnish and equip offices as follows:

1. Pay for temporary mobile unit permits as required by the local governing agencies.
2. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
3. Conference room of sufficient size to accommodate meetings of ten individuals. Furnish room with conference table, chairs, and tack and marker boards.
4. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 degrees F.
5. Lighting fixtures capable of maintaining average illumination of 20 fc at desk height.

PART 3 EXECUTION

3.01 TEMPORARY UTILITY INSTALLATION

A. Temporary Utility Installation, General:
   1. Engage local utility companies to install temporary service or to make connections to existing service.
   2. Arrange with the companies and existing users for an acceptable time when service can be interrupted to make connections.
   3. Establish a service implementation and termination schedule. As early as possible, change to use of permanent service, to enable removal of the temporary utility and to eliminate any possible interference with completion of the Work.
   4. Provide adequate capacity for each stage of construction.
   5. Obtain and pay for easements required to bring temporary utilities to the site where the Owner's easement cannot be utilized for that purpose.

B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
   1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.

C. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. Exercise measures to conserve water.
   1. Extend branch piping with outlets located so water is available by hoses with threaded connections. Provide temporary pipe insulation to prevent freezing.
   2. Use trigger-operated nozzles for water hoses, to avoid waste of water

D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
   1. Provide adequate number of facilities for use by all persons and trades employed on Work during construction period.
   2. Supply toilet tissue, hand sanitizer, and similar disposable materials as appropriate for each facility. Provide covered waste containers for used material.
   3. Maintain daily in clean and sanitary condition.
   4. Toilets: Use of Owner's existing toilet facilities will not be permitted.

E. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
   1. Prior to commencing work, isolate the HVAC system in area where work is to be performed.
      a. Coordinate timing and extent of disconnection of existing rooftop HVAC units with Owner.
      b. Coordinate timing and extent of shutdown of fire-suppression, fire-protection and fire alarm and detection systems with Owner.

F. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.
   1. Provide power outlets for construction operations, with branch wiring and distribution boxes located as needed. Provide flexible power cords as required.

2. Power connection and consumption shall not disrupt Owner's need for continuous service.

G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
   1. Provide and maintain 2 foot candles lighting to exterior staging and storage areas after dark for security purposes.
   2. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.
   3. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
   4. Maintain lighting and provide routine repairs.
   5. Permanent building lighting may be utilized during construction.

H. Telecommunication Service: Provide temporary telecommunication service in common-use facilities for use by all construction personnel.
   1. Telephone Land Lines: Install one telephone line(s) for each field office.
      a. At each telephone, post a list of important telephone numbers.
         1) Police and fire departments.
         2) Ambulance service.
         3) Contractor's home office.
         4) Architect's office.
         5) Engineers' offices.
         6) Owner's office.
         7) Principal subcontractors' field and home offices.
   2. Internet Connections: Minimum of one DSL modem or faster.
   3. Email: Account/address reserved for project use.
   4. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.

3.02 SUPPORT FACILITIES INSTALLATION

A. Vehicular Access and Parking: Conduct the Work so as to ensure the least possible obstruction to vehicular traffic and inconvenience to the general public and the residents in the vicinity of the Work and to ensure the protection of persons, property and natural resources. No road or street shall be closed to the public except with the permission of the Owner and the proper governmental authority. Make temporary provisions to ensure the use of sidewalks, fire lanes, private and public driveways and proper functioning of gutters, sewer, inlets, drainage ditches and culverts, irrigation ditches and natural water courses, if any on the Work site.
   1. Parking area for project visitors and construction personnel shall be at location designated by Owner.
   2. Construct and maintain temporary access to public thoroughfares to serve construction area, as necessary.
      a. Relocate as Work progress requires. Provide detours necessary for unimpeded traffic flow.
   3. Coordinate access and haul routes with governing authorities and Owner.
   4. Provide and maintain access to fire hydrants, free of obstructions.
   5. Provide means of removing mud from vehicle wheels before entering streets.
   6. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.
   7. Provide barricades, warning signs, flag men or other traffic regulators which may become necessary for protection of public, construction personnel and property.
   8. Protect existing pavement and driveways from damage from construction equipment.

B. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
   1. Temporary Signs: Provide signs as required to inform public and individuals seeking entrance to Project.
   2. No other signs are allowed without Owner permission except those required by law.

C. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with Section 01 70 00 - Execution for progress cleaning requirements.
   1. Comply with requirements of Section 01 74 19 - Construction Waste Management and Disposal.
   2. Provide construction dumpsters. Do not intermingle trash with school dumpsters.
   3. Provide a recycling program for the recycling of waste materials that are generated during construction. Provide waste recycling bins and containers for metal, glass, cardboard, gypsum, etc. Provide for pick-up on a regular basis so as not to encumber the site. Place bins away from any building structures to protect against fires.

D. Temporary Elevator Use: Use of elevators is not permitted.

3.03 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
   1. Burning or burying of rubbish and waste materials on Project Site prohibited. Provide dump box for collection of waste materials.
   2. Disposal of volatile fluid wastes (such as mineral spirits, oil or paint thinner) in storm or sanitary sewer systems is strictly prohibited.

B. Progress Cleaning: Comply with requirements specified in Section 01 70 00 - Execution.

C. Barriers: Provide barriers to prevent unauthorized entry to construction areas , to allow for Owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
   1. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
   2. Provide protection for plants designated to remain. Replace damaged plants.
   3. Provide barricades required by governing authorities for work in public right of way.

D. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
   1. Provide barricades or fencing and maintain same around all trees, shrubs or other landscaped areas adjacent to work of this Contract to protect such areas from damage of any nature caused by construction operations.
   2. Replace any plantings damaged or destroyed with plants of equivalent size, type and nature as approved by Architect.

E. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.
   1. Extent of Fence: As required to enclose portion of site determined sufficient to accommodate construction operations, unless otherwise indicated on Drawings. Coordinate extent with Owner and Architect prior to installing fencing.
   2. Construction: Commercial grade chain link fence, unless otherwise indicated.
   3. Provide 6 foot high fence. Equip with vehicular and pedestrian gates with locks.
      a. Provide support blocks and bracing as required to completely stabilize fencing and gates.
      b. Maintain fencing for duration of construction. Move fencing as required for orderly progression of work; maintain secure enclosure at all times.
      c. Remove fencing and supports prior to Substantial Completion, when such removal will not create a safety hazard for the public.

F. Security: Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.
   1. All personnel under the employment of the Contractor and its Subcontractors that travel to, or spend time at, the project site are to wear photo ID badges while on the work site. Individuals not wearing badges will be removed from the project work site. ID badges are to contain:
      a. Individual's full name (no nicknames).
      b. Individual's company affiliation.
      c. Recent photograph of the individual; taken within the last 4 years.
   2. All personnel under the employment of the Contractor and its Subcontractors that spend time at the project site, must be run through formal background screening by the Contractor and pass that screening review, before being allowed on the work site. Background screening is to be done by a professional screening firm meeting the following qualifications:
      a. Must have a minimum of five years of screening experience specifically for construction industry clients.
      b. Must have a minimum of fifteen employees.
      c. Must be able to provide access to an internet based screening management software system which has a feature to allow access by the District to view the pass-no pass result for each screened Contractor/Subcontractor employee working on a District project.
      d. Must be accredited by the National Association of Professional Background Screeners (NAPBS).
   3. Each individual will be screened for having committed any crime as listed in ORS 342.142, most recent edition.
   4. Where materials and equipment must be temporarily stored and are of substantial value, or attractive for possible theft, provide secure lockup.
   5. Enforce strict discipline in connection with the timing of installation and release of materials to minimize the opportunity for theft and vandalism.
   6. Coordinate with Owner's security program.

G. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

H. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
   1. Prohibit smoking in construction areas.
   2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
   3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
   4. Take all precautions to prevent possibility of fire resulting from construction operations. Particularly avoid hazardous accumulations of rubbish and unsecured, flammable materials.
   5. Provide emergency fire extinguishing equipment of adequate type and quantity, readily available and properly maintained.

I. Temporary First Aid Facilities: Provide adequate first aid facilities for construction personnel.

3.04 MOISTURE AND MOLD CONTROL

A. Contractor's Moisture-Protection Plan: Avoid trapping moisture in finished work. Document visible signs of mold that may appear during construction.

B. When materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
   1. Protect porous materials from water damage.

2. Protect stored and installed material from flowing or standing water.
3. Keep porous and organic materials from coming into prolonged contact with concrete.
4. Remove standing water from decks.
5. Keep deck openings covered or dammed.
6. Discard or replace water-damaged material.
7. Do not install material that is wet.
8. Discard, replace or clean stored or installed material that begins to grow mold.

3.05 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, materials, prior to Substantial Completion inspection.

B. Clean and repair damage caused by installation or use of temporary work.

C. Restore new permanent facilities used during construction to specified condition.

END OF SECTION

SECTION 01 60 00
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Manufacturer's standard warranties and special warranties.

B. General product requirements.

C. Transportation, handling, storage and protection.

D. Product option requirements.

E. Substitution limitations and procedures.

1.02 RELATED REQUIREMENTS

A. Section 01 30 00 - Administrative Requirements: Submittal requirements and electronic submission requirements.

B. Section 01 40 00 - Quality Requirements: Product quality monitoring.

C. Section 01 74 19 - Construction Waste Management and Disposal: Waste disposal requirements potentially affecting packaging and substitutions.

1.03 SUBMITTALS

A. Proposed Products List: Electronically submit list of major products and list of finish materials proposed for use, with name of manufacturer, trade name, and model number of each product.
   1. Submit within 15 days after date of Agreement.
   2. For products specified only by reference standards, list applicable reference standards.
   3. Indicate product lead times.

B. Substitution Requests: Electronically submit each request for consideration as a PDF. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
   1. Name of PDF shall reflect the specification Section number and the proposed product manufacturer or product name.
   2. Limit each request to one proposed substitution.
   3. Submit a separate form for each item upon which approval is requested, with the exception of groups of items (e.g., electrical fixtures, plumbing fixtures, etc.) for which an itemized listing may be attached.
   4. Acceptance of the particular product or method on a previous project does not confer or imply acceptance for this project.
   5. Submit samples to Architect upon request.

C. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

D. Shop Drawing Submittals: Prepared specifically for this Project.

E. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
   1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

1.04 QUALITY ASSURANCE

A. For products or workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
   1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

D. Should specified reference standards conflict with Contract Documents, request clarification from the Architect before proceeding.

E. Neither the contractual relationships, duties, nor responsibilities of the parties in Contract nor those of the Architect shall be altered by the Contract Documents by mention or inference otherwise in any reference document.

F. Contractor warrants to the Owner that the materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform to the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of material and equipment.

1.05 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
   1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
   2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
   1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
   2. Refer to Divisions 02 through 33 Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section 01 77 00 - Closeout Procedures.

PART 2 PRODUCTS

2.01 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by the Contract Documents.
   1. Means new material, machinery, components, equipment, fixtures, and systems comprising the Work. Does not include machinery and equipment used for preparation, fabrication, conveying, and erection of the Work.
   2. Products may also include existing materials or components when specifically designated for reuse.

B. DO NOT USE products having any of the following characteristics:
   1. Made using or containing CFC's or HCFC's.
   2. Made of wood from newly cut old growth timber.

C. Where all other criteria are met, Contractor shall give preference to products that:
   1. Have longer documented life span under normal use.
   2. Result in less construction waste.

2.02 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
   1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
   2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
   3. Two or more items of the same kind shall be considered identical and by the same manufacturer.
   4. Provide products suitable for service conditions.
   5. Adhere to equipment capacities, sizes and dimensions shown or specified unless variations are specifically approved in writing.
   6. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
   7. Where products are accompanied by the term "as selected," Architect will make selection.
   8. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

2.03 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming Products of More than One Manufacturer: Use one of the products named and meeting specifications, no options or substitutions allowed.

D. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

E. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Submit a request for substitution for other named manufacturers. Use of manufacturers not named not allowed.

F. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
   1. If no product available within specified category matches and complies with other specified requirements, comply with requirements for substitutions

G. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

PART 3 EXECUTION

3.01 SUBSTITUTION PROCEDURES

A. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section. Requests received after that time will not be considered except as specified below under "Substitutions Requested After Award of Contract."

B. Submit all requests for substitutions electronically as PDFs.
   1. Submit all requests for substitutions during the Bid Phase via email to bill.conboy@ibigroup.com.
   2. Submit all requests for substitutions after the Bid Phase in accordance with requirements for electronic submittals in Section 01 30 00 - Administrative Requirements.

3. Submit all requests for substitutions after the Bid Phase through the Contractor. Substitution requests received directly from Subcontractors or Suppliers will be returned through the Contractor without review.

C. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.

D. A request for substitution constitutes a representation that the Contractor/Bidder:
   1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
   2. Agrees to provide the same warranty for the substitution as for the specified product.
   3. Agrees to coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
   4. Waives claims for additional costs or time extension that may subsequently become apparent.
   5. Will pay for changes to building design, including architectural or engineering design, detailing, construction costs, or re-approval by authorities caused by the requested substitution.

E. Substitutions after Award of Contract will not be considered when:
   1. Indicated or implied on shop drawings or product data submittals without formal request submitted in accordance with this Section.
   2. Submittal for substitution request has not been reviewed and recommended by Contractor. Substitution requests received directly from Subcontractors or Suppliers will be returned through the Contractor without review.
   3. Acceptance will require substantial revision of Contract Documents or other items of the Work.
   4. Submittal for substitution request does not include point-by-point comparison of proposed substitution with specified product.

F. Substitution Request Form:
   1. Use Substitution Request Form bound at the end of this Section for substitution requests during the bid phase.
   2. Use "Substitution Request (After the Bidding Phase)" form bound at the end of this Section for substitution requests after the Award of Contract.

G. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
   1. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
   2. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
   3. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable specification section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
   4. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
   5. Samples, where applicable or requested.
   6. Certificates and qualification data, where applicable or requested.
   7. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
   8. List of availability of maintenance services and replacement materials.
   9. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.

10. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
11. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
12. Cost information, including a proposal of change, if any, in the Contract Sum.
13. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
14. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

H. Accepted Substitutions prior to Bid Date will be listed in Addenda published in accordance with Advertisement for Bids and the Instructions to Bidders. Bidders will not rely upon approvals made in any other manner.

I. Architect's Action for Substitutions After Award of Contract: If necessary, Architect will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
   1. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
   2. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

3.02 SUBSTITUTIONS REQUESTED AFTER AWARD OF CONTRACT

A. Substitutions will normally not be considered after two days prior to last addendum date, except when required due to unforeseen circumstances. Within a period of 30 days after date of Contract, the Owner may, at its option, consider formal written requests for substitution of products in place of those specified when submitted in accord with the requirements stipulated herein. To receive consideration, one or more of the following conditions must be documented in any such request:
   1. The substitution is required for compliance with final interpretation of Code requirements or insurance regulations.
   2. The substitution is required due to unavailability of a specified product, through no fault of the Contractor.
   3. The substitution is required because subsequent information disclosed the inability of the specified product to perform properly or to fit in the designated space.
   4. Manufacturer's or fabricator's refusal to certify or warrant performance of specified product as required.
   5. Subsequent information that a long delivery date will not be compatible with the Contract construction period.
   6. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.

B. Owner reserves the right to reject any and all substitution requests for any reason, without obligation or liability

3.03 TRANSPORTATION AND HANDLING

A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.

B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.

C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

D. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.

E. Transport and handle products in accordance with manufacturer's instructions.

F. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

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

H. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.

I. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.04 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.

B. Store materials in a manner that will not endanger Project structure.

C. Store and protect products in accordance with manufacturers' instructions.

D. Store with seals and labels intact and legible.

E. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

F. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.

G. For exterior storage of fabricated products, place on sloped supports above ground.

H. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.

I. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.

J. Comply with manufacturer's warranty conditions, if any.

K. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

L. Prevent contact with material that may cause corrosion, discoloration, or staining.

M. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

N. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SUBSTITUTION REQUEST FORM

TO: Dull Olson Weekes - IBI Group Architects Inc.
907 SW Harvey Milk Street
Portland, OR 97205
Attn: jim.fitzpatrick@ibigroup.com

PROJECT: West Tualatin View Elementary School Roof Replacement

We hereby submit for your consideration the Product described below as a substitute for the specified product indicated:

1. Specified Product:

   Name: _____

   Section:_____ Paragraph: _____

2. Proposed Substitution:

   a. Brand Name:_____

   b. Model/Catalog No.: _____

   c. Manufacturer: _____
   (Name)

   _____
   (Address) (Zip) (Telephone)

   d. Nearest Distributor:_____
   (Name)

   _____
   (Address) (Zip) (Telephone)

   e. Substitute product effects adjacent Work in the following way:

   _____
   _____

3. Supporting Data:

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

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

4. Certification:

   The undersigned certifies that the following paragraphs, unless modified on attachments, are correct:

a. The proposed substitution does not affect dimensions shown on Drawings.

b. The undersigned will pay for changes to the building design, including engineering design, detailing and construction costs caused by the requested substitution.

c. The proposed substitution will have no adverse affect on other trades, the construction schedule, or specified warranty requirements.

d. Maintenance and service parts will be locally available for the proposed substitution.

e. The function, appearance and quality of the proposed substitution are equal or superior in all respects to the product specified.

5. Submitted By:

Firm:_____
(Name)

_____
(Address) (Zip) (Telephone)

By:_____ Title: _____
(Please type or print)

Signature:_____

6. Acceptance/Rejection:

Acceptable substitution items will be covered by an Addendum issued to all Bidders.

7. Architects Action:
The following is for use by the Architect:

___ Accepted ___ Accepted with exceptions as noted
___ Not Accepted ___ Received after deadline

Remarks: _____
_____
_____
_____

By:_____ Date: _____

For: Dull Olson Weekes - IBI Group Architects Inc.

END OF FORM

SUBSTITUTION REQUEST
(After the Bidding Phase)

Project: _____ Substitution Request Number: _____

_____ From: _____

To: _____ Date: _____

_____ Architect Project Number: _____

Re: _____ Contract For: _____

Specification Title: _____ Description: _____

Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____

Manufacturer: _____ Address: _____ Phone: _____

Trade Name: _____ Model No: _____

Installer: _____ Address: _____ Phone: _____

History: ☐ New Product ☐ 2-5 years old ☐ 5-10 years old ☐ More than 10 years old

Differences between proposed substitution and specified product: _____

_____

_____

Point by Point comparative data attached - REQUIRED

Reason for not providing specified item: _____

_____

Similar Installation:

Project: _____ Architect: _____

Address: _____ Owner: _____

Date Installed: _____

Proposed substitution affects other parts of Work: ☐ No ☐ Yes, explain _____

_____

Savings to Owner for accepting substitution: _____ ($_____).

Proposed substitution changes Contract Time: ☐ No ☐ Yes [Add] [Deduct] _____ days

Supporting Data Attached:

☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

_____

Telephone: _____

Attachments: _____

_____

_____

REVIEW AND ACTION

☐ Substitution approved - Make submittals in accordance with Specification Section 01 30 00.

☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01 30 00.

☐ Substitution rejected - Use specified materials.

☐ Substitution Request received too late - Use specified materials.

Signed by: _____ Date: _____

Additional Comments: ☐ Contractor ☐ Subcontractor ☐ Supplier ☐ Manufacturer ☐ A/E ☐ _____

_____

_____

_____

_____

_____

_____

_____

SECTION 01 70 00
EXECUTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Examination, preparation, and general installation procedures.

B. Protection of installed construction.

C. Correction of the Work.

D. Progress cleaning.

1.02 RELATED REQUIREMENTS

A. Section 01 74 19 - Construction Waste Management and Disposal: Additional procedures for trash/waste removal, recycling, salvage, and reuse.

1.03 REFERENCE STANDARDS

A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations.

1.04 QUALITY ASSURANCE

A. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 EXAMINATION

A. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where applicable, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
    a. Description of the Work.
    b. List of detrimental conditions, including substrates.
    c. List of unacceptable installation tolerances.
    d. Recommended corrections.
2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
3. Examine walls and roofs for suitable conditions where products and systems are to be installed.
    a. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
4. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.02 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings in substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

D. Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication.

E. Verify space requirements and dimensions of items shown diagrammatically on Drawings.

F. Review Contract Documents and field conditions. Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of the Contractor, submit a request for information to Architect according to requirements in Section 01 30 00 - Administrative Requirements.

3.03 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
   1. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
   2. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
   3. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
   4. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
   5. Make neat transitions between different surfaces, maintaining texture and appearance.

B. Installer Inspections: Require installer of each major unit of work to inspect substrate and conditions for installation and to report unsatisfactory conditions in writing.
   1. Correct unsatisfactory conditions before proceeding with installation.
   2. Inspect each product immediately before installation.
   3. Do not install damaged or defective products, materials or equipment.
   4. Start of installation shall be understood as acceptance of substrate conditions by the installer.

C. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

D. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

E. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking, attachment plates, anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
   1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
   2. Allow for building movement, including thermal expansion and contraction.
   3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.04 PROTECTION OF INSTALLED CONSTRUCTION

A. Protect installed Work and provide special protection where specified in individual specification Sections.

B. Provide temporary and removable protection for installed products. Control activity in immediate work area to minimize damage.

C. Provide and maintain temporary shoring and lateral bracing of structure during erection to resist all loads including:
   1. Wind
   2. Seismic
   3. Construction
   4. Materials
   5. Moving equipment

D. Do not remove temporary bracing and shoring until adequate, permanent connections or structural elements are in final position and positively anchored.

E. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

F. Prohibit traffic from landscaped areas.

G. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

H. Comply with manufacturer's written instructions for temperature and relative humidity.

3.05 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.
   1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Restore permanent facilities used during construction to their specified condition.

C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

3.06 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
   1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
   2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 degrees F.
   3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
      a. Utilize containers intended for holding waste materials of type to be stored.
   4. Daily cleaning shall include magnetic sweep of jobsite to pick up all nails and metallic debris.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
   1. Remove liquid spills promptly.

2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 01 74 19 - Construction Waste Management and Disposal.

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

END OF SECTION

SECTION 01 74 19
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.01 WASTE MANAGEMENT REQUIREMENTS

A. Owner requires that this project generate the least amount of trash and waste possible.

B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.

C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.

D. Required Recycling, Salvage, and Reuse: The following may not be disposed of in landfills or by incineration:
   1. Aluminum and plastic beverage containers.
   2. Corrugated cardboard.
   3. Wood pallets.
   4. Clean dimensional wood: May be used as blocking or furring.
   5. Metals, including packaging banding, metal studs, sheet metal, and other items made of steel, iron, galvanized steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
   6. Plastic buckets.
   7. Plastic sheeting.
   8. Rigid foam insulation.

E. Contractor shall develop and follow a Waste Management Plan designed to implement these requirements.

F. Methods of trash/waste disposal that are not acceptable are:
   1. Burning on the project site.
   2. Burying on the project site.
   3. Dumping or burying on other property, public or private.
   4. Other illegal dumping or burying.
   5. Incineration, either on- or off-site.

G. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.02 RELATED REQUIREMENTS

A. Section 01 30 00 - Administrative Requirements: Additional requirements for project meetings, reports, submittal procedures, and project documentation.

B. Section 01 50 00 - Temporary Facilities and Controls: Additional requirements related to trash/waste collection and removal facilities and services.

1.03 DEFINITIONS

A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.

B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.

C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.

D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.

E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.

F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.

G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.

H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

I. Return: To give back reusable items or unused products to vendors for credit.

J. Reuse: To reuse a construction waste material in some manner on the project site.

K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.

L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.

M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.

N. Toxic: Poisonous to humans either immediately or after a long period of exposure.

O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.

P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Submit Waste Management Plan within 10 calendar days after receipt of Notice of Award of Bid, or prior to any trash or waste removal, whichever occurs sooner; submit projection of all trash and waste that will require disposal and alternatives to landfilling.
   1. Prior to commencing construction on site, develop and have reviewed and approved a construction site waste management plan.

C. Waste Management Plan: The plan will cover all Contractor work on site. Source reduction on the job site should be an integral part of the plan. Include the following information:
   1. Analysis of the trash and waste projected to be generated during the entire project construction cycle, including types and quantities.
   2. Landfill Options: The name, address, and telephone number of the landfill(s) where trash/waste will be disposed of, the applicable landfill tipping fee(s), and the projected cost of disposing of all project trash/waste in the landfill(s).
   3. Landfill Alternatives: List all waste materials that will be diverted from landfills by reuse, salvage, or recycling.
   4. Meetings: Describe regular meetings to be held to address waste prevention, reduction, recycling, salvage, reuse, and disposal.
   5. Materials Handling Procedures: Describe the means by which materials to be diverted from landfills will be protected from contamination and prepared for acceptance by designated facilities; include separation procedures for recyclables, storage, and packaging.
   6. Transportation: Identify the destination and means of transportation of materials to be recycled; i.e. whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler.
      a. Identify licensed haulers and processors of recyclables; identify markets for salvaged materials; identify deconstruction, salvage and recycling strategies and processes; include waste auditing; and document the cost for recycling, salvaging and reusing materials.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 WASTE MANAGEMENT PROCEDURES

A. See Section 01 30 00 for additional requirements for project meetings, reports, submittal procedures, and project documentation.

B. See Section 01 50 00 for additional requirements related to trash/waste collection and removal facilities and services.

3.02 WASTE MANAGEMENT PLAN IMPLEMENTATION

A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.

B. Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, Owner, and Architect.

C. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.

D. Meetings: Discuss trash/waste management goals and issues at project meetings, particularly at:
   1. Pre-bid meeting.
   2. Pre-construction meeting.
   3. Regular job-site meetings.

E. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
   1. Provide containers as required.
   2. Provide construction dumpsters. Do not intermingle trash with school dumpsters.
   3. Provide adequate space for pick-up and delivery and convenience to subcontractors.
   4. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.

F. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.

G. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.

H. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.

I. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

END OF SECTION

SECTION 01 77 00
CLOSEOUT PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Substantial Completion.

B. Final Completion.

C. Punch List.

D. Warranties.

E. Cleaning prior to Substantial Completion review.

F. Final Cleaning.

1.02 RELATED REQUIREMENTS

A. Section 01 13 31 - Certificate of Compliance.

B. Section 01 13 32 - Certificate of No Hazardous Materials.

C. Section 01 78 00 - Closeout Submittals: Project record documents, operation and maintenance (O&M) data, warranties and bonds.

D. Section 01 79 00 - Demonstration and Training: Requirements relating to Owner training prior to Closeout.

1.03 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting review for determining date of Substantial Completion, complete the following. List items below that are incomplete with request.

1. In progress payment request coincident with or first following date claimed, show either 100 percent completion for portion of work claimed as "substantially complete", or list incomplete items, value of incompletion, and reasons for being incomplete. Include supporting documentation for completion as indicated in these contract documents.
    a. Submit statement showing accounting of changes to the Contract Sum.
    b. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
2. Advise Owner of pending insurance changeover requirements.
3. Submit workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits and similar releases.
5. Submit completed Certificate of Compliance. Refer to Section 01 13 31.
6. Submit completed Certificate of No Hazardous Materials. Refer to Section 01 13 32.
7. Prepare and submit drafts for Operation and Maintenance Manuals.
8. Prepare and submit drafts for Project Record Documents.
9. Terminate and remove temporary facilities from Project site, along with construction tools, and similar elements.
10. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
11. Complete final cleaning requirements.
12. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
13. Make submittals that are required by governing or other authorities.
    a. Provide copies to Architect and Owner.
    b. Provide copy of Occupancy Permit to Architect and Owner.

B. Review: Submit a written request for review for Substantial Completion. On receipt of request, Architect will either proceed with review or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after review or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
   1. Results of completed review will form the basis of requirements for Final Completion.
   2. Should the Architect have to perform any additional reviews due to failure of Work to comply with claims of completion made by Contractor, the cost for each additional review will be charged to the Owner at the Architect/Engineer's hourly rate. The Owner shall have the right to deduct such charges from the contract amount as provided in the Conditions of the Contract.

1.04 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final review for determining final completion, complete the following:
   1. Submit a final Application for Payment with final waivers according to Section 01 20 00 - Price and Payment Procedures.
      a. Submit updated final statement, accounting for additional (final) changes to Contract Sum.
   2. Submit consent of surety.
   3. Prepare and submit final Project Record Documents within 30 days after date of Substantial Completion or before final completion, whichever occurs first.
   4. Submit final warranties.
   5. Submit final operation and maintenance manuals.
   6. Submit certified copy of Architect's Substantial Completion review list of items to be completed or corrected (punch list). The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
   7. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
   8. Submit permanent Certificate of Occupancy.
   9. Submit payment and release of liens to requirements of General Conditions. Before final payment, the Contractor shall furnish the following to the Architect:
      a. An affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner of property might in any way be responsible, have been paid or otherwise satisfied (use AIA Form G706 or approved).
      b. An affidavit from each Subcontractor on AIA Form G706 or approved.
      c. Letter from Bonding Company addressed to Owner but submitted to the Architect, approving release of final payment and waiving submission of final receipts as well as a statement confirming the extension of the Bond for the warranty period as specified. Final receipts from all Subcontractors and material and equipment suppliers may be required to furnish to the Owner by the Contractor if the Surety does not waive this requirement. Letters to be in substantially the following form:

         (Name of Owner)Re: (Bond No.)
         (Address)(Name of Contractor)
         (Name of Project)
         Gentlemen:
         The (Name of Bonding Company), surety on the above named Bond, consents to payment of retained percentages and agrees to waive submission of final receipts.
         It is also agreed that the final payment to the Contractor shall not relieve the Surety Company of any of its obligations and that the Bond is extended to include guarantees and warranties of workmanship and materials.
         (NAME OF BONDING COMPANY)
         Attorney-in-Fact

d. Submit Contractor's Affidavit of Release of Liens (AIA Form G706A).
e. Return all copies of the Drawings and Specifications in accordance with the General Conditions.

10. Submit Affidavit of Wages Paid for Contractor and all sub-contractors.
11. Submit Department of Revenue Release (for projects over $35,000 only).
12. Instruct Owner's personnel in maintenance of products and systems.
13. Submit attendance record for training of Owner's personnel.
14. Complete requirements of Section 01 78 00 - Closeout Submittals.
15. Complete requirements of Section 01 79 00 - Demonstration and Training.

B. Review: Submit a written request for final review for acceptance. On receipt of request, Architect will either proceed with review or notify Contractor of unfulfilled requirements. Architect will either prepare a letter to Owner recommending final acceptance or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Additional Reviews: Request an additional review when the Work identified in previous reviews as incomplete is completed or corrected.
2. Should the Architect have to perform any such additional reviews due to failure of Work to comply with claims of completion made by Contractor, the cost for each additional review will be charged to the Owner at the Architect/Engineer's hourly rate. The Owner shall have the right to deduct such charges from the contract amount as provided in the Conditions of the Contract.
3. Provide additional cleaning services as required for Work which was not complete at the time of initial review. Reclean as required until all Work is fully complete and recommended for final acceptance by Architect.
4. If the Work does not achieve Final Completion within two weeks of the date originally scheduled to do so, plus any time adjustments by Change Order, the Architect's time and efforts beyond that period shall constitute extra services, the cost of which at the Architect's standard hourly rates will be deducted from the Contractor's Final Payment or retainage by the Owner.
5. Punch list items in the Schedule of Values will be released on any given line item only when all punchlist items relating to that line item are satisfactorily completed.

1.05 CONTRACTOR'S LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Prior to requesting review for Substantial Completion, perform a thorough punch list of the project identifying incomplete items, damaged items and substandard items requiring correction.
1. Distribute the Punch List to applicable subcontractors and indicate corrections made to each item.
2. Reinspect and sign off on all complete items.
3. This Punch List will form the basis of the list to be submitted with the request for Substantial Completion.
4. Supplement Punch List with valuation of incomplete items and reasons for being incomplete.
5. Prepare Punch List in digital format acceptable to Architect.

B. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. Organize list of spaces in sequential order by roof area.
2. Include the following information at the top of each page:
a. Project name.
b. Date.
c. Name of Architect.
d. Name of Contractor.
e. Page number.

3. Submit list of incomplete items in the following format:
    a. PDF electronic file.

1.06 WARRANTIES

A. Submittal Time:
    1. Submit summary of warranties included in the bid within seven days after Notice of Intent to Award Contract (Prior to Execution of the Contract). Indicate duration of each warranty and start date.
    2. Submit sample warranties as part of the project submittal process.
    3. Submit final warranties before requesting review for final acceptance.

B. Comply with requirements of Section 01 78 00 - Closeout Submittals.

PART 2 PRODUCTS

2.01 MATERIALS

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

PART 3 EXECUTION

3.01 CLEANING PRIOR TO SUBSTANTIAL COMPLETION REVIEW

A. At time of project close-out, clean or reclean the Work to the condition expected from a normal, commercial building cleaning and maintenance program.

B. Complete the following cleaning operations before requesting the Architect's review for certification of Substantial Completion.
    1. Remove grease, dust, dirt, stains, manufacturer's labels, fingerprints, etc., from sight exposed surfaces.
    2. Remove non-permanent protection and labels.
    3. Repair, patch and touch-up marred surfaces.
    4. Remove construction debris.
    5. Police yards and grounds.

3.02 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and anti-pollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
    1. Complete the following cleaning operations before requesting review for certification of Substantial Completion for entire Project or for a portion of Project:
        a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
        b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
        c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
        d. Remove tools, construction equipment, machinery, and surplus material from Project site.
        e. Remove labels that are not permanent.
        f. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
            1) Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates.

g. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove other foreign substances.
h. Leave Project clean and ready for occupancy.

2. Maintain in cleaned condition until Final Completion or Owner occupancy.

END OF SECTION

SECTION 01 78 00
CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project Record Documents.

B. Operation and Maintenance Manuals.

C. Warranties and bonds.

1.02 RELATED REQUIREMENTS

A. Section 01 31 23 - Project Management Database (PMD): Electronic submittal of record documents.

B. Section 01 77 00 - Closeout Procedures: Contract closeout procedures.

C. Individual Product Sections: Specific requirements for operation and maintenance data.

D. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

A. Record Drawings:
   1. Draft: Submit one copy of marked-up record prints in electronic color PDF format prior to request for review for Substantial Completion.
   2. Final: Submit one paper copy set and an electronically scanned copy of marked up prints within 30 days of dated established for Substantial Completion or prior to request for review for final completion, whichever occurs first.
   3. Approved permit set of plans.

B. Record Specifications:
   1. Draft: Submit one copy of marked-up copy of Project Manual in electronic color PDF format prior to request for review for Substantial Completion.
   2. Final: Submit one copy of marked-up copy of Project Manual and one electronically scanned copy within 30 days of date established for Substantial Completion or prior to request for review for final completion, whichever occurs first.

C. Operation and Maintenance Manuals:
   1. Draft: Submit one copy of draft manuals in electronic color PDF format prior to request for review for Substantial Completion. Architect will review draft and return one copy with comments. Revise content of all document sets as required prior to final submission.
   2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
   3. Final: Submit three sets of revised Manuals and an electronically scanned copy in final form prior to request for review for final completion.

D. Warranties and Bonds:
   1. Submit a summary of warranties included in the bid within seven days after Notice of Intent to Award Contract (Prior to Execution of the Contract). Indicate duration of each warranty and start date.
   2. Draft: Submit as part of normal submittal process.
   3. Final: Submit final forms of warranties prior to request for review for final completion.

E. PDF Format: Submit searchable PDF electronic files. File names shall clearly identify the Owner, project name, drawing or specification number and name and date. File name shall be established to list in the same order as identified in the Contract Documents.
   1. Submit electronic documents for record documents and Operations and Maintenance Manuals by e-Builder as specified in Section 01 31 23 - Project Management Database (PMD).

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and Construction Change Directives.
   5. ASIs and responses to RFIs.
   6. Reviewed shop drawings, product data, and samples.
   7. Manufacturer's instruction for assembly, installation, and adjusting.
   8. Architect will provide one hard copy and one PDF electronic file of a conformed set of Contract Documents, incorporating addenda for use by Contractor in developing As-Built Drawings.

B. The As-Built documents shall include all disciplines of work whether changes occur or not. These documents, as well as the approved permit set of plans, shall be available to the Architect and Owner at the site and reviewed with them on a monthly basis. Satisfactory maintenance of up-to-date record drawings on a monthly basis will be a requirement for approval of progress payments.

C. Store As-Built documents in the field office apart from the Contract Documents used for construction. Do not use project As-Built documents for construction purposes. Maintain As-Built documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project As-Built documents for Architect's reference during normal working hours.

D. As-Built Drawings:
   1. Content: Types of items requiring marking include, but are not limited to, the following:
      a. Dimensional changes to Drawings.
      b. Revisions to details shown on Drawings.
      c. Actual existing equipment locations.
      d. Changes made by Addenda.
      e. Changes made by Change Order or Construction Change Directive.
      f. Changes made following Architect's written orders, including ASIs and responses to RFIs.
      g. Details not on the original Contract Drawings.
      h. Field records for variable and concealed conditions.
      i. Record information on the Work that is shown only schematically.
   2. Mark the Contract Drawings and Shop Drawings completely and accurately. Utilize personnel proficient at recording graphic information in production of marked-up record prints.
   3. Mark As-Built sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
   4. Mark important additional information that was either shown schematically or omitted from original Drawings.
   5. Mark revisions and/or clarifications issued by Addenda, ASI, Construction Change Directive, Change Orders or responses to RFIs to reflect the change. Each such revision shall be graphically depicted to represent physical construction and clearly noted with the applicable Addenda, ASI, Change Order or RFI number. Notation of the Addenda, RFI, ASI, Construction Change Directive or Change Order number alone will not be acceptable.
   6. Ensure entries are complete and accurate, enabling future reference by Owner.
   7. Scanned Drawings: After review of draft drawings by Architect, incorporate necessary changes and prepare a full set of scanned Contract Drawings and Shop Drawings on CD-ROM.

E. Specifications: Legibly mark and record at each product section a description of actual products installed, including the following:
   1. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
   2. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
   3. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals.
   4. Mark revisions and/or clarifications issued by Addenda, ASI, Construction Change Directive, Change Orders or responses to RFIs to reflect the change. Each such revision shall be graphically depicted to represent physical construction and clearly noted with the applicable Addenda, ASI, Change Order or RFI number. Notation of the Addenda, RFI, ASI, Construction Change Directive or Change Order number alone will not be acceptable.
   5. Format: Submit record Specifications as scanned PDF electronic file(s) of marked up paper copy of Specifications.

3.02 OPERATION AND MAINTENANCE DATA

A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

A. For Each Product, Applied Material, and Finish:
   1. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
   2. Product data, with catalog number, size, composition, and color and texture designations.
   3. Information for re-ordering custom manufactured products.

B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

C. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

D. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.

E. Additional information as specified in individual product specification sections.

F. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

A. For Each Item of Equipment and Each System:
   1. Description of unit or system, and component parts.
   2. Identify function, normal operating characteristics, and limiting conditions.

3. Include performance curves, with engineering data and tests.
4. Complete nomenclature and model number of replaceable parts.

B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

C. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

D. Include manufacturer's printed operation and maintenance instructions.

E. Include sequence of operation by controls manufacturer.

F. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

G. Provide control diagrams by controls manufacturer as installed.

H. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

I. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

J. Include test and balancing reports.

K. Additional Requirements: As specified in individual product specification sections.

3.05 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.

B. Where systems involve more than one specification section, provide separate tabbed divider for each system.

C. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.

D. Cover: Identify each binder with typed or printed Volume Title (e.g., Equipment Operation and Maintenance Manual), name of Project, BSD, Architect, and date of Substantial Completion. Include Contractor's name and date. On bound edge, imprint name of project, BSD and year of Substantial Completion.

E. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.

F. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.

G. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.

H. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.

I. Drawings: Provide with reinforced punched binder tab. Bind in with text. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

J. Arrangement of Contents: Organize each volume in parts as follows:
1. Project Directory.
2. Table of Contents, of all volumes, and of this volume.

3. Operation and Maintenance Data: Arranged by system, then by product category.
   a. Source data.
   b. Product data, shop drawings, and other submittals.
   c. Operation and maintenance data.
   d. Field quality control data.
   e. Photocopies of warranties and bonds.
4. Design Data: To allow for addition of design data furnished by Architect or others, provide a tab labeled "Design Data" and provide a binder large enough to allow for insertion of at least 20 pages of typed text.

K. PDF Electronic File: After review of draft manuals, assemble each manual into a composite electronically-indexed file. Submit on digital media acceptable to Architect.
1. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically-linked operation and maintenance directory.
2. Enable inserted reviewer comments on draft submittals.
3. File Names and Bookmarks: Enable bookmarking of individual documents based upon file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel upon opening file.

3.06 WARRANTIES AND BONDS

A. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.

B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.

D. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.
1. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.
2. The Owner reserves the right to refuse to accept or pay for Work for the Project where a Special Warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

E. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Completion is determined.

F. Verify that documents are in proper form and contain full information.

G. Co-execute submittals when required.

H. Retain warranties and bonds until time specified for submittal.

I. Manual: Bind in commercial quality 8-1/2 by 11 inch three D side ring binders with durable plastic covers.

J. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project, BSD, Architect, and date of Substantial Completion. Include name of Contractor and date. On bound edge, imprint name of project, BSD and year of Substantial Completion.

K. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.
   1. Product or work item.
   2. Installer of product or item, with name of principal, address, and telephone number.
   3. Describe the work provided by this installer/Subcontractor, under this Contract.
   4. Date of beginning of warranty or service and maintenance contract. (See General Condition's Warranty paragraph.)
   5. Duration of warranty or service maintenance contract.
   6. Information for Owner's personnel, including:
      a. Proper procedure in case of failure.
      b. Contact phone numbers of manufacturer.
   7. Instances that might affect validity of warranty or bond.
   8. Contractor, name of responsible principal, address, and telephone number.

L. Schedule of Warranties: Provide a summary schedule of start and end date of each warranty.

M. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

END OF SECTION

SECTION 01 79 00
DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.01 SUMMARY

A. Demonstration of products and systems where indicated in specific specification sections.

B. Training of Owner personnel in operation and maintenance is required for:
   1. Fall protection devices.

C. Training of Owner personnel in care, cleaning, maintenance, and repair is required for:
   1. Roofing and other weather-exposed or moisture protection products.

1.02 RELATED REQUIREMENTS

A. Section 01 78 00 - Closeout Submittals: Operation and maintenance manuals.

B. Other Specification Sections: Additional requirements for demonstration and training.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Training Plan: Owner will designate personnel to be trained; tailor training to needs and skill-level of attendees.
   1. Submit to Architect for transmittal to Owner.
   2. Submit not less than four weeks prior to start of training.
   3. Revise and resubmit until acceptable.
   4. Provide an overall schedule showing all training sessions.
   5. Include at least the following for each training session:
      a. Identification, date, time, and duration.
      b. Description of products and/or systems to be covered.
      c. Name of firm and person conducting training; include qualifications.
      d. Intended audience, such as job description.
      e. Objectives of training and suggested methods of ensuring adequate training.
      f. Methods to be used, such as classroom lecture, live demonstrations, hands-on, etc.
      g. Media to be used, such as slides, hand-outs, etc.
      h. Training equipment required, such as projector, projection screen, etc., to be provided by Contractor.

C. Training Manuals: Provide training manual for each attendee; allow for minimum of two attendees per training session.
   1. Include applicable portion of O&M manuals.
   2. Include copies of all hand-outs, slides, overheads, video presentations, etc., that are not included in O&M manuals.
   3. Provide one extra copy of each training manual to be included with operation and maintenance data.

D. Training Reports:
   1. Identification of each training session, date, time, and duration.
   2. Sign-in sheet showing names and job titles of attendees.
   3. List of attendee questions and written answers given, including copies of and references to supporting documentation required for clarification; include answers to questions that could not be answered in original training session.

E. Video Recordings: Submit digital video recording of each demonstration and training session for Owner's subsequent use.
   1. Format: DVD Disc.
   2. Label each disc and container with session identification and date.

1.04 QUALITY ASSURANCE

A. Instructor Qualifications: Familiar with design, operation, maintenance and troubleshooting of the relevant products and systems.
   1. Provide as instructors the most qualified trainer of those contractors and/or installers who actually supplied and installed the systems and equipment.
   2. Where a single person is not familiar with all aspects, provide specialists with necessary qualifications.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 DEMONSTRATION - GENERAL

A. Non-Operating Products: Demonstrate cleaning, scheduled and preventive maintenance, and repair procedures.
   1. Perform demonstrations not less than two weeks prior to Substantial Completion.

3.02 TRAINING - GENERAL

A. Conduct training on-site unless otherwise indicated.

B. Owner will provide classroom and seating at no cost to Contractor.

C. Provide training in minimum two hour segments.

D. Training schedule will be subject to availability of Owner's personnel to be trained; re-schedule training sessions as required by Owner; once schedule has been approved by Owner failure to conduct sessions according to schedule will be cause for Owner to charge Contractor for personnel "show-up" time.

E. Review of Facility Policy on Operation and Maintenance Data: During training discuss:
   1. The location of the O&M manuals and procedures for use and preservation; backup copies.
   2. Typical contents and organization of all manuals, including explanatory information, system narratives, and product specific information.
   3. Typical uses of the O&M manuals.

F. Product- and System-Specific Training:
   1. Review the applicable O&M manuals.
   2. Discuss common troubleshooting problems and solutions.
   3. Discuss warranties and guarantees, including procedures necessary to avoid voiding coverage.

G. Be prepared to answer questions raised by training attendees; if unable to answer during training session, provide written response within three days.

END OF SECTION

SECTION 02 41 19
SELECTIVE STRUCTURE DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Selective demolition of building elements for alterations purposes.

B. Raising of select roof top units as necessary to accommodate height of new roof assembly.

1.02 RELATED REQUIREMENTS

A. Section 07 01 50.19 - Preparation for Re-Roofing: Removal of existing roofing, roof insulation, flashing, trim, and accessories.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Site Plan: Showing:
   1. Areas for temporary construction and field offices.
   2. Crane pick plan as applicable.

1.05 PREINSTALLATION CONFERENCE

A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; schedule attendance with Architect, Owner, District Maintenance staff, Contractor, Subcontractors for demolition, mechanical, plumbing and electrical. Conference shall be held in conjunction with conferences specified in Section 07 01 50.19 - Preparation for Re-Roofing and Section 07 53 00 - Elastomeric Membrane Roofing.
   1. This is a required meeting prior to the commencement of any demolition.

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION

3.01 SCOPE

A. Remove portions of existing buildings as indicated on Drawings.
   1. Remove roof ladders where indicated. Patch and repair resultant damage to walls/parapets at location of ladder attachments to prevent water intrusion and to conceal any evidence of ladder removal.
   2. Remove existing roof assembly including insulation at locations indicated on Drawings. Remove no more existing roofing than can be covered in one day by new roofing and so that building interior remains watertight and weathertight.
      a. Comply with Section 07 01 50.19 - Preparation for Re-Roofing for requirements for existing roof tear-off.
      b. Comply with Section 07 53 00 - Elastomeric Membrane Roofing for installation of fully adhered EPDM re-cover roof assembly.
   3. Disconnect, lift and temporarily relocate curbed roof top units as required to accommodate new roof level insulation including but not limited to roof top HVAC units, skylights, vents and fans.
      a. Disconnect existing ductwork and reconnect ductwork to equipment after installation on new curb.
         1) Provide extensions to existing ductwork as required for connection to reinstalled equipment.
         2) Cap all ducts and piping that may temporarily be left unconnected.
         3) New ductwork to match existing in material and metal gage.
         4) Seal all joints.
      b. Disconnect and reconnect all electrical systems related to relocated mechanical units.
      c. Reinstall mechanical units on reconstructed curbs. Anchor equipment with size and spacing of anchors to match existing or as recommended by equipment

manufacturer, whichever is more stringent. Provide seismic restraint on all equipment in accordance with code requirements.

d. Employ services of qualified MEP subcontractors to disconnect and subsequently reconnect units.
e. Verify proper operation of units in presence of Owner and Architect.
f. Comply with requirements specified in Divisions 22, 23, 26 and 28.

3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Do not begin removal until receipt of notification to proceed from Owner.

B. Protect existing structures and other elements that are not to be removed.

C. Perform demolition in a manner that maximizes salvage and recycling of materials.
   1. Comply with requirements of Section 01 74 19 - Construction Waste Management and Disposal.

3.03 SELECTIVE DEMOLITION FOR ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
   1. Report discrepancies to Architect before disturbing existing installation.
   2. Beginning of demolition work constitutes acceptance of existing conditions.

B. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.

C. Remove existing work as indicated and as required to accomplish new work.
   1. Remove items indicated on Drawings.

D. Protect existing work to remain.
   1. Perform cutting to accomplish removals neatly and as specified for cutting new work.
   2. Repair adjacent construction and finishes damaged during removal work.
   3. Patch as specified for patching new work.

3.04 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash from site.

B. Remove from site all materials not to be reused on site; comply with requirements of Section 01 74 19 - Construction Waste Management and Disposal.

C. Leave site in clean condition, ready for subsequent work.

D. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

SECTION 05 50 00
METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Shop fabricated and manufactured steel , including, but not limited to, the following:
   1. Metal ladders.

B. Prefabricated ladders and ship ladders.

1.02 RELATED REQUIREMENTS

A. Section 07 72 00 - Roof Accessories: Safety posts to be installed on vertical ladders.

B. Section 09 96 00 - High-Performance Coatings: Coating finish and metal primers for use for shop primers.

1.03 REFERENCE STANDARDS

A. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements.

B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.

C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

D. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.

E. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

F. ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.

G. ASTM B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold-Finished Bar, Rod, and Wire (Metric).

H. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

I. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel.

J. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions.

K. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).

L. ASTM F1941 - Standard Specification for Electrodeposited Coatings on Threaded Fasteners.

M. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.

N. AWS D1.1/D1.1M - Structural Welding Code - Steel.

O. SSPC-SP 11 - Power Tool Cleaning to Bare Metal.

P. SSPC-SP 2 - Hand Tool Cleaning.

Q. SSPC-SP 6 - Commercial Blast Cleaning.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: For the following:
   1. Prefabricated aluminum ladders.

C. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

1. Prepare shop drawings from field measurements where possible.
2. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

D. 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. Submit submittals as "Deferred Submittals" in accordance with Section 01 30 00 - Administrative Requirements. Transmit a copy of each submittal indicating agency approval to the Architect for record.

E. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

F. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

1.05 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design ladders, including comprehensive engineering analysis by a qualified professional engineer licensed in the State of Oregon, using performance requirements and design criteria indicated.

B. Structural Performance of Ladders: Ladders shall withstand the effects of loads and stresses within limits and under conditions specified in ANSI A14.3.
1. Ladders accessing equipment on roofs or elevated structures shall comply with requirements of Section 306.5 of the Oregon Mechanical Specialty Code.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

1.06 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to the following:
1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. Certify to WABO Standard No. 27-13 "WABO Welder and Welding Operator Performance Qualification Standard."

1.07 DELIVERY, STORAGE AND PROTECTION

A. Transport, handle, store and protect products with special custom wrapping and handling procedures to protect and touch-up shop primers at every stage of shipping.

1.08 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

1.09 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

A. Steel Sections: ASTM A 36/A 36M.

B. Steel Tubing: ASTM A500/A500M, Grade B cold-formed structural tubing.

C. Plates: ASTM A283/A283M.

D. Fasteners: Provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade and class required.

E. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, galvanized to ASTM A153/A153M where connecting galvanized components.

F. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

G. Shop and Touch-Up Primer for Interior Ferrous Metal: Either Tnemec Series 27 Typoxy WB at 3 to 4 mils DFT or primer specified in Section 09 96 00 - High-Performance Coatings, complying with VOC limitations specified in Section 09 96 00.
   1. Manufacturer's standard fast-curing, lead- and chromate-free, universal modified-alkyd primer can be used only at the specific elements listed in the FINISHES - STEEL Article.

H. Primer and Touch-Up Primer for Galvanized Surfaces: Either Tnemec Series 27 Typoxy WB at 2 to 2.5 mils or primer specified in Section 09 96 00 - High-Performance Coatings, complying with VOC limitations of authorities having jurisdiction.

2.02 MISCELLANEOUS MATERIALS

A. Nonshrink, Metallic Grout: Factory-packaged, ferrous-aggregate grout complying with ASTM C1107/C1107M, specifically recommended by manufacturer for heavy-duty loading applications.

B. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.03 FABRICATION

A. Fit and shop assemble items in largest practical sections, for delivery to site. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Use materials of size and thickness indicated or, if not indicated, as required to produce strength and durability in finished product for intended use and, where applicable, to meet performance requirements.

C. Fabricate items with joints tightly fitted and secured.

D. Continuously seal joined members by continuous welds, unless otherwise indicated on Drawings.

E. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

F. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

G. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
   1. Provide anchor bolts for connecting to other work.
      a. Drill and tap steel as required to receive bolted connections.
      b. Make bolt holes 1/16 inch larger than nominal bolt diameter.
   2. Do not furnish bolts with threads within shear plane of the bolt.

H. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.04 METAL LADDERS

A. Ladders: Steel; in compliance with ANSI A14.3; with mounting brackets and attachments; prime paint finish.
   1. Side Rails: Tube steel members of size detailed spaced at 24 inches, unless otherwise indicated on Drawings.
      a. Extend rails 42 inches above top rungs or landing and return rails to wall or structure unless other secure handholds are provided.
      b. At roof ladders over parapets, extend rails as detailed.

2. Rungs: 3/4 inch diameter solid round bar spaced 12 inches on center.
    a. Provide nonslip surfaces on top of each rung either by coating rung with aluminum-oxide granules set in epoxy-resin adhesive or by using a type of manufactured rung filled with aluminum-oxide grout.
    b. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
3. Space rungs 7 inches from wall surface with 3/8 inch by 3 inch steel angle brackets to support rails.
    a. Drill bracket to receive wall anchors.
    b. Weld brackets at 12 inches from each end of rails, unless otherwise indicated, and at not more than 60 inches on center at intermediate points.
4. Galvanize exterior ladders, including brackets and fasteners.
5. Shop prime interior ladders.

2.05 PREFABRICATED LADDERS

A. Prefabricated Ladder (Angled Fixed): Welded metal unit complying with ANSI A14.3; factory fabricated to greatest degree practical and in the largest components possible.
    1. Components: Manufacturer's standard rails, rungs, treads, handrails, returns, platforms and safety devices complying with the requirements of the MATERIALS article of this section.
    2. Materials: Aluminum; ASTM B221 (ASTM B221M), 6063 alloy, T52 temper.
    3. Finish: Mill finish aluminum.
    4. Mounting:
        a. Non-Penetrating Base: Basis of Design KATTCLIMB LD419F.
        b. Off-Floor Mount: Basis of Design KATTCLIMB LD42180S.
    5. Products with Platform:
        a. KATTCLIMB; Model RL22; www.fixfastusa.com/fixed-ladders.
        b. Substitutions: See Section 01 60 00 - Product Requirements.
    6. Products with Handrails Over Roof:
        a. KATTCLIMB; Model RL21; www.fixfastusa.com/fixed-ladders.
        b. Substitutions: See Section 01 60 00 - Product Requirements.

2.06 FINISHES - STEEL

A. Galvanize and prime paint all exterior steel items.

B. Prime paint all steel items.
    1. Exceptions: Galvanize items to be embedded in concrete and items to be embedded in masonry.

C. Prepare surfaces to be primed in accordance with SSPC-SP 2 where indicated to receive manufacturer's standard primer.

D. Prepare surfaces to be primed in accordance with SSPC-SP 6 where indicated to receive high-performance coating finish.

E. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

F. Prime Painting: One coat of specified primer applied in strict accordance with primer manufacturer's instructions:
    1. Provide one coat of manufacturer's standard primer for the following items:
        a. Interior ladders.

G. Galvanizing: Galvanize after fabrication to ASTM A123/A123M requirements.

2.07 FABRICATION TOLERANCES

A. Squareness: 1/8 inch maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch.

C. Maximum Misalignment of Adjacent Members: 1/16 inch.

D. Maximum Bow: 1/8 inch in 48 inches.

E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

3.03 INSTALLATION

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

C. Install items plumb and level, accurately fitted, free from distortion or defects.

D. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

E. Field weld components as indicated.

F. Perform field welding in accordance with AWS D1.1/D1.1M.
   1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
   2. Obtain fusion without undercut or overlap.
   3. Remove welding flux immediately.
   4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

G. Obtain approval prior to site cutting or making adjustments not scheduled.

H. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized.

3.04 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting.

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.
   1. Clean surfaces of weld seams according to SSPC-SP 11, "Power Tool Cleaning to Bare Metal."

3.05 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

SECTION 06 10 00
ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Structural dimension lumber framing.

B. Sheathing.

C. Roof-mounted curbs.

D. Roofing nailers.

E. Preservative treated wood materials.

F. Miscellaneous framing and sheathing.

G. Miscellaneous wood nailers, furring, and grounds.

1.02 RELATED REQUIREMENTS

A. Section 01 22 00 - Unit Prices.

B. Section 01 74 19 - Construction Waste Management and Disposal.

1.03 REFERENCE STANDARDS

A. AWC (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings.

B. APA PRP-108 - Performance Standards and Qualification Policy for Structural-Use Panels (Form E445).

C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

E. AWPA U1 - Use Category System: User Specification for Treated Wood.

F. PS 2 - Performance Standard for Wood-Based Structural-Use Panels.

G. PS 20 - American Softwood Lumber Standard.

H. WCLIB (GR) - Standard Grading Rules for West Coast Lumber No. 17.

I. WWPA G-5 - Western Lumber Grading Rules.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide technical data on wood preservative materials and application instructions.

1. For composite-wood products, provide documentation indicating that product contains no urea formaldehyde.

1.05 DELIVERY, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.

1. Species: Douglas Fir, unless otherwise indicated. No Larch.
2. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
3. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service

for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

B. Lumber fabricated from old growth timber is not permitted.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

A. Grading Agency: West Coast Lumber Inspection Bureau; WCLIB (GR).

B. Grading Agency: Western Wood Products Association; WWPA G-5.

C. Sizes: Nominal sizes as indicated on drawings, S4S.

D. Moisture Content: S-dry or MC19.

E. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
1. Lumber: S4S, No. 2 or Standard Grade.
2. Boards: Standard or No. 3.

2.03 CONSTRUCTION PANELS

A. Roof Related Plywood Nailers and Fascias: APA PRP-108, Structural I Rated Sheathing, Exterior Exposure Class, and as follows:
1. Span Rating: 24/0.
2. Thickness: 3/4 inch, nominal, unless otherwise indicated.

B. Plywood Sheathing: CDX Plywood sheathing, Exterior 5-ply laminated wood panels, PS 1, Grade C-D, Exposure I.
1. Thickness: 1/2-inch.
2. Maximum Moisture Content: 19 percent.

2.04 FASTENERS FOR INSTALLATION OF PLYWOOD SHEATHING

A. Screws: ASTM C 954, #8 screws except with wafer heads and reamer wings, minimum length shall be 1-5/8-inch; do not exceed this length unless required for securement of plywood sheathing.

B. Nails: Type 304 stainless steel ring-shank nails. Nails must have the same gauge and head diameter as a 10d common nail - full headed; minimum length shall be 1-5/8-inch long. Shank diameter 0.148-inches; head diameter 5/16-inch.

2.05 MISCELLANEOUS MATERIALS

A. Provide all miscellaneous rough hardware and material items required for complete and proper fabrication and installation of Work.

B. Fasteners for Exterior Finish Carpentry: Provide hot dipped galvanized finish nails, in sufficient length to penetrate not less than 1-inch into wood substrate.

2.06 FACTORY WOOD TREATMENT

A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
1. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

B. Preservative Treatment:
1. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
b. Treat lumber exposed to weather.
c. Treat lumber in contact with roofing, flashing, or waterproofing.
d. Treat lumber in contact with masonry or concrete.
e. Treat lumber less than 18 inches above grade.
f. Treat lumber in other locations as indicated.

2. Preservative Pressure Treatment of Plywood Above Grade: AWPA U1, Use Category UC2 and UC3B, Commodity Specification F using waterborne preservative.
    a. Kiln dry plywood after treatment to maximum moisture content of 19 percent.
    b. Treat plywood in contact with roofing, flashing, or waterproofing.
    c. Treat plywood in contact with masonry or concrete.
    d. Treat plywood less than 18 inches above grade.
    e. Treat plywood in other locations as indicated.

PART 3 EXECUTION

3.01 PREPARATION

A. Coordinate installation of rough carpentry members specified in other sections.

B. Coordinate with Work of other Sections for removal of existing roof. Do not remove more sheathing than can be replaced the same day.
1. Inspect existing roof sheathing and remove and replace any damaged decking, fascia or other wood as directed by the Owner or its representative. In particular, remove any wood exhibiting dry rot, mold or mildew. Chase damage to extinction.
2. Provide solid blocking for support of new plywood sections where needed.
3. Record number and lengths of replaced components.
    a. Prior to starting work, notify Architect of defects requiring correction.
    b. Refer to Section 01 22 00 - Unit Prices.

3.02 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

3.03 ROOF-RELATED CARPENTRY

A. Coordinate installation of roofing carpentry with roofing assembly installation.

B. Provide wood curb at all roof openings except where specifically indicated otherwise. Form corners by alternating lapping side members.

C. Provide nailers, blocking, tapered shims and spacers as required for a complete roofing assembly.

3.04 INSTALLATION OF CONSTRUCTION PANELS

A. Roof Nailers and Fascia Backing: Secure panels with long dimension perpendicular to framing members with ends staggered and over firm bearing.

B. Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.
1. Provide a 1/8-inch space between panel edge and end joints to allow for expansion.
2. Screw panels to framing; staples are not permitted.

3.05 WOOD BLOCKING AND NAILER INSTALLATION

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.

C. Provide solid wood blocking between framing members where require to support edges of curbs or other load-bearing items.

D. Perimeter wood nailers: spike together; assure anchorage into existing wood structure using 16d in first layer - 12-inches on center minimum unless otherwise noted.

3.06 TOLERANCES

A. Framing Members: 1/4 inch from true position, maximum.

B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.07 MISCELLANEOUS INSTALLATION

A. Install miscellaneous wood materials as required to conform to IBC and SFM requirements.

3.08 CLEANING

A. Waste Disposal: Comply with the requirements of Section 01 74 19 - Construction Waste Management and Disposal.
   1. Comply with applicable regulations.
   2. Do not burn scrap on project site.
   3. Do not burn scraps that have been pressure treated.
   4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.

B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.

C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

SECTION 07 01 50.19
PREPARATION FOR RE-ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Removal of existing roof and base flashings.

B. Removal of existing sheet metal flashings and wall panels.

1.02 RELATED REQUIREMENTS

A. Section 01 22 00 - “Unit Prices” unit prices for replacement wood sheathing and nailers where required.

B. Section 02 41 19 - Selective Structure Demolition.

C. Section 06 10 00 - Rough Carpentry.

D. Section 07 53 00 - Elastomeric Membrane Roofing.

E. Section 07 62 00 - Sheet Metal Flashing and Trim.

1.03 SUBMITTALS

A. Photographs: Show existing conditions of adjoining construction and site improvements, including exterior and interior finish surfaces that might be misconstrued as having been damaged by re-roofing operations. Submit prior to start of Work.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with affected mechanical and electrical work associated with roof penetrations.

B. Schedule work to coincide with commencement of installation of new roofing system.

1.05 PREINSTALLATION CONFERENCE

A. Preinstallation Meeting: Convene one week before starting work of this section.
   1. Meet with Owner, Architect, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, sheathing Installer, and installers whose work interfaces with or affects roofing, including installers of roof-mounted equipment.
   2. Review preparation and installation procedures related to roofing system tear-off and replacement including, but not limited to, the following:
      a. Verify items to be removed and items to remain or to be reinstalled.
      b. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, facilities needed to make progress and avoid delays.
      c. Review re-roofing preparation, including membrane roofing system manufacturer's written instructions.
      d. Existing roof drains and roof drainage during each stage of re-roofing and roof drain plugging and plug removal requirements.
      e. Examine sheathing substrate conditions and finishes for compliance with requirements, including flatness and fastening.
      f. Review structural loading limitations of roof deck.
      g. Review temporary protection requirements for existing and new roofing system.
      h. Review protection requirements for interior spaces, both occupied and unoccupied, of the building.
      i. Review base flashing, special roofing details, drainage, penetrations, equipment curbs, and condition of other construction that will affect reroofing.
      j. Shutdown of fire-suppression, fire-protection and fire alarm and detection systems.
      k. Timing and sequencing for shutdown of existing MEP equipment located on the roof.
      l. Existing conditions that may require notification of Architect before proceeding.

1.06 QUALITY ASSURANCE

A. Materials Removal Firm Qualifications: Installer of new membrane roofing system.

1.07 FIELD CONDITIONS

A. Do not remove existing roofing membrane when weather conditions threaten the integrity of the building contents or intended continued occupancy.

B. Maintain continuous temporary protection prior to and during installation of new roofing system.

C. Protect existing building to be re-roofed, adjacent buildings, walkways, exterior plantings and landscaping from damage or soiling from re-roofing operations.

D. Limit overall roof loads and equipment wheel loads on existing roofing to avoid damage to areas not scheduled for immediate replacement.

E. Weather Limitations: Proceed with roofing preparations only when existing and forecasted weather conditions permit work to proceed without water entering the building.

F. Owner will occupy portions of building immediately below re-roof areas. Conduct re-roofing so Owner's operations will not be disrupted. Provide Owner with not less than 48 hours' notice of activities that may affect Owner's operations.
   1. Place protective dust or water leakage covers over sensitive equipment or furnishings. Coordinate with Owner the shutdown of HVAC and/or fire-alarm or detection equipment if needed and the evacuation of occupants from below the work area(s) when/if necessary.
   2. Before working over structurally impaired areas of sheathing, if any are discovered, notify Owner to evacuate occupants from below the affected area. Verify that occupants below the work area have been evacuated before proceeding with work over the impaired deck area.

G. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.

H. Coordinate with Owner for timing of disconnection of existing mechanical equipment to permit continued possible operation of the existing facility during roof replacement activities.

PART 2 PRODUCTS

2.01 MATERIALS

A. Protection: Provide plastic sheets, tarps, roof membranes, and/or other appropriate products to use as protective coverings at roof repair and replacement locations exposed during the work. Provide weights, mechanical attachment or approved adhesives, to retain temporary protective coverings in position.
   1. Use protective coverings as necessary as temporary means to prevent moisture intrusion into building interior.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that existing roof surface is clear and ready for work of this section.

B. Inspect existing substrate, sheet metal flashings, nailers and sheathing for deterioration and damage. If nailers and/or sheathing have deteriorated, immediately notify Architect.

3.02 PREPARATION

A. Sweep roof surface clean of loose matter.

B. Remove loose refuse and dispose off site.

C. Coordinate with Owner to shut down air-intake equipment in the vicinity of the Work, when applicable. Cover air-intake louvers before proceeding with re-roofing work that could affect indoor air quality or activate smoke detectors in the ductwork.

D. During removal operations, have sufficient and suitable materials on-site to facilitate rapid installation of temporary protection in the event of unexpected rain.

E. Maintain roof drains in functioning condition to ensure roof drainage at end of each workday. Prevent debris from entering or blocking roof drains and conductors. Use roof drain plugs specifically designed for this purpose. Remove roof drain plugs at end of each workday, when no work is taking place or when rain is forecast.

1. If roof drains are temporarily blocked or unserviceable during performance of work, provide alternative drainage method to remove water and eliminate ponding. Do not permit water to enter into or under new or existing membrane roofing system.

3.03 MATERIAL REMOVAL

A. Remove only existing roofing materials that can be replaced with new materials the same day.

B. Remove sheet metal flashing and trim as indicated on Drawings.

C. Remove roofing membrane, perimeter base flashings, flashings around roof protrusions down to existing roof sheathing.

D. Remove existing cant strips, damaged wood blocking, nailers, and other components not shown on Drawing details, unless considered detrimental to system performance.

E. Raise existing curbs or install new curbs as required to accommodate new roofing assembly. Coordinate with Work of Section 02 41 19 - Selective Structure Demolition and Section 06 10 00 - Rough Carpentry.

F. Repair existing wood sheathing surfaces as necessary to provide smooth working surface for new roof assembly.
   1. Coordinate with Work of Section 06 10 00 - Rough Carpentry for identification and replacement of damaged wall sheathing.

G. If sheathing surface is not suitable for new roofing, or if structural integrity of sheathing is suspect, notify Architect immediately.

H. Existing Sheet Metal Flashing and Wall Panels: Where indicated as "existing", do not damage sheet metal flashings and wall panels associated with work to be performed or elsewhere during daily working activities.

3.04 ROOF TEAR-OFF

A. General: Notify Owner each day of extent of roof tear-off proposed for that day.

B. Comply with requirements specified in Section 02 41 19 - Selective Structure Demolition for removal of selected building elements.

C. Sheet Metal Removal: Detach and recycle existing sheet metal flashings where new flashings are to be installed as shown on the Drawings.
   1. Avoid damaging existing sheet metal flashings that are to remain.
   2. Existing flashings or metal elements that will remain but that are damaged beyond acceptable use are to be replaced with new flashing or elements that match existing.
   3. Immediately offload and transport sheet metal flashing to locations indicated by the Owner as conditions allow until permanent disposal is performed.

3.05 DECK PREPARATION

A. Inspect roof sheathing after tear-off of existing roofing system.

B. Verify that substrates are visibly dry and free of moisture at start of each day's work. Do not proceed with roofing work if moisture is present.

C. If sheathing surface is not suitable for receiving new roofing or if structural integrity of sheathing is suspect, immediately notify Owner and Architect. Do not proceed with installation until directed by Owner and Architect.

D. All damaged sheathing must be removed and replaced with new to matching existing.

E. Remove and replace damaged and deteriorating plywood wall sheathing and wood nailers in accordance with Section 01 22 00 - Unit Prices and Section 06 10 00 - Rough Carpentry upon authorization by Owner or Architect.

3.06 VAPOR BARRIER / TEMPORARY ROOFING

A. Install approved temporary roofing over areas to be re-roofed as specified in 07 53 00.

B. Prepare temporary roof to receive new roof assembly. Obtain approval for temporary roof substrate from roofing manufacturer and Architect before installing new roof.

3.07 INFILL MATERIALS INSTALLATION

A. After roof tear off, substrate inspection and repair, fill in tear-off areas with roof assembly.
   1. Installation of infill materials is specified in Section 07 53 00 - Elastomeric Membrane Roofing.
   2. Installation of wood blocking, curbs, nailers and wall sheathing is specified in Section 06 10 00 - Rough Carpentry.

3.08 FASTENER PULL-OUT TESTING

A. Perform fastener pull-out tests according to SPRI FX-1, and submit test report to Architect and Consultant before installing new roofing system.

3.09 PROTECTION

A. Provide temporary protective sheeting over uncovered sheathing surfaces.

B. Turn sheeting up and over parapets and curbing. Retain sheeting in position with weights.

C. Provide for surface drainage from sheeting to existing drainage facilities. Do not allow sheeting to pond water.

D. Do not permit traffic over unprotected or repaired sheathing surface.

E. Protect interior and adjacent exterior spaces from falling debris and asphalt dust during all phases of the roof replacement.

3.10 DISPOSAL

A. Collect demolished materials and place in containers. Promptly dispose of demolished materials not indicated to be recycled. Do not allow demolished materials to accumulate on-site. Transport and legally dispose of demolished materials off Owner's property.

END OF SECTION

SECTION 07 42 13
METAL WALL PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Manufactured metal panels for exterior wall panels, with related flashings and accessory components.

1.02 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Wall panel substrate.

B. Section 07 92 00 - Joint Sealants: Sealing joints between metal wall panel system and adjacent construction.

1.03 REFERENCE STANDARDS

A. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

B. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.

C. SMACNA (ASMM) - Architectural Sheet Metal Manual.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate dimensions, layout, joints, construction details, trim, and methods of anchorage.
   1. Shop drawings must reflect architectural detailing and conditions shown on the Drawings. Manufacturer's standard catalog-type details are not acceptable.

C. Product Data: Manufacturer's data sheets on each product to be used.

D. Samples: Submit two samples of wall panel and soffit panel, 6 inch by 6 inch in size illustrating finish color, sheen, and texture.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years of documented experience.

B. Installer Qualifications: Company specializing in installing products of the type specified in this section with minimum five years of documented experience.

C. Designer Qualifications: Design metal wall panel systems, including support framing under direct supervision of a Professional Engineer experienced in design of this Work and licensed in the State of Oregon.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.

B. Store prefinished material off the ground and protected from weather; prevent twisting, bending, or abrasion; provide ventilation; slope metal sheets to ensure proper drainage.

C. Prevent contact with materials that may cause discoloration or staining of products.

1.07 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Materials Manufacturer Warranty: Repair or replace defective materials for a period of 2 years from Date of Substantial Completion.

C. Finish Warranty: Provide manufacturer’s special warranty covering failure of factory-applied exterior finish on metal wall panels and agreeing to repair or replace panels that show evidence of finish degradation, including significant fading, chalking, cracking, or peeling within specified warranty period of 20 years from Date of Substantial Completion.

D. Warrant steel panel core substrate against rupture, structural failure or perforation due to exposure to normal atmospheric corrosion within a 25 year period from Date Substantial Completion.

E. Installer Warranty: Repair or replace products or components which fail due to faulty workmanship for a period of 2 years from Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers:
1. AEP Span: www.aepspan.com.
2. The Bryer Company
3. Taylor Metal Products: www.taylormetal.com.

2.02 MANUFACTURED METAL PANELS

A. Wall Panel System: Factory fabricated prefinished metal panel system, site assembled.
1. Provide exterior panels.
2. Delegated Design: Design and size components to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of wall as calculated in accordance with IBC. Design pressure as indicated on Structural Drawings.
3. Maximum Allowable Deflection of Panel: L/180 for length(L) of span.
4. Movement: Accommodate movement within system without damage to components or deterioration of seals, movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; and deflection of structural support framing.
5. Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.
6. Fabrication: Formed true to shape, accurate in size, square, and free from distortion or defects; pieces of longest practical lengths.
7. Corners: Factory-fabricated in one continuous piece with minimum 2 inch returns.

B. Exterior Wall Panels:
1. Profile: Vertical; Standing Seam. Basis of design Span-Lok hp by AEP Span.
2. Side Seams: Double-interlocked, tight-fitting, sealed with continuous gaskets.
3. Material: Precoated steel sheet, 22 gage, 0.0299 inch minimum thickness.
4. Panel Width: 16 inches.
5. Color: To match existing metal panel siding.

C. Internal and External Corners: Same material, thickness, and finish as exterior sheets; profile to suit system; shop cut and factory mitered to required angles.

D. Trim: Same material, thickness and finish as exterior sheets; brake formed to required profiles.
1. Provide base trim with factory-drilled drainage holes; minimum 3/16-inch ovals at maximum 24-inches on center. Drill before applying factory finish coatings.

E. Anchors: Stainless steel.

2.03 MATERIALS

A. Precoated Steel Sheet: Aluminum-zinc alloy-coated steel sheet, ASTM A792/A792M, Commercial Steel (CS) or Forming Steel (FS), with AZ50/AZM150 coating; continuous-coil-coated on exposed surfaces with specified finish coating and on panel back with specified panel back coating.

2.04 PANEL FINISH

A. Fluoropolymer Coating System: Manufacturer’s standard multi-coat thermocured coating system, including minimum 70 percent fluoropolymer color topcoat with minimum total dry film thickness of 0.9 mil; color and gloss as indicated.

B. Concealed Finish: Manufacturer's standard finish.

C. Colors: To match existing metal panels.

2.05 ACCESSORIES

A. Gaskets: Manufacturer's standard type suitable for use with system, permanently resilient; ultraviolet and ozone resistant.

B. Concealed Sealants: Non-curing butyl sealant or tape sealant.

C. Exposed Sealant: Elastomeric; silicone, polyurethane, or silyl-terminated polyether/polyurethane.
   1. Seam Sealant: Factory-applied, non-skinning, non-drying type.
   2. Color: To match metal panel color where visible.

D. Insect Screen: Charcoal colored fiberglass screening comprised of an 18 x 16 woven mesh.

E. Fasteners: Manufacturer's standard type to suit application; with soft neoprene washers, steel, hot dip galvanized. Fastener cap same color as exterior panel.

F. Field Touch-up Paint: As recommended by panel manufacturer.

G. Bituminous Paint: Asphalt base.

H. Self-Adhered Membrane (SAM): Self-adhesive sheet flashing, ASTM D1970/D1970M.
   1. Self-Adhered Membrane: Composite, self-adhesive, flashing product consisting of a pliable, rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than 0.036 inch.
      a. Verify material selection with Work of Section 07 25 00 - Weather Barriers for compatibility of materials.
      b. Available Products:
         1) BASF MasterSeal; MasterSeal AWB 920 FIB.
         2) Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Perm-A-Barrier Wall Flashing.
         3) Henry Company; Blueskin SA.
         4) Tremco Inc; ExoAir 110 or ExoAir 110 LT.
         5) Substitutions: See Section 01 60 00 - Product Requirements.

2.06 FABRICATIONS

A. Form sections true to shape, accurate in size, square and free from distortion or defects.

B. Form pieces in longest practical lengths.
   1. Factory fabricate all components for field assembly.
   2. Comply with indicated profiles, dimensions and structural requirements.

C. Fabricate corners in one continuous piece with minimum 18 inch returns.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that building framing members, including furring members are in alignment and within wall panel manufacturer's tolerances, ready to receive panels.

B. Verify that insulation has been properly installed.

3.02 PREPARATION

A. Install Z-Furring horizontally behind metal wall panels as indicated. Coordinate spacing and layout of Z-Furring with installers of exterior insulation.
   1. Install at 16 inches on center, unless otherwise indicated.
   2. Refer to applicable wall types for maximum spacing.
   3. Install shims as required to provide plumb and square application of metal wall panels.

B. Prior to installing insulation, verify that all holes in water-resistive barrier related to installing thermal spacers and/or Z-furring/hat channel have been sealed.

C. Friction fit insulation in place in accordance with insulation manufacturer's recommendations. Verify that insulation is tightly fitted with sides of insulation slightly compressed at each spacer.

1. Mechanically attach insulation with insulation manufacturer's recommended clips or pins.
2. Comply with requirements specified in Section 07 21 00 - Thermal Insulation.

3.03 INSTALLATION

A. Remove strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions.

B. Install panels on walls in accordance with manufacturer's instructions.

C. Protect surfaces in contact with cementitious materials and dissimilar metals with bituminous paint. Allow to dry prior to installation.

D. Fasten panels to structural supports; aligned, level, and plumb. Provide gaskets between panels and framing for thermal break at all fasteners.

E. Locate joints over supports.

F. Use concealed fasteners unless otherwise approved by Architect.

G. Seal and place gaskets to prevent weather penetration. Maintain neat appearance.
   1. Coordinate with other trades to ensure that panels, weather seals and flashing are properly installed where wall panels interface with Work of other Sections.

H. Install insect screen at openings to prevent insect intrusion.

I. Install wall panel edge trim as detailed. Ensure that weep holes and drainage channel in lower trim pieces are free of obstructions, dirt, debris, and sealant.
   1. Install in accordance with SMACNA (ASMM) and manufacturer's recommendations

3.04 TOLERANCES

A. Maximum Offset From True Alignment Between Adjacent Members Butting or In Line: 1/16 inch.

B. Maximum Variation from Plane or Location Indicated on Drawings: 1/4 inch.

3.05 CLEANING

A. Remove site cuttings from finish surfaces.

B. Clean and wash prefinished surfaces with mild soap and water; rinse with clean water, unless recommended otherwise by manufacturer. Maintain in a clean condition during construction.

END OF SECTION

SECTION 07 53 00
ELASTOMERIC MEMBRANE ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Elastomeric roofing membrane (EPDM), fully adhered.

B. Deck level rigid insulation

C. Plywood substrate board.

D. Cover board.

E. Flashings.

F. Walkway pads.

1.02 RELATED REQUIREMENTS

A. Section 06 10 00 - “Rough Carpentry” for wood curbs, nailers, and sheathing.

B. Section 07 01 50.19 - “Preparation for Re-Roofing” for methods of existing roof tear-off procedures and requirements.

C. Section 07 62 00 - “Sheet Metal Flashing and Trim” for sheet metal flashing and trim integral with roofing.

1.03 REFERENCE STANDARDS

A. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.

B. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.

C. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.

F. ASTM D4637/D4637M - Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane.

G. ASTM E108 - Standard Test Methods for Fire Tests of Roof Coverings.

K. NRCA ML104 - The NRCA Roofing and Waterproofing Manual.

L. UL 790 - Standard for Standard Test Methods for Fire Tests of Roof Coverings.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with installation of associated counterflashings installed under other sections.

1.05 PREINSTALLATION CONFERENCE

A. Preinstallation Meeting: Convene a preinstallation meeting prior to start of roofing operations.
   1. Meet with Owner, Architect, Consultant, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, and installers whose work interfaces with or affects roofing.
   2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
   3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
   5. Review structural loading limitations of roof deck during and after roofing.
   6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
   7. Review governing regulations and requirements for insurance and certificates if applicable.
   8. Review temporary protection requirements for roofing system during and after installation.

9. Review roof observation and repair procedures after roofing installation.

1.06 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating membrane materials, flashing materials, insulation, fasteners, and cover board.

C. Shop Drawings: Indicate joint or termination detail conditions, conditions of interface with other materials, setting plan for tapered insulation at roof drain sumps and scuppers, mechanical fastener layout, and walkway layout.
   1. Include fastening patterns for corner, perimeter and field-of-roof locations.

D. Selection Samples: Manufacturer's full range of available colors for walkway pads.

E. Samples for Verification: Submit two samples 6 by 6 inches in size illustrating the following:
   1. Sheet roofing of color required.
   2. Walkway pads of color required.
   3. Pre-fabricated flashing accessories.

F. Manufacturer's Certificate: Provide certificate signed by membrane manufacturer. Certify that products meet or exceed specified requirements.
   1. Submit evidence of compliance with performance requirements.
   2. Submit manufacturer's system specific assembly letter.

G. Manufacturer's Installation Instructions: Indicate membrane seaming precautions and perimeter conditions requiring special attention.

H. Product Test Reports: For components of roofing system, tests performed by manufacturer and witnessed by a qualified testing agency.

I. Manufacturer's Field Reports: Indicate procedures followed, ambient temperatures, humidity, wind velocity during application, and supplementary instructions given.

J. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.
   1. Manufacturer's warranty is evidence of satisfactory inspection. Report shall be submitted if warranty cannot be issued because of improper workmanship, or if manufacturer's inspection noted any conditions requiring correction.

K. Sample Warranties: For Manufacturer's and Installer's special warranties.

L. Warranty: Submit manufacturer and installer warranties and ensure forms have been completed in Owner's name and registered with manufacturer.

1.07 QUALITY ASSURANCE

A. Perform work in accordance with NRCA ML104 and manufacturer's instructions.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum twenty years of documented experience.
   1. The roofing membrane manufacturer must be an actual manufacturer of products used, no "Private Label" material, in which one company's name goes on a product manufactured by other is acceptable for this project.
   2. Manufacturer warranty shall be provided directly by the membrane manufacturer. Manufacturer must submit proof of Warranty Reserve Fund. No third party insurance backed warranties will be allowed.

C. Installer Qualifications: Company authorized and trained by the membrane manufacturer to install the specified roof system and acquire the specified warranty, and specializing in performing the work of this section with minimum ten years of documented experience. Manufacturer to provide documentation stating that bidding contractors meet this qualification.
   1. The installer shall be thoroughly experienced and be able to provide evidence of having at least ten years successful experience installing single ply EPDM roofing systems similar to the specified system(s).

2. Installer shall, upon request, provide a reference list with owner contact information of at least five projects of comparable size and scope within a 50 mile radius of this project, having been completed within the last 12 months, which may be observed by representatives of the Owner.
3. Installing contractor must have installed a minimum one million square feet of warranted roof systems by the submitted manufacturer. Manufacturer to provide documentation that bidding contractors meet this qualification.
4. Crew Experience and Supervision: Provide adequate number of experiences workers regularly engaged in this type of work who are skilled in the application techniques of the materials specified. Provide at least one thoroughly trained and experienced foreman/superintendent on the job at all time roofing is in progress.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in manufacturer's original containers, dry, undamaged, with seals and labels intact, labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency marking, and directions for storing and mixing with other components.

B. Store products in weather protected environment, clear of ground and moisture. Protect stored liquid material from direct sunlight.
   1. 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.

1.09 FIELD CONDITIONS

A. 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.

B. Have necessary waterproof canvas or plastic sheeting readily available in case of emergency. The Contractor will be held liable for any damage to building interior due to Contractor's negligence.

C. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.

D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

E. Adhesive applied roofing materials shall not be applied when dirt, dust, debris, oil, contaminants, etc. are present on the substrate being adhered to.

1.10 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.
   1. Special warranty shall include all components of membrane roofing system, including membrane, base flashings, roof insulation, fasteners and plates, cover boards, roofing accessories, adhesives, sealants and other components or roofing system.
   2. Pro-Rated System Warranties will not be accepted.
   3. Warranty Period: 20 years from Date of Substantial Completion.

C. Special Project Warranty: Submit roofing Installer's warranty, signed by Installer, covering Work of this Section, including all components of roofing system such as membrane roofing,

base flashing, roof insulation, fasteners, cover boards, and walkway pads for the specified warranty period.

1. Warranty Period: Two years from Date of Substantial Completion.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. General Performance: Installed roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roofing and base flashings shall remain watertight.
   1. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G152, ASTM G154, or ASTM G155.
   2. Impact Resistance: Roofing system shall resist impact damage when tested according to ASTM D3746/D3746M or ASTM D4272/D4272M.

B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.

C. IBC Basic Wind Speed Design Criteria: The completed membrane roofing system shall meet or exceed IBC Basic Wind Speed Design Criteria of 130 mph, 3 second gust duration, Exposure B, urban and suburban area. IBC uplift pressures shall be calculated in accordance with ASCE 7 “Minimum Design Loads for Buildings and Other Structures, but not less than the following:
   1. Field-of-Roof Uplift Pressure: 30.4 psf.
   2. Perimeter Uplift Pressure: 51.0 psf.
   3. Corner Uplift Pressure: 76.7 psf.

D. Exterior Fire-Test Exposure: ASTM E108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

E. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated. Identify products with appropriate markings of applicable testing agency.

2.02 SYSTEM DESCRIPTION

A. Roof Assembly at Roof Areas A and B:
   1. Fully adhered EPDM roofing system adhered to cover board which is adhered with urethane insulation adhesive to top layer rigid insulation. Rigid insulation consists of 2-layers of 2-inch thick polyisocyanurate insulation. First layer of insulation is mechanically attached to the structure and the second layer is adhered with urethane insulation adhesive. Insulation layers are installed over a vapor barrier / temporary roof.

B. Roof Assembly at Roof Area I:
   1. Fully adhered EPDM roofing system adhered to cover board which is mechanically attached to structure.

2.03 MANUFACTURERS

A. EPDM Membrane Materials:
   1. Carlisle SynTec Systems, Inc; Sure-Seal EPDM: www.carlisle-syntec.com.
   2. Firestone Building Products, LLC; RubberGard Platinum: www.firestonebpco.com.
   3. Johns Manville; JM EPDM NR: www.jm.com.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

2.04 ROOFING MEMBRANE AND ASSOCIATED MATERIALS

A. Elastic Sheet Membrane: Ethylene-propylene-diene-terpolymer (EPDM); non-reinforced; complying with minimum properties of ASTM D4637/D4637M.
   1. Thickness: 0.090 inch (90 mil), nominal.
   2. Color: Black.

B. Seaming Materials:

1. Field Seams: Minimum 6-inch splice tape.
2. Base Flashing Seams: Minimum 3-inch splice tape.

C. Elastic Sheet Membrane Flashing: EPDM sheet; conforming to the following:
1. Thickness: 0.060 inch 60 mil, nominal.
2. Color: Black.
3. Products:
a. Carlisle SynTec Systems; Sure-Seal EPDM.
b. Firestone Building Products; RubberGard EPDM.
c. Johns Manville; JM EPDM NR 60 MIL.

2.05 PLYWOOD WALL SUBSTRATE BOARD AND COVER BOARDS/SUBSTRATE BOARDS

A. Plywood Wall Substrate Board: As specified in Section 06 10 00 - Rough Carpentry.

B. Cover Board and Substrate Board: Glass mat faced gypsum panels, ASTM C1177/C1177M, fire resistant type, 1/2 inch thick.
1. Products:
a. Georgia-Pacific DensDeck Prime: www.gp.com/build.
b. USG Securock Glass-Mat Roof Board: www.usg.com.
2. Dimension: 4 foot by 4 foot maximum.
3. Method of Attachment: Installed in low rise foam adhesive.
a. Available Product: OlyBond 500 or approved equal.

2.06 INSULATION

A. Polyisocyanurate Board Insulation: Rigid cellular foam, complying with ASTM C1289, Type II, Class 1, cellulose felt or glass fiber mat both faces; Grade 2 and with the following characteristics:
1. Compressive Strength: 20 psi
2. Board Size: 48 by 96 inch for mechanically attached applications only.
3. Board Size: 48 by 48 for adhered applications.
4. Board Edges: Square.
5. Base Layer Method of Attachment: Mechanically fastened with approved fasteners and plates.
6. Top Layer(s) Method of Attachment: Adhered in low rise foam adhesive.
7. Manufacturer: As approved by membrane manufacturer.
8. Provide preformed saddles, crickets, tapered edge strips and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

B. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4-inch per 12-inches, at locations indicated on Drawings.

C. Provide preformed saddles, crickets, tapered edge strips and other insulation shapes as indicated on Drawings for sloping to drain.

D. Tapered Edge Strip: Rigid polyisocyanurate board of 24-inch wide, tapering from 0-inch to 2-inch thickness. Stack units to achieve required thickness as indicated on Drawings.

2.07 ACCESSORIES

A. General: Provide auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing.

B. Self-Adhered Elastic Sheet Membrane Flashing: Semi-cured EPDM flashing membrane factory laminated to cured seam tape.

C. Self-Adhered Uncured Elastic Sheet Membrane Flashing: Uncured EPDM flashing membrane factory laminated to splice tape.

E. Seaming Material: Manufacturer's standard, synthetic-rubber polymer primer, butyl splice tape with release film. Minimum 6-inch wide.

F. Lap Sealant: Manufacturer's standard, single-component sealant, colored to match membrane roofing.

G. Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.

H. Membrane Adhesive: Manufacturer's standard solvent based adhesive.

I. Surface Conditioner for Adhesives: Compatible with membrane and adhesives.

J. Insulation Adhesive: As recommended by insulation manufacturer.

K. Metal Termination Bars: Manufacturer's standard, predrilled aluminum bars, approximately 1 by 1/8 inch thick; with anchors.

L. Miscellaneous Accessories: Provide preformed cone and vent sheet flashings, molded pipe boot flashings, preformed inside and outside corner sheet flashings, reinforced EPDM securement strips, T-joint covers, in-seam sealants, termination reglets, cover strips and other accessories.

M. Walkway Pads: Factory-formed, nonporous, heavy-duty, solid-rubber, slip-resisting, surface-textured walkway pads, approximately 3/16 inch thick and acceptable to roofing system manufacturer.
   1. Size: As indicated.
   2. Surface Color: As selected from manufacturer's full range of available colors.

N. Safety Warning Line: Self-adhered 6-inch wide nominal 30-mil thick yellow unsupported TPO membrane compatible with EPDM membranes.

2.08 VAPOR BARRIER / TEMPORARY ROOF

A. Sheathing Paper: Red-rosin type, minimum 3 lb / 100 sq. ft.
   1. W.R. Meadows, Inc.; Red Rosin Paper
   2. Or approved.

B. Base Sheet: ASTM D 4601, Type II, non-perforated, asphalt-impregnated and coated, glass fiber sheet, dusted with fine mineral surfacing on both sides; suitable for application method specified, and as follows:
   1. Products:
      a. Carlisle SynTec; Sure MB
      b. Firestone Building Products: MB Base
      c. Johns Manville; PermaPly 28
      d. Or approved.

C. Ply Sheets: ASTM D 2178, Type VI, asphalt-impregnated, glass-fiber felt.
   1. Products:
      a. Carlisle SynTec; Type IV Glass Ply Felt
      b. Firestone Building Products; Ply IV
      c. Johns Manville; GlasPly IV
   2. 2-plies.
   3. Adhered over base sheet in ASTM D 312, Type III or IV roofing asphalt.
   4. Provide glaze coating of roofing asphalt over ply sheets at a minimum rate of 15-pounds per 100-square feet.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and site conditions are ready to receive work.

B. Verify deck is supported and secure.

C. Verify substrate is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.

D. Verify substrate surfaces are dry and free of snow or ice.

E. Verify that necessary wall sheathing and plywood substrate board has been installed and securely attached.

F. Verify that roof openings, curbs, and penetrations through roof are solidly set, and roof drain bodies are in place.

G. Verify that all curbs, wall surfaces, equipment supports and other roof penetrations that will receive roofing materials will allow the installation of full height flashings. Verify heights of all penetrations which are located within crickets and slope upgrades; extend penetrations where necessary.

H. 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.

I. Prepare existing roof system in accordance with requirements specified in Section 07 01 50.19 - Preparation for Re-Roofing.

3.02 PREPARATION

A. Clean substrate of dust, debris, moisture and other substances detrimental to roofing installation according to roofing manufacturer's written instructions. Remove sharp projections.
   1. Moisture includes rain, dew, ice, frost, snow and the like.
   2. Dust and debris includes dirt, oil, and other materials inherent in the substrate.

B. Prevent materials from entering and clogging conductors and from spilling or migrating onto surfaces of other construction.

C. Inspect all substrates for irregularities and defects that prohibit the proper installation of new roofing materials. Notify the Architect of all defects for proper correction, prior to installation of new materials.

D. Substrates shall be clean and dry, smooth, free of fins, raised edges, sharp edges, protruding or loose nails, and free of foreign material.

E. Prepare all surfaces and details in accordance with manufacturer's printed instructions and the Contract Documents.

F. Protect building surfaces and equipment from damage and contamination from roofing work.

G. 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.

H. Prepare existing roof system in accordance with requirements specified in Section 07 01 50.19 - Preparation for Re-Roofing.

3.03 VAPOR BARRIER / TEMPORARY ROOF

A. Sheathing Paper: Clean substrate of all dust and debris prior to installation. Loosely lay one course of sheathing paper, lapping edges and ends a minimum of 2-1/2-inches.

B. Base Sheet: Install lapped base-sheet mechanically fastened to roof deck over sheathing paper with approved fasteners and plates to resist uplift pressures when roof is “dried-in” with vapor barrier temporary roof.

C. Built-Up Vapor Retarder: Install two glass-fiber felt plies lapping each felt 19-inches over preceding felt. Embed each felt in a solid mopping of hot roofing asphalt. Glaze coat completed surface with hot roofing asphalt at a rate of 15-pounds per 100-square feet.

D. Completely seal vapor retarder at terminations, obstructions, and penetrations to prevent air movement into built-up roofing.

3.04 INSULATION INSTALLATION

A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with roofing system and insulation manufacturer's written instructions for installing roof insulation.

C. Roof level insulation assembly units that become wet or damaged shall be removed from the project site. Any wet or damaged insulation units which are installed must be removed.

D. Provide dimensional lumber stops and nailers at flanged penetrations and edges, including ridges and as otherwise shown on the Drawings. Provide additional stops as recommended by the manufacturer of the roofing materials.

E. Mechanically Fastened and Adhered Insulation:
   1. Install first layer of insulation to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
   2. Set each subsequent layer of insulation in ribbons of low rise urethane foam adhesive pressing and maintaining insulation in place. Provide temporary ballast to weigh down individual boards in order to achieve flush seams until board has fully bonded.
   3. Fasten insulation base layer to resist specified uplift pressure at corners, perimeters and field of roof according to roofing system manufacturer's written instructions.

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.
   1. Offset joints of insulation below a minimum of 6 inches in each direction.
   2. Cut and fit insulation within 1/4 inch of nailers, projections and penetrations.

G. Install tapered insulation under area of roofing to conform to slope as indicated on the Drawings.

H. Trim surface of insulation where necessary to achieve a flush finished condition that does not restrict flow of water.

3.03 COVER BOARD INSTALLATION

A. Install cover board over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches in each direction. Loosely butt cover boards together and adhere to insulation below.
   1. Adhere cover boards in ribbons of low rise urethane foam adhesive pressing and maintaining insulation in place. Provide temporary ballast to weigh down individual boards in order to achieve flush seams until board has fully bonded.
   2. Secure insulation to resist specified uplift pressure at corners, perimeters and field of roof according to roofing system manufacturer's written instructions.

3.04 MEMBRANE APPLICATION

A. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.

B. Shingle joints on sloped substrate in direction of drainage.

C. Adhere roofing membrane over area to receive roofing according to membrane roofing system manufacturer's written instructions.
   1. Start installation of roofing in presence of roofing system manufacturer's technical personnel.

D. Accurately align roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

E. Bonding Adhesive: Apply to substrate and underside of roofing at rate required by manufacturer and allow to partially dry before installing roofing. Do not apply to splice area of roofing.

F. In addition to adhering, mechanically fasten roofing securely at terminations, penetrations and perimeters.

G. Apply roofing with side laps shingled with slope of roof deck where possible.

H. Tape Seam Installation: Clean and prime both faces of splice areas, apply splice tape and firmly roll side and end laps of overlapping roofing according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of roofing terminations.

I. Coordinate installation of roof drains and sumps and related flashings.
   1. Spread sealant over deck-drain flange at roof drains and securely seal membrane roofing in place with clamping ring.

J. Repair tears, voids and lapped seams in roofing that do not comply with requirements.

K. Adhere protection sheet over membrane roofing at locations indicated.

3.06 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories and adhere to substrate according to roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean splice areas, apply seam tape and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.07 FINISHING UNBALLASTED SURFACES

A. Install walkway pads. Space pad joints to permit drainage.
   1. Avoid installation of walkway pads over drainage ways in a manner that prevents water from evacuation the roof.

B. Safety Warning Line: Install safety warning line where indicated.
   1. Layout temporary markings on surface of new roof membrane with dimension of 10'-0" from leading edges. Lines shall be straight and accurate with a tolerance of 1/2-inch in 10'-0".
   2. Clean surface of roof membrane and prime as required by material manufacturer.
   3. Align and adhere safety warning line membrane as indicated and per temporary markings with same tolerance. Butt all seams; do not overlap.

3.08 DAILY SEAL

A. On phased roofing, when the completion of flashings and terminations in not achieved by the end of the work day, provide a daily seal to temporarily close the membrane to prevent water infiltration.

B. Seal all tie-offs to prevent moisture from flowing under new work.

3.09 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for field quality control and inspection.

B. Require site attendance of roofing material manufacturers weekly during installation of the Work.

C. Technical Representative of material manufacturer shall perform the following services:
   1. Periodically observe work in progress.
   2. Be present to observe deck preparation, general installation procedures and final completion; submit documentation of manufacturer's final acceptance.
   3. Perform a punch list inspection upon Substantial Completion of the project indicating all items in need of attention, including conformance to manufacturer's published installation instructions and the Contract Documents.

D. Final Roof Inspection: Upon completion of the installation, arrange for an inspection to be made by a non-sales technical representative of the membrane manufacturer in order to determine whether or not corrective work will be required before the warranty will be issued. Notify the Owner and Architect seventy-two hours prior to the manufacturer's final inspection.

E. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.

F. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.10 CLEANING

B. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and conform to their documented instructions.

C. Repair or replace defaced or damaged finishes caused by work of this section.

3.11 PROTECTION

A. Protect installed roofing and flashings from construction operations.

B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials.

END OF SECTION

SECTION 07 62 00
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fabricated sheet metal items, including flashings, counterflashings, wall panels, gutters, downspouts, splash pans, and other items indicated in Schedule.

B. Stainless steel flashings with soldered seams.

C. Sealants for joints within sheet metal fabrications.

1.02 RELATED REQUIREMENTS

A. Section 06 10 00 - “Rough Carpentry” for wood nailers for sheet metal flashing and trim integral with roofing.

B. Section 07 01 50.19 - “Preparation for Re-Roofing” for methods of existing roof tear-off procedures and requirements.

C. Section 07 53 00 - “Elastomeric Membrane Roofing” for roofing system.

1.03 REFERENCE STANDARDS

A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix).

B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

C. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.

D. ASTM B32 - Standard Specification for Solder Metal.

E. ASTM C1311 - Standard Specification for Solvent Release Sealants.

F. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.

G. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.

H. ASTM D2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.

I. ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films.

J. SMACNA (ASMM) - Architectural Sheet Metal Manual.

K. SPRI ES-1 - Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems.

1.04 PREINSTALLATION CONFERENCE

A. Preinstallation Conference: Convene one week before starting work of this section. Conference shall be held in conjunction with conferences specified in Section 07 01 50.19 - Preparation for Re-Roofing and Section 07 53 00 - Elastomeric Membrane Roofing.

1. Insure that all parties whose work interfaces with roof system application are in attendance. These parties include, but are not limited to, the following:
    a. Owner.
    b. Architect.
    c. Building enclosure consultant.
    d. Contractor.
    e. Contractor's superintendent.
    f. Sheet metal contractor.
    g. Roofing installer.
    h. Roofing manufacturer's representative.

1.05 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies as indicated shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Design, fabricate and install flashings at roof edges in accordance with SPRI ES-1, except with basic wind speed of 130**.**

C. Water Infiltration: Provide sheet metal flashing and trim that does not allow water infiltration to building interior.

1.06 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details. Include the following:
   1. Identification of material, thickness, weight and finish for each item and location in Project.
   2. Roof plan indicating layout of radius coping including lengths between individual pieces.
   3. Details for forming sheet metal flashing and trim, including profiles, shapes, seams and dimensions.
   4. Details for joining, supporting and securing sheet metal flashing and trim, including layout of fasteners, cleats, clips, saddles and other attachments. Include pattern of seams.
   5. Details of termination points and assemblies, including fixed points.
   6. Details of special conditions.
   7. Details of connections to adjoining work.
   8. Detail formed flashing and trim at a scale of not less than 3 inches per 12 inches.

C. Samples: Submit two samples 6 x 6 inch in size illustrating metal finish color.

D. Warranties: Special warranties specified in this Section.

1.07 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA (ASMM) requirements and standard details, except as otherwise indicated.

B. Fabricator and Installer Qualifications: Company specializing in sheet metal work with ten years of documented experience.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

B. Prevent contact with materials that could cause discoloration or staining.

1.09 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Special Project Warranty: Submit Installer's warranty, on Installer's standard or customized form, signed by Installer, covering the Work of this Section, including all components of flashing and sheet metal against defects in materials and workmanship, for the following warranty period:
   1. Warranty Period: Two years from date of Substantial Completion.

C. Special Warranty on Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Hunter units when tested according to ASTM D2244.
      b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
      c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 SHEET MATERIALS

A. Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gage (0.0239 inch) thick base metal.

B. Pre-Finished Galvanized Steel: Provide aluminum-zinc alloy-coated steel according to ASTM A 792/A 792M, Class AZ50 coating designation, Grade 40; pre-painted by coil-coating process to comply with ASTM A 755/A 755M; minimum 24 gage (0.0239 inch) thick base metal.
   1. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system.
   2. Color: As chosen by Owner from manufacturer's standard color offerings.

C. Stainless Steel: ASTM A666, Type 304, soft temper, 22 gage (0.034 inch) inch thick; smooth No. 2D finish.

D. Lead: ASTM B749, 4 lbs / sq ft. thick, unless otherwise indicated.

2.02 ACCESSORIES

A. General: Provide materials and types of fasteners, solder, protective coatings, sealant and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal, unless otherwise indicated.

B. Fasteners: Wood screws, flat head screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and appropriate for the substrates encountered.
   1. Exposed Fasteners: Stainless steel hex head with EPDM bonded washers.
   2. Unexposed Fasteners: Stainless steel flat head.
   3. Blind Fasteners: High-strength stainless steel rivets suitable for metal being fastened.
   4. Masonry and Concrete Screw Anchors: Threaded stainless steel anchors with flat or hex heads. Impact driven fasteners are not acceptable. Provide EPDM bonded washers and finish to match color of metal being fastened where exposed to view.

C. Water Resistive Barrier (vertical surfaces): Water resistive / air barrier membrane; 26-mil thick, triple layer polypropylene fabric sheet; maximum permeance rating of 50 perm; self-adhering.
   1. Henry Company, Blueskin VP 160
   2. VaporShield, WrapShield SA
   3. GCP Applied Technologies; Perma-A-Barrier VPS

D. Self-Adhering, High-Temperature Sheet (SAHTS): Minimum 30 to 40 mils thick, consisting of slip-resisting polyethylene film coated on one side with a layer of butyl rubber adhesive.
   1. Service Temperature: 300 degrees F per ASTM D1204.
   2. Low-Temperature Flexibility: Unaffected at -20 degrees F per ASTM D1970/D1970M.
   3. Products:
      a. GCP Applied Technologies; Grace Ultra
      d. Protecto Wrap Company; Jiffy Seal Ice & Water Guard HT BUTYL
      c. Tremco Incorporated; ExoAir 110AT
      e. Substitutions: See Section 01 60 00 - Product Requirements.
   4. Locations of Use: Below sheet metal copings at parapet walls, behind fascia flashing, and where indicated on Drawings.

E. Sealant to be Concealed in Completed Work: Single-Component, Solvent-Release, Butyl Rubber Sealant, Polyisobutylene Plasticized, Heavy Bodied: ASTM C1311.
   1. Products:
      a. Pecora Corporation; BC-158.
      b. Tremco Incorporated; Butyl Sealant.
      c. Substitutions: See Section 01 60 00 - Product Requirements.
   2. Locations of Use:
      a. As indicated in Drawings.

F. Sealant to be Exposed in Completed Work: Single-Component, Nonsag, Fast-Curing, Silyl-Terminated Polyether Sealant: ASTM C920, Type X, Grade NS, Class 50, for Use NT, M, A, G and O.
   1. Products:
      a. BASF Building Systems; MasterSeal NP 150.
      b. Tremco Incorporated; Dymonic FC.
      c. ChemLink; M-1.
      d. Substitutions: See Section 01 60 00 - Product Requirements.
   2. Locations of Use:
      a. Exposed lap joints in sheet metal flashing and trim.

G. Solder: ASTM B32; Sn50 (50/50) type.

H. Stainless Steel Clamping Bands: Sizes as dictated by condition, screw type tightening system.

I. Strom Collars: 24 gage (0.025 inch) stainless steel.
   1. Basis of Design: SBC Industries, Model UMB or UMB-Bell.
   2. Or approved.

2.03 FABRICATION

A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA (ASMM) that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.
   1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
   2. Obtain field measurements for accurate fit before shop fabrication.
   3. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
   4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.

B. Shop Forming Requirements:
   1. Fabricate sheet metal flashing and wall liners as detailed and in accordance with reviewed shop drawings. Use the SMACNA Architectural Sheet Metal Manual as a guide and basis for fabrication wherever applicable.
   2. Provide for thermal movement of sheet metal.
   3. Angle bottom edges of exposed vertical surfaces to form hemmed drip edge.
   4. Fabricate to dimensions indicated on shop drawings.
   5. Fabricate sheet metal with lines, brakes and angles sharp and true, and surfaces free from oil canning, wave, warp or buckle.
   6. Fold exposed edges of sheet metal back to form 1/2-inch wide hem on side concealed from view.
   7. Provide galvanic protection in areas where dissimilar metals are adjacent to each other.
   8. Spring Locks: Provide flashing pieces fabricated to spring lock where indicated on the Drawings.

C. Field verify dimensions prior to fabrication.

D. Form sections true to shape, accurate in size, square, and free from distortion or defects.

E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal. Fabricate in sizes recommended by SMACNA (ASMM) for application, but not less than thickness of metal being secured.
   1. Provide continuous cleats on outside face of copings.

F. Form pieces in longest possible lengths.

G. Hem exposed edges on underside 1/2 inch; miter and seam corners.

H. Form material with standing seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams. Comply with SMACNA Manual

details (Figures 3-2 and 3-3 and other Figures as applicable to specific installation). Orient seams properly for direction of water flow.

1. Standing Seams: 1-inch high with sealant at folded corners. Fold the ends over to form watertight, 45 degree finished ends. All cap flashing is to have standing seams.
2. Solder-Lap Seams: 1-inch finish width; sweat full with solder.
3. Double S Lock Seams: Form 1-1/4 inch with S shaped seam on each edge of flashing sheet for concealed fastening.
4. Solder lap seams around roof scuppers. Solder exposed gutter and downspouts seams. Finish not less than 1-inch wide.

I. Fabricate corners of flashings from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant. Solder galvanized steel that is not prefinished. Do not solder prefinished steel.

1. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.

J. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.

K. Fabricate flashings to allow toe to extend 4 inches over roofing. Return and break edges.

2.04 ROOF DRAINAGE SHEET METAL FABRICATIONS

A. Continuous Hanging Gutters: Fabricate to cross section complete with end pieces, outlet tubes, and other accessories as required. Furnish flat-stock gutter spacers and gutter brackets fabricated from same metal as gutters, of size recommended by SMACNA but not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, and gutter accessories from same metal as gutters.

1. Gutter Style: Continuous, seamless “6-K” style hanging gutter.
2. Expansion Joints: Butt type with cover plate.
3. Sheet Metal: Pre-coated galvanized steel as specified in this section.
4. Sheet Metal Color: As selected by Owner from manufacturer’s standard color offerings.
5. Attachment: Gutter brackets and hangers
   a. Hangers: Hangfast Gutter Hangers manufactured Raytec LLC.
   b. Brackets: As indicated on Drawings.
6. Sealant: Aluminum Pigmented SBR Rubber Sealant
   a. Henkel Corporation; OSI Gutter Seal
   b. Tremco Incorporated; Gutter Seal
   c. Alcoa; Gutter Seal

B. Downspouts: Fabricate rectangular downspouts complete with mitered elbows. Furnish with metal hangers, from same material as downspouts, and anchors.

1. Fabricated Hanger Style: Fig 1-35B according to SMACNA’s “Architectural Sheet Metal Manual”.
2. Sheet Metal: Pre-coated galvanized steel as specified in this section.
3. Sheet Metal Color: As selected by Owner from manufacturer’s standard color offerings

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not proceed with Work until construction to receive the Work is completed.

B. Examine substrates and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected. Surfaces to receive sheet metal shall be clean, even, smooth, dry and free from defects and projections that might adversely affect the application. Verify slope prior to installation.

C. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.

D. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 PREPARATION

A. Verify that surfaces to receive sheet metal have been covered with flashing membrane specified in Section 07 53 00 - Elastomeric Membrane Roofing. Notify Contractor is this has not been installed.
   1. Refer to Drawings for membrane and sheet metal application.

3.03 INSTALLATION

A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and SMACNA (ASMM). Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

B. Install Work watertight and weathertight, without oil canning, buckles, tool marks, fastening stresses, distortion or defects which impair strength or mar appearance.

C. Roof-Edge Flashings: Secure metal flashings at roof edges according to Section 1504.5 of the Oregon Structural Specialty Code.

D. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection.

E. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.
   1. Coat back side of stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
   2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet.

F. Insert flashings into reglets to form tight fit. Secure in place with lead wedges. Seal flashings into reglets with sealant.

G. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.

H. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

I. Install high-temperature self-adhered membrane (SAHTS) flashing where indicated. Install under all copings except where roof membrane extends under the full width of coping. Apply primer if required by manufacturer. Apply in shingle fashion to shed water, with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps with roller. Cover within 14 days or as required by SAHTS manufacturer.

J. Seal metal joints watertight.

K. Solder metal joints for full metal surface contact for flashings that are not prefinished. After soldering, wash metal clean with neutralizing solution and rinse with water.
   1. Clean and flux metals prior to soldering.
   2. Perform soldering with a heavy soldering copper of blunt design, properly tinned for use.
   3. Perform soldering slowly with a wall heated surface and fill with solder.
   4. Do not solder coil-coated galvanized sheet steel.

L. Cleating at Seams: For size and spacing, refer to Drawings and SMACNA (ASMM). Secure one end with two fasteners and fold the cleat over the fastener heads. Unless otherwise indicated, use 2-inch by 3-inch long cleats of the same material and thickness of metal being installed.

M. Continuous Flashing Cleats: Secure cleats with annular threaded or ring-shank nails long enough to penetrate the wood nailer at least 1-1/4 inches. Nail heads to be at least 3/16-inch in diameter. Alternatively, cleats may be secured with minimum No. 8 screws long enough to

penetrate the nailer 3/4-inch or penetrate metal 3/8-inch. Provide fasteners at 6 inches on center or closer. Fastener frequency should be doubled in the building corner regions.

N. Parapet Scuppers: Install scuppers where indicated through parapet. Continuously support scupper, set to correct elevation, and seal flanges to interior wall face, over cants or tapered edge strips, and under roofing membrane. Install face plate as indicated on Drawings.

O. Pipe or Post Counterflashing (Storm Collar): Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending a minimum of 4 inches over base flashing. Install stainless-steel draw band and tighten.

P. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints a minimum of 4 inches and bed with sealant. Secure in a waterproof manner by means of snap-in installation and sealant or lead wedges and sealant.

Q. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.

R. Opening Flashings in Frame Construction: Install continuous head, sill, jamb and similar flashings to extend 4 inches beyond wall openings.

S. Wall Flashing: Fabricate and install with interlocking seams at bottom as indicated in SMACNA Figure 3-9 with alternate fastening method. Provide 24 inch (610 mm) wide panels with flat seams (Alternate Section A-A).

T. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

U. Connect gutters to downspouts with leaders. Seal connection watertight.

V. Set splash pans under downspouts ad indicated on Drawings.

3.05 ROOF-DRAINAGE SYSTEM INSTALLATION

A. General: Install sheet metal roof-drainage items to produce complete roof-drainage system according to cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.

B. Hanging Gutters: Provide continuous gutters profiled as indicated on Drawings. Provide for thermal expansion. Attach gutters at fascia to firmly anchor into position. Provide end closures and seal watertight with sealant. Slope to downspouts.
   1. Anchor gutters with gutter hangers and brackets as indicated on Drawings.

C. Downspouts: Join sections with 1-1/2-inch telescoping joints.
   1. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately 60 inches o.c.
   2. Connect downspouts to underground drainage system.
   3. Provide clean-out at connection to underground storm drainage system as indicated on Drawings.

3.04 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for field inspection requirements.

B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

3.05 SCHEDULE

A. Fabricate sheet metal flashing and trim from the following materials of the minimum thicknesses indicated, unless otherwise required on the Drawings or to meet performance requirements.

B. Parapet Wall Scupper Sleeves: Fabricate scuppers of dimensions required with closure flange trim to exterior, 4-inch- wide wall flanges to interior, and base extending 4 inches beyond cant

or tapered strip into field of roof. Make provisions for tapered sump and associated cant strip as detailed.
1. Stainless Steel: 24 gage (0.025 inch) thick.
2. Joint Style: Soldered.

C. Scupper Face Plate: Fabricate to profiles indicated on Drawings.
1. Pre-Finished Galvanized Sheet: 24 gage (0.0239 inch) thick.
2. Joint Style: Lapped, riveted and sealed.

D. Conductor Heads: Fabricate conductor heads with flanged back and stiffened top edge and of dimensions and shape indicated complete with outlet tubes, exterior flange trim and built-in overflows.
1. Pre-Finished Galvanized Steel: 24 gage (0.0239 inch) thick.

E. Copings: Fabricate in minimum 96-inch-long, but not exceeding 10-foot-long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and drill elongated holes for fasteners on interior leg. Miter corners, seal watertight.
1. Pre-Finished Galvanized Steel: 24 gage (0.0239 inch) thick.
2. Joint Style: Standing seam.

F. Saddles: Fabricate concealed saddles fully welded and watertight.
1. Stainless Steel: 24 gage (0.025 inch) thick.
2. Joint Style: Soldered.

G. Cleats:
1. Galvanized Steel: 22 gage (0.030 inch) thick.
2. Joint Style: Lapped and sealed.

H. Counterflashing:
1. Pre-Finished Galvanized Steel: 24 gage (0.0239 inch) thick.
2. Joint Style: Lapped and sealed with interlocking hems.

I. Kerf-Cut Counterflashing:
1. Stainless Steel: 24 gage (0.025 inch) thick.
2. Joint Style: Lapped and sealed.

J. Drip Edge Metal:
1. Pre-Finished Galvanized Steel: 24 gage (0.0239 inch) thick.
2. Joint Style: Lapped and sealed with interlocking hems.

K. Rake Edge Metal:
1. Pre-Finished Galvanized Steel: 24 gage (0.0239 inch) thick.
2. Joint Style: Lapped and sealed with interlocking hems.

L. Seismic Joint Cover Flashing:
1. Pre-Finished Galvanized Steel: 24 gage (0.0239 inch) thick.
2. Joint Style: Standing seam.

M. Raised Edge Metal:
1. Pre-Finished Galvanized Steel: 24 gage (0.0239 inch) thick.
2. Joint Style: Lapped and sealed with interlocking hems.

N. One or Two Piece Storm Collar Flashing with Hose Clamp:
1. Stainless Steel: 26 gage (0.016) thick.
2. Joint Style: Soldered.
3. Basis of Design: SBC Industries; UMB or UMB-BELL

O. Miscellaneous Flashings: Fabricate with profiles as shown on Drawings and from sheet metal materials as indicated.

Q. Splash Pans: Stainless Steel: 22 gage (0.031 inch) thick.

1. Joint Style: Soldered.

END OF SECTION

SECTION 07 72 00
ROOF ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Roof hatches.

B. Non-penetrating pedestals.

C. Roof top pipe supports.

D. Roof hatch railing system.

E. Ladder safety post.

F. Roof edge railing system.

1.02 RELATED REQUIREMENTS

A. Section 05 50 00 - Metal Fabrications: Ladders to receive ladder safety posts.

B. Section 07 53 00 - Elastomeric Membrane Roofing: Roofing systems to receive roof accessories.

C. Section 07 62 00 - Sheet Metal Flashing and Trim: Roof accessory items fabricated from sheet metal.

1.03 REFERENCE STANDARDS

A. 29 CFR 1910.23 - Ladders.

B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

1.04 COORDINATION

A. Coordinate layout and installation of roof accessories with roofing membrane and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.

B. Field Measurements: Where handrails and railings are indicated to fit to other construction, check actual dimensions of other construction by accurate field measurements before fabrication.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used.
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
   4. Maintenance requirements.

C. Shop Drawings for Ladder Safety Posts: Show profiles, accessories, location, dimensions and interface with ladder. Show interface with ladders specified in Section 05 50 00 - Metal Fabrications.

D. Shop Drawings: Submit detailed layout developed for this project and provide dimensioned location and number for each type of roof accessory.

E. Samples: Submit manufacturer’s samples of each size of rooftop pipe support specified.

F. Warranty Documentation:
   1. Submit manufacturer warranty.
   2. Ensure that forms have been completed in Owner's name and registered with manufacturer.

G. Operation and Maintenance Data: For roof accessories to include in operation and maintenance manuals. Submit manufacturer's maintenance instructions, describing semi-annual visual inspection of rooftop pipe supports and realignment as necessary.

1.06 DELIVERY, STORAGE, AND HANDLING

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

B. Store products under cover and elevated above grade.

1.07 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 ROOFTOP PIPE SUPPORTS

A. Supports small rooftop pipes with engineered, prefabricated pipe supports.

B. Installs without roof penetrations or damage to membrane roofing.

C. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. OMG Roofing Products
      a. Model: Height Adjustable Strut.
      b. Material: Smooth, flexible, black, EPDM rubber.
      c. Protects roof system from damage due to movement.
      d. UV stable
      e. First Strut Channel: Low profile, 1-5/8-inch, galvanized steel, accepts standard strut clamps placed on top of base support.
      f. Second Strut Channel:
      g. Low profile, placed above first strut channel, 1-5/8-inch, galvanized steel, accepts standard strut clamps.
      h. Height: Adjustable with 2, zinc-plated threaded rods and nuts.
      i. Supports sit freely on roof.
      j. Pipe Support Heights: Adjustable from 4 inches (after removing second strut channel or setting it above pipes) to 10 inches.
      k. Width at Top: 10 inches.
      l. Accommodates single or multiple pipes.
      m. Supports Nominal Pipe Size: Single pipe up to 6 inches.
      n. Maximum Load Capacity per Support: 160 lbs.
   2. Or approved.

2.02 ROOF HATCHES

A. Roof Hatch Manufacturers:
   1. Bilco Company: www.bilco.com/#sle.
   2. Substitutions: Not permitted.

B. Roof Hatches, General: Factory-assembled aluminum frame and cover, complete with operating and release hardware.
   1. Style: Provide flat metal covers unless otherwise indicated.
   2. Mounting Substrate: Provide frames and curbs suitable for mounting on flat roof deck sheathing with insulation.
   3. For Ladder Access RH-1: Single leaf; 30 by 36 inches.

C. Frames and Curbs: One-piece curb and frame with integral cap flashing to receive roof flashings; extended bottom flange to suit mounting.
   1. Material for Roof Hatches: Mill finished aluminum, 11 gage, 0.0907 inch thick.
   2. Insulation: Manufacturer's standard; 1 inch rigid fiberboard, located on outside face of curb.
   3. Curb Height: 12 inches from finished surface of roof, minimum.

D. Metal Covers: Flush, insulated, hollow metal construction.
   1. Capable of supporting 40 psf live load.
   2. Material for Roof Hatches: Mill finished aluminum; outer cover 11 gage, 0.0907 inch thick, liner 0.04 inch thick.
   3. Insulation: Manufacturer's standard 1 inch rigid glass fiber.
   4. Gasket: Neoprene, continuous around cover perimeter.

E. Safety Railing System: Manufacturer's standard accessory safety rail system mounted directly to curb.
   1. Comply with 29 CFR 1910.23, with a safety factor of two.
   2. Manufacturers:
      a. BILCO Company; Bil-Guard 2.0: www.bilco.com/#sle.
      b. Substitutions: Not permitted.

F. Hardware: Type 316 stainless steel, unless otherwise indicated or required by manufacturer.
   1. Lifting Mechanisms: Compression or torsion spring operator with shock absorbers that automatically opens upon release of latch; capable of lifting covers despite 10 psf load.
   2. Hinges: Heavy duty pintle type.
   3. Hold open arm with vinyl-coated handle for manual release.
   4. Latch: Upon closing, engage latch automatically and reset manual release.
   5. Manual Release: Pull handle on interior.
   6. Locking: Provide latch with interior tee handle and with flush or recessed exterior keyed cylinder (dead bolt). Dead bolt shall be keyed to match building locks: Schlage Interchangeable Core (IC) cylinder.

2.03 NON-PENETRATING ROOFTOP SUPPORTS/ASSEMBLIES

A. Non-Penetrating Rooftop Support/Assemblies: Manufacturer-engineered and factory-fabricated, with pedestal bases that rest on top of roofing membrane, and not requiring any attachment to roof structure and not penetrating roofing assembly.
   1. Design Loadings and Configurations: As required by applicable codes.
   2. Support Spacing and Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
   3. Steel Components: Stainless steel, or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A123/A123M.
   4. Hardware, Bolts, Nuts, and Washers: Stainless steel, or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A153/A153M.

B. Roof Crossover Assembly (RCA): Stepped Bridge Crossover.
   1. Basis of Design: Miro Industries 2 Step Bridge Crossover.

2.04 ROOF HATCH RAILING SYSTEM

A. Railing System: Provide manufacturer's standard railing system that directly attaches to hatch curbs.

B. Characteristics:
   1. Safety yellow color.
   2. Railing system shall attach to cap flashing of the roof hatch and shall not penetrate any roofing material.
   3. Meet the requirements of OSHA 29 CFR 1910.23 and OSHA strength requirements with a factor of safety of no less than two.
   4. Provide self-closing gate.
   5. Posts and Rails: Round reinforced fire retardant fiberglass treated with a UV inhibitor.
   6. Hardware:
      a. Mounting Brackets: 1/4 inch thick hot dip galvanized steel.
      b. Hinges and Post Guides: 6063-T5 aluminum.
      c. Fasteners: Type 316 stainless steel.

C. Basis-of-Design Product: Bil-Guard 2.0 Hatch Safety Railing System Model RL2 sized for roof hatch manufactured by Bilco Company.

2.05 LADDER SAFETY POSTS

A. Ladder Safety Post: Provide pre-assembled safety post at each vertical ladder serving a roof access hatch.

B. Performance Characteristics:
   1. Tubular post which shall lock automatically when fully extended.
   2. Have controlled upward and downward movement.
   3. Have a release lever to disengage the post to allow it to be returned to its lowered position.
   4. Have adjustable mounting brackets to fit ladder rung spacing indicated and clamp brackets to accommodate ladder rungs of size indicated.
      a. Refer to Section 05 50 00 - Metal Fabrications and drawings for ladders.
   5. Fabricate safety post to comply with OSHA 1910.27 for fixed ladders. Must support 200 pound load.

C. Post: High strength square tubing. Provide a pull up loop at the upper end of the post to facilitate raising the post.

D. Finish: Powder coat paint, Safety Yellow.

E. Balancing Spring: Stainless steel spring balancing mechanism to provide smooth, easy, controlled operation when raising and lowering the safety post.

F. Hardware: Type 316 stainless steel.

G. Material:
   1. Hot-dipped galvanized steel.

H. Basis-of-Design Product:
   1. Model LU-2 LadderUp Safety Post manufactured by Bilco Company.

2.06 ROOF EDGE RAILING SYSTEM

A. Roof Edge, Elevated Platform Fall Protection: Provide permanent pedestrian barrier system, including railings, and mounts.
   1. Basis of Design: Peak Fall Protection Roof Mounted Guard Rail; Series RM-GR 1000-GALV; www.peak-fp.com.
   2. Standards: System shall have top and mid rail in accordance with OSHA Standards - 29 CFR 1910.29 (b).
   3. Structural Load: 200 lb (90.7 kg), minimum, in any direction to all components in accordance with OSHA Regulation 29 CFR 1926.502.
   4. Height: 42 inches (1067 mm), nominal above walking surface.
   5. Railings: 1-1/4 inch schedule 40 galvanized steel pipe, free of sharp edges and snag points.
   6. Mounting Style: Deck Mount - railings non-removable.
   7. Quality/Standards Certifications: Manufacturer must be American Welding Society welding qualified for Welding Standards AWS D1.1 & AWS D1.3 Third party qualification documentation required prior to shipment.

B. Finish: Hot-dipped zinc galvanized.

PART 3 EXECUTION

4.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. Verify substrate openings are coordinated with frame sizes before proceeding with installation.

C. Field verify as-built conditions and sizes and profiles of ladders for accuracy to fit ladder safety posts prior to fabrication.

D. Examine rooftop and membrane roofing to receive rooftop pipe supports.

E. Notify Architect of conditions that would adversely affect installation or subsequent use.

F. Do not begin installation until unacceptable conditions are corrected.

4.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using methods recommended by manufacturer for achieving acceptable results for applicable substrate under project conditions.

C. Clear membrane roofing of debris to allow base of each rooftop pipe support to sit flat and roofing.

4.03 INSTALLATION

A. Install in accordance with manufacturer's instructions, in manner that maintains roofing system weather-tight integrity.

B. Install rooftop pipe supports in accordance with manufacturer’s instructions at location indicated on the Drawings.

C. Spacing of rooftop pipe supports:
   1. Pipe Diameters 2 inches to 5 inches: Maximum 10 feet apart.
   2. Pipe Diameter 1-1/2 inches: Maximum 8 feet apart.
   3. Pipe Diameters less than 1-1/2 inches: Maximum 6 feet apart.
   4. Place 1 additional support at every union and source and along with 1 at side of junctions.

4.04 SAFETY

A. Drawings and specifications do not include design or construction details or instructions relating to contractor's safety precautions or to means, methods, techniques, sequences or procedures required for contractor to perform Work.

B. Contractor shall provide necessary shoring, railing, barricades, protective devices, safety instructions and procedures to perform Work safely and to comply with safety requirements of the governing authorities.

4.05 CLEANING

A. Clean installed work to like-new condition.

4.06 PROTECTION

A. Protect installed products until completion of project.

B. Protect installed rooftop pipe supports to ensure that, except for normal weathering, supports will be without damage or deterioration at time of Substantial Completion.

C. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 07 72 60
FALL PROTECTION DEVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Roof tie-down system and fall arrest for worker safety.

1.02 RELATED REQUIREMENTS

A. Section 01 79 00 - Demonstration and Training: Detailed requirements.

1.03 REFERENCE STANDARDS

A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards.

B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.

C. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

1.04 PREINSTALLATION CONFERENCE

A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.
   1. Include attendance by roofing installer to coordinate interface with existing and re-roof conditions and proper flashing of all roof penetrations.

1.05 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design fall protection system capable of withstanding loads and stresses within limits and under conditions specified in OSHA and other applicable safety codes, including comprehensive engineering analysis by a qualified professional engineer licensed in the State of Oregon.

1.06 SYSTEM DESCRIPTION

A. Provide structural fall restraint and fall arrest system capable of withstanding loads and stresses within limits and under conditions specified in OSHA and other applicable safety codes.
   1. Provide fall protection anchors permanently attached to roof structure.

B. Design Requirements: Anchors and accessories comprising system of following types:
   1. Roof anchors, spaced as indicated, for safety snap connection by individual workers capable of withstanding a minimum 5000 pound load or safety factor of 2 and meeting the requirements of OSHA 1926.502(d)(8).

C. Performance Requirements: System and components tested for the resistance of the following loads:
   1. Fall Restraint: 4 Users.
   2. Fall Arrest: 2 Users.
   3. Design Tie-back anchors to resist at least 5000 pounds applied in any direction at a height of 8-inches above top of roof.

1.07 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: For each type of device specified, including manufacturer's standard fabrication details and installation instructions.

C. Shop Drawings: Show layout, profiles and anchorage details.
   1. Provide calculations stamped by a Professional Engineer experienced in design of this Work and licensed in the State of Oregon.

D. Test Reports: Indicate anchor fabrication compliance with performance requirements.

E. Maintenance Data: Written instructions for maintenance of fall prevention safety devices to be included in the Operation and Maintenance Manual.

F. Signage: Provide laminated sign showing system layout and usage notes, to be installed at each roof access.

G. Warranty Documentation: Submit manufacturer's warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.08 QUALITY ASSURANCE

A. Designer Qualifications: Perform design under direct supervision of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than ten years of continuous documented experience and exhibiting records of successful in-service acceptability and performance. Firm must employ personnel dedicated to provide regularly scheduled Authorized and Competent Personnel Training courses to comply with OSHA requirements for Owner's personnel.

C. OSHA Standards: Comply with Occupational Safety and Health Administration Standards for the Construction Industry 29 CFR 1926.500 Subpart M (Fall Protection), and with applicable State Administrative Code safety standards for Fall Restraint and Fall Arrest.

D. Source Limitation: Obtain all roof anchors through one source from a single manufacturer.

E. Testing: Perform quality control tests for each system in accordance with manufacturer's requirements.

1.09 COORDINATION

A. Coordinate installation of anchors to existing structural deck to meet requirements of roof anchor manufacturer.

B. Coordinate sequencing of placement of roofing system insulation and flashing to ensure water-tight integrity of roof.

1.10 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a one year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis-of Design Manufacturer: Guardian Fall Protection Inc.

B. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 MATERIALS

A. Steel Plates, Bars: ASTM A36/A36M.

B. Steel Pipe: ASTM A53/A53M.

C. Roof Anchors: Guardian CB Series, each a welded assembly consisting of top U-bolt eyelet, pipe upright and baseplate.
   1. Steel Upright: 2-1/2 inch ID steel pipe, Schedule 80 pipe, height to suit roof construction.
   2. Steel U-Bolt: 5/8-inch diameter U-bar, galvanized steel.
   3. Base Plate: 3/8-inch steel plate punched with holes for attachment to roof deck.

2.03 FABRICATION

A. Fabricate work true to dimension, square, plumb, level and free from distortions or defects detrimental to appearance and performance.

B. Prepare, treat and coat galvanized metal to comply with manufacturer's written instructions. Prepare galvanized metal by removing grease, dirt, oil, flux and other foreign matter.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine framing and substrate and verify conditions comply with structural requirements for proper system performance.

B. Proceed with installation of roof anchors only after verifying conditions are satisfactory.

3.02 INSTALLATION

A. General: Install fall protection systems in accordance with manufacturer's instructions and recommendations.

B. Provide on-site inspection and supervision of installation by factory-trained representative.

C. Install at locations indicated on Drawings, unless manufacturer recommends closer spacing. Confirm changes in location with Structural Engineer.
   1. Provide plan indicating any deviations of installed anchor locations.

3.03 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Provide manufacturer's field representative to inspect installation.

C. Test 100 percent of anchors in accordance with manufacturer's recommendations.

3.04 DEMONSTRATION

A. Instruct Owner's personnel in proper use and maintenance of fall prevention safety devices.
   1. Use operation and maintenance data as reference during demonstration.
   2. Turn over accessories to Owner.

B. Test and adjust system devices. Replace damaged or malfunctioning items.

END OF SECTION

SECTION 07 92 00
JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Joint sealants.

B. Joint backings and accessories.

1.02 RELATED REQUIREMENTS

A. Section 07 24 00 - Exterior Insulation and Finish Systems Repair.

B. Section 07 62 00 - Sheet Metal Flashing and Trim: Sealants in sheet metal flashing and trim assemblies.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.
   1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
   2. List of backing materials approved for use with the specific product.
   3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
   4. Substrates the product should not be used on.
   5. Substrates for which use of primer is required.
   6. Installation instructions, including precautions, limitations, and recommended backing materials and tools.
   7. Sample product warranty.
   8. SWRI Validation: Provide currently available sealant product validations as listed by SWRI (VAL) for specified sealants.

C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.

D. Joint-Sealant Schedule: Include the following information:
   1. Joint-sealant application, joint location, and designation.
   2. Joint-sealant manufacturer and product name.
   3. Joint-sealant formulation.
   4. Joint-sealant color.

E. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.

F. Preinstallation Field Adhesion Test Plan: Submit at least two weeks prior to start of installation.

G. Field Quality Control Plan: Submit at least two weeks prior to start of installation.

H. Preinstallation Field Adhesion Test Reports: Submit filled out Preinstallation Field Adhesion Test Reports log within 10 days after completion of tests; include bagged test samples and photographic records.

I. Field Quality Control Log: Submit filled out log for each length or instance of sealant installed, within 10 days after completion of inspections/tests; include bagged test samples and photographic records, if any.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section and with at least five years of documented experience.

C. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.

D. Preinstallation Field Adhesion and Compatibility Test Plan: Include destructive field adhesion testing of one sample of each combination of sealant type and substrate (substrates to include, but are not limited to, roofing membrane and all types of self-adhered membrane), except interior acrylic latex sealants, and include the following for each tested sample.
   1. Identification of testing agency.
   2. Name(s) of sealant manufacturers' field representatives who will be observing
   3. Preinstallation Field Adhesion Test Log Form: Include the following data fields, with known information filled out.
      a. Substrate; if more than one type of substrate is involved in a single joint, provide two entries on form, for testing each sealant substrate side separately.
      b. Test date.
      c. Location on project.
      d. Sealant used.
      e. Stated movement capability of sealant.
      f. Test method used.
      g. Date of installation of field sample to be tested.
      h. Date of test.
      i. Copy of test method documents.
      j. Age of sealant upon date of testing.
      k. Test results, modeled after the sample form in the test method document.
      l. Indicate use of photographic record of test.
   4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.
      a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1.1 in ASTM C1193 or Method A, Tail Procedure in ASTM C1521.
         1) For joints with dissimilar substrates, verify adhesion to each substrate separately, extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

E. Field Quality Control Plan:
   1. Visual inspection of entire length of sealant joints.
   2. Destructive field adhesion testing of sealant joints.
      a. For each different sealant and substrate combination, allow for one test every 100 feet in the first 1000 linear feet, and one test per 1000 linear feet thereafter, or once per floor on each elevation.
      b. If any failures occur in the first 1000 linear feet, continue testing at frequency of one test per 500 linear feet at no extra cost to Owner.
   3. Field testing agency's qualifications.
   4. Field Quality Control Log Form: Show same data fields as on Preinstallation Field Adhesion Test Log, with known information filled out and lines for multiple tests per sealant/substrate combinations; include visual inspection and specified field testing; allow for possibility that more tests than minimum specified may be necessary.

F. Field Adhesion Test Procedures:
   1. Allow sealants to fully cure as recommended by manufacturer before testing.
   2. Have a copy of the test method document available during tests.
   3. Record the type of failure that occurred, other information required by test method, and the information required on the Field Quality Control Log.
   4. When performing destructive tests, also inspect the opened joint for proper installation characteristics recommended by manufacturer, and report any deficiencies.
   5. Deliver the samples removed during destructive tests in separate sealed plastic bags, identified with project, location, test date, and test results, to Owner.

6. If any combination of sealant type and substrate does not show evidence of minimum adhesion or shows cohesion failure before minimum adhesion, report results to Architect.

G. Destructive Field Adhesion Test: Test for adhesion in accordance with ASTM C1521, using Destructive Tail Procedure.
   1. Sample: At least 18 inch long.
   2. Minimum Elongation Without Adhesive Failure: Consider the tail at rest, not under any elongation stress; multiply the stated movement capability of the sealant in percent by two; then multiply 1 inch by that percentage; if adhesion failure occurs before the "1 inch mark" is that distance from the substrate, the test has failed.
   3. If either adhesive or cohesive failure occurs prior to minimum elongation, take necessary measures to correct conditions and re-test; record each modification to products or installation procedures.

1.05 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Special Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
   1. Warranty Period for Silicone Sealants: 20 years from Date of Substantial Completion.

C. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 JOINT SEALANT APPLICATIONS

A. Scope:
   1. Exterior Joints: Seal open joints, whether or not the joint is indicated on the drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
      a. Joints between different exposed materials.
      b. Other joints indicated below.
   2. Do not seal the following types of joints.
      a. Joints where installation of sealant is specified in another section.

2.02 JOINT SEALANTS - GENERAL

A. Sealants and Primers: Provide products having lower volatile organic compound (VOC) content than indicated in SCAQMD 1168.
   1. Architectural Sealants: 250 g/L.
   2. Sealant Primers for Nonporous Substrates: 250 g/L.
   3. Sealant Primers for Porous Substrates: 775 g/L.

B. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

C. Colors: As selected by Architect from manufacturer's full range.

2.03 SILICONE JOINT SEALANTS

A. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 100/50, for Use NT.
   1. Products:
      a. Dow Corning Corporation; 790.
      b. Momentive Performance Materials; SilPruf LM SCS2700.
      c. Pecora Corporation; 890.
      d. Sika Corporation, Construction Products Division; Sikasil WS-290.
      e. Tremco Incorporated; Spectrem 1.

2. Stain-Test-Response Characteristics: Nonstaining to porous substrates per ASTM C1248.
3. Locations of Use:
   a. Exterior joints in vertical and nontraffic surfaces.

2.04 ACCESSORIES

A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application. Oversize 30 to 50 percent larger than joint width.
   1. Manufacturers:
      a. Sof Rod manufactured by Nomaco Inc.
      b. MasterSeal 921 manufactured by BASF.
      c. Substitutions: See Section 01 60 00 - Product Requirements.

B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.

C. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.

D. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.

E. Primers: Type recommended by sealant manufacturer to suit application; non-staining. Confirm requirements based on preconstruction field testing.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that joints are ready to receive work.

B. Verify that backing materials are compatible with sealants.

C. Verify that backer rods are of the correct size.

D. Preinstallation Adhesion Testing: Install a sample for each test location shown in the test plan.
   1. Test each sample as specified in PART 1 under QUALITY ASSURANCE article.
   2. Notify Architect of date and time that tests will be performed, at least 7 days in advance.
   3. Arrange for sealant manufacturer's technical representative to be present during tests.
   4. Record each test on Preinstallation Adhesion Test Log as indicated.
   5. If any sample fails, review products and installation procedures, consult manufacturer, or take whatever other measures are necessary to ensure adhesion; re-test in a different location; if unable to obtain satisfactory adhesion, report to Architect.
   6. After completion of tests, remove remaining sample material and prepare joint for new sealant installation.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.
   1. Remove existing sealant residue as required to provide a solid bond with new sealants. Where necessary to expose clean, sound surfaces, use wire brush, grind, sandblast or solvent clean as recommended by sealant manufacturer.

B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
   1. Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction field tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

3.03 INSTALLATION

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform installation in accordance with ASTM C1193.

C. Seal all exposed joints of dissimilar materials and elsewhere as indicated

D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.

E. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
   1. Do not leave gaps between ends of sealant backings.
   2. Do not stretch, twist, puncture, or tear sealant backings.
   3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

F. Install bond breaker backing tape where backer rod cannot be used.

G. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.

H. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.

I. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

3.04 FIELD QUALITY CONTROL

A. Perform field quality control inspection/testing as specified in PART 1 under QUALITY ASSURANCE article.

B. Destructive Adhesion Testing: If there are any failures in first 1000 linear feet, notify Architect immediately.

C. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

D. Repair destructive test location damage immediately after evaluation and recording of results.

3.05 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

B. Protect sealants until cured.

3.06 POST-OCCUPANCY

A. Post-Occupancy Inspection: Perform visual inspection of entire length of project sealant joints at a time that joints have opened to their greatest width; i.e. at the low temperature in the thermal cycle. Report failures immediately and repair.

END OF SECTION

SECTION 08 62 00
UNIT SKYLIGHTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Thermoformed plastic skylights with integral frame.

B. Integral insulated curb.

1.02 RELATED REQUIREMENTS

A. Section 07 62 00 - Sheet Metal Flashing and Trim: Skylight counterflashing.

1.03 REFERENCE STANDARDS

A. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for windows, doors, and skylights.

B. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

C. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide structural, thermal, and daylighting performance values.

C. Shop Drawings: Indicate configurations, dimensions, locations, fastening methods, and installation details.

D. Grade Substantiation: Prior to submitting shop drawings or starting fabrication, submit one of the following showing compliance with specified grade:
   1. Evidence of AAMA Certification.
   2. Evidence of WDMA Certification.
   3. Evidence of CSA Certification.
   4. Test report(s) by independent testing agency itemizing compliance and acceptable to authorities having jurisdiction.

E. Manufacturer's Installation Instructions: Indicate special procedures.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with not less than five years documented experience.

1.06 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide five year manufacturer warranty, including coverage for leakage due to defective skylight materials or construction.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Unit Skylights:
   1. Kingspan: www.kingspan.com.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 UNIT SKYLIGHTS

A. Unit Skylights: Factory-assembled glazing in aluminum frame, free of visual distortion, and weathertight.
   1. Shape: Square dome.
   2. Glazing: Triple.
   3. Operation: None; fixed.
   4. Nominal Size: Match existing conditions.

5. Basis of Design: Kingspan Model ALB-CM-3-CPC-WPM-CPM-MF.

2.03 PERFORMANCE REQUIREMENTS

A. Provide unit skylights that comply with the following:
   1. Grade: AAMA/WDMA/CSA 101/I.S.2/A440 requirements for specific skylight type:
   2. Design to withstand live loads as calculated in accordance with O.S.S.C. code.
   3. Provide impact resistance as required for OSHA Impact Fall Protection.
   4. Allow for expansion and contraction within system components caused by a cycling surface temperature range of 170 degrees F without causing detrimental effects to system or components.
   5. U-Value: 0.60 maximum.
   6. Solar Heat Gain Coefficient: Not to exceed 0.40

2.04 COMPONENTS

A. Triple Glazing: Acrylic plastic; factory sealed.

B. Support Curbs: ASTM B209 (ASTM B209M) Sheet aluminum, sandwich construction; 1 inch thick, 12 inches high; glass fiber insulation; with integral flange for anchorage to roof deck.

2.05 ACCESSORIES

A. Anchorage Devices: Type recommended by manufacturer, exposed to view.

B. Counterflashings: Same metal type and finish as skylight frame.

C. Protective Back Coating: Zinc molybdate alkyd.

D. Sealant: Elastomeric, silicone, compatible with material being sealed .

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that openings and substrate conditions are ready to receive work of this section.

3.02 PREPARATION

A. Apply protective back coating on aluminum surfaces of skylight units that will be in contact with cementitious materials or dissimilar metals.

3.03 INSTALLATION

A. Install aluminum curb assembly, fastening securely to roof decking; flash curb assembly into roofing system.

B. Install skylight units and mount securely to curb assembly; install counterflashing as required.

C. Apply sealant to achieve watertight assembly.

3.04 CLEANING

A. Remove protective material from prefinished aluminum surfaces.

B. Wash down exposed surfaces; wipe surfaces clean.

C. Remove excess sealant.

END OF SECTION

SECTION 09 24 00
CEMENT PLASTERING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Cement plastering.

1.02 RELATED REQUIREMENTS

A. Section 09 91 13 - Exterior Painting.

1.03 REFERENCE STANDARDS

A. ASTM C926 - Standard Specification for Application of Portland Cement-Based Plaster.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittals procedures.

B. Product Data: Provide data on plaster materials and trim accessories.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing the work of this section with minimum five years documented experience.

1.06 FIELD CONDITIONS

A. Exterior Plaster Work: Do not apply plaster when substrate or ambient air temperature is 40 degrees F or lower, or when temperature is expected to drop below 40 degrees F within 48 hours of application.

PART 2 PRODUCTS

2.01 CEMENT PLASTER APPLICATIONS

A. Lath Plaster Base: As recommended by manufacturer.
   1. Number of Coats: Match existing thickness.

2.02 FACTORY PREPARED CEMENT PLASTER

A. Exterior Portland cement plaster system made of scratch and brown base coat, leveling coat with reinforcing mesh, and acrylic finish coat; install in accordance with ASTM C926.
   1. Provide weather resistive barrier as part of the system, by the same manufacturer.
   2. Manufacturer - Basis of Design:
      a. BASF Wall Systems; Senergy Platinum CI Stucco Ultra: www.wallsystems.basf.com/#sle.
   3. Other Acceptable Manufacturers:
      a. LaHabra; FastWall 300: www.lahabrastucco.com/#sle.
      b. Parex USA, Inc; Armourwall 300: www.parexusa.com/#sle.
      c. Substitutions: See Section 01 60 00 - Product Requirements.

2.03 ACCESSORIES

A. Lath, Beads, Screeds, and Joint Accessories: As recommended by manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions are acceptable prior to starting this work.

B. Verify lath is flat, secured to substrate, and joint and surface perimeter accessories are properly in place.

3.02 MIXING

A. Mix only as much plaster as can be used prior to initial set.

B. Mix materials dry, to uniform color and consistency, before adding water.

C. Protect mixtures from frost or freezing temperatures, contamination, and excessive evaporation.

3.03 APPLICATION

A. Apply plaster in accordance with manufacturer's written instructions and comply with ASTM C926.

B. Base Coats:
   1. Apply base coat(s) to fully embed lath and to specified thickness.
   2. Follow guidelines in ASTM C926 and manufacturer's written installation instructions for moist curing base coats and application of subsequent coats.

C. Leveling Coat:
   1. Apply leveling coat to specified thickness.

D. Finish Coats:
   1. Cement Plaster:
      a. Apply with sufficient material and pressure to ensure complete coverage of base to specified thickness.
      b. Apply desired surface texture while mix is still workable.

3.04 TOLERANCES

A. Maximum Variation from True Flatness: 1/8 inch in 10 feet.

3.05 REPAIR

A. Patching: Remove loose, damaged or defective plaster and replace with plaster of same composition; finish to match surrounding area.

END OF SECTION

SECTION 09 96 00
HIGH-PERFORMANCE COATINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. High performance coatings (HPC) for the following conditions:
   1. Exterior Substrates:
      a. Galvanized steel.

B. Surface preparation.

1.02 RELATED REQUIREMENTS

A. Section 05 50 00 - Metal Fabrications: Shop priming of metal substrates with primers specified in this Section.

1.03 REFERENCE STANDARDS

A. ASTM D3359 - Standard Test Method for Measuring Adhesion by Tape Test.

B. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual.

C. SCAQMD 1113 - South Coast Air Quality Management District Rule No.1113.

D. SSPC-PA 2 - Procedure For Determining Conformance To Dry Coating Thickness Requirements.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide complete list of all products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. Include printed statement of VOC content and chemical components for interior coatings.

C. Samples for Verification: For each type of coating system and in each color and gloss of finish coat indicated.
   1. Submit Samples on shop primed and galvanized steel, 8 inches square.

D. Product List: For each product indicated. Cross-reference products to coating system and locations of application areas. Use same designations indicated on Drawings and in schedules.

E. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and surface preparation requirements.

F. Maintenance Data: Include cleaning procedures and repair and patching techniques.
   1. At project completion, provide an itemized list complete with manufacturer, coating type and color coding for all colors used for Owner's later use in maintenance.

G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Extra Coating Materials: 1 gallon of each type and color. All extra stock containers are to be new and unopened.
   3. Label each container with manufacturer's name, product number, color number, and room names and numbers where used.

1.05 PREINSTALLATION CONFERENCE

A. Preinstallation Conference: Convene a preinstallation meeting one week before starting work of this section; require attendance by all relevant installers. Agenda items will include field conditions, substrate conditions, coordination of shop applied primers with finish coatings, application methods, and field quality control testing and inspection.
   1. Bring copies of reviewed color draw-downs for all required colors.

1.06 QUALITY ASSURANCE

A. Master Painters Institute (MPI) Standards:
   1. Preparation and Workmanship: Comply with requirements in MPI (APSM) - "Master Painters Institute Architectural Painting Specification Manual" for products and coating systems indicated.

B. Surface Preparation: Obtain written confirmation of the specific surface preparation procedures and primers used for all fabricated steel items from the fabricator(s) to ascertain appropriate and manufacturer compatible finish coat materials to be used before painting any such work.

C. Comply with requirements of SSPC-PA 2 for measurement of coating thickness.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of coating, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Coating Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.08 FIELD CONDITIONS

A. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

B. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the coating product manufacturer.

C. Do not install materials when temperature is below 55 degrees F or above 90 degrees F.

D. Maintain this temperature range, 24 hours before, during, and 72 hours after installation of coating.

E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

F. Restrict traffic from area where coating is being applied or is curing.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Products: Provide one of the products listed in Part 2.

B. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in Part 2:
   1. Carboline Company (Carboline)
   2. Kelly-Moore Paints (Kelly).
   3. Miller Paint Co. (Miller).
   4. Rodda Paint / Cloverdale Paint Co. (Rodda).
   5. Sherwin-Williams Co. (S-W).
   6. Tnemec Company, Inc. (Tnemec).

C. Substitutions: Not permitted.

2.02 MATERIALS

A. Coatings - General: Provide complete multi-coat systems formulated and recommended by manufacturer for the applications indicated, in the thicknesses indicated.
   1. For shop primed items, omit specified primer if shop primer is compatible with finish coats and in good condition as determined by finish coating manufacturer.

B. Material Compatibility: Provide materials for use within each coating system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

C. Volatile Organic Compound (VOC) Content:
   1. All paints and coating wet applied on site must meet the applicable limits of the SCAQMD 1113. VOC shall not exceed the limits indicated below:
      a. Rust Preventative Coatings/Industrial Maintenance Coatings: 100 g/L.

D. Colors: As selected by Architect.

2.03 ACCESSORY MATERIALS

A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of coated surfaces.

2.04 EXTERIOR HIGH-PERFORMANCE COATING SCHEDULE

A. Zinc-Coated Metal: Provide the following finish systems over exterior zinc-coated (galvanized) metal surfaces:
   1. Semigloss, Two-Component, Pigmented Aliphatic Acrylic Polyurethane: One finish coat, over intermediate coat and metal primer with total dry film thickness not less than 6.5 mils, unless noted otherwise.
      a. Prime: Manufacturer's recommended metal primer.
         1) Carboline: Galoseal WB at 0.5 to 1.0 mils DFT.
         2) Kelly: K-M 15 Chemical Mastic High Build Epoxy.
         3) Miller: PPG 97-145 Series Pitt-Guard D-T-R Polyamide Epoxy
         4) Rodda: Precision Coatings DTM 1300v100 HB Epoxy Primer.
         5) S-W: Macropoxy 646 FC Epoxy (B58-600).
         6) Tnemec: Series 27 Typoxy WB at 2 to 2.5 mils.
      b. Intermediate Coat:
         1) Carboline: None required.
         2) Kelly: K-M 15 Chemical Mastic High Build Epoxy.
         3) Miller: PPG 95-8800 Series Pitthane High Build Semi-Gloss Urethane.
         4) Rodda: None required.
         5) S-W: None required.
         6) Tnemec: None required.
      c. Finish Coat:
         1) Carboline: Carbothane 133 VOC at 3 to 4 mils.
         2) Kelly: K-M 375 High Build Gloss Polyurethane Enamel.
         3) Miller: PPG 95-8800 Pitthane High Build Semi-Gloss Urethane.
         4) Rodda: Precision Coatings PC3v100 Acrylic Polyurethane Semi-Gloss.
         5) S-W: Hi-Solids Polyurethane S/G (B65-350).
         6) Tnemec: Series 750 Endura-Shield at 2 to 2.5 mils.
      d. Topcoats: Manufacturer's recommended clear topcoat, it any, as required to assure colorfastness of final coating system.
         1) S-W: DiamondClad Clear B65T105 1 to 2 mils.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Do not begin application of coatings until substrates have been properly prepared.

C. Verify that substrate surfaces are ready to receive work as instructed by the coating manufacturer. Obtain and follow manufacturer's instructions for examination and testing of substrates.

D. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

E. Test shop-applied primer for compatibility with subsequent cover materials.

F. Proceed with coating application only after unacceptable conditions have been corrected.
   1. Commencing coating application constitutes Contractor's acceptance of substrates and conditions.

3.02 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in MPI (APSM) applicable to substrates indicated.

B. Clean substrates of substances that could impair bond of coatings, including dirt, oil, grease, and incompatible paints and encapsulants.
   1. Remove incompatible primers and reprime substrate with compatible primers as required to produce coating systems indicated.

C. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied coatings.

D. Protect adjacent surfaces and materials not receiving coating from spatter and overspray; mask if necessary to provide adequate protection. Repair damage.

3.03 PRIMING

A. Apply primer to unprimed surfaces, unless specifically not required by coating manufacturer. Apply in accordance with coating manufacturer's instructions.

3.04 COATING APPLICATION

A. Apply coatings in accordance with manufacturer's written instructions, to thicknesses specified.

B. Apply in uniform thickness coats, without runs, drips, pinholes, brush marks, or variations in color, texture, or finish. Finish edges, crevices, corners, and other changes in dimension with full coating thickness.

C. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color and appearance.

3.05 FIELD QUALITY CONTROL

A. Painted surfaces shall be considered to lack uniformity and soundness if any of the following defects are apparent to Architect.
   1. Brush/roller marks, streaks, laps, runs, sags, drips, heavy stippling, hiding or shadowing by inefficient application methods, skipped or missed areas, or foreign materials in paint coatings.
   2. Evidence of poor coverage at rivet heads, plate edges, lap joints, crevices, pockets, corners, reentrant angles or similar conditions.
   3. Damage due to touching before paint is sufficiently dry or any other contributory cause.
   4. Damage due to application on moist surfaces or caused by inadequate protection from the weather.
   5. Damage and/or contamination of paint due to blown contaminants (dust, spray paint, etc.).

B. Painted surfaces shall be considered unacceptable if any of the following are evident under natural lighting source for exterior surfaces:
   1. Visible defects are evident on vertical or horizontal surfaces when viewed at normal viewing angles from a distance of not less than 39 inches.
   2. Visible defects are evident on ceilings, soffits and other overhead surfaces when viewed at normal viewing angles.
   3. When the final coat on any surface exhibits a lack of uniformity of color, sheen texture and hiding across full surface area.
   4. Dry mil thicknesses do not meet manufacturer’s recommended thickness or specified thickness.
   5. Lack of adhesion. Test surfaces indicating lack of adhesion in accordance with ASTM D3359 or as recommended by coating manufacturer.

C. Owner may provide field inspection and testing.
   1. Painted surfaces will be tested for dry mil thickness for each coat.
   2. Shop primers and painted surfaces will be tested for adhesion.
   3. Surfaces will be tested at frequency discussed in the preinstallation conference and as deemed appropriate by Owner.

D. Touch-up and restore painted surfaces damaged by testing.
   1. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.06 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

B. Clean surfaces immediately of overspray, splatter, and excess material.

C. Protect work of other trades against damage from coating operation. Correct damage by cleaning, repairing, replacing, and recoating, as approved by Architect, and leave in an undamaged condition.

D. After coating has cured, clean and replace finish hardware, fixtures, and fittings previously removed.

E. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

3.07 PROTECTION

A. Protect finished work from damage.

3.08 EXTERIOR SCHEDULE

A. Steel: Semigloss, Two-Component, Pigmented Aliphatic Acrylic Polyurethane:
   1. Ladders.
   2. Steel guardrails.

END OF SECTION

SECTION 23 00 00

HEATING, VENTILATING AND AIR CONDITIONING (HVAC) BASIC REQUIREMENTS

PART 1 - GENERAL

1.01 DESIGN-BUILD SUMMARY OF WORK

A. Work included in 23 00 00 applies to Division 23, Heating, Ventilating and Air Conditioning (HVAC) work to provide materials, labor, tools, permits and incidentals to make HVAC systems ready for Owner's use for proposed project.

1.02 DESIGN-BUILD INSTRUCTIONS

A. This document is issued to give Bidders a basis for preparing a proposal to design and install complete HVAC systems for this project.

B. Alternates to this Document may be offered as a separate proposal.

C. Bidder to submit the following information with the Proposal:

1. Preliminary drawings indicating major equipment locations and preliminary layout.
2. Description of systems, manufacturer and method of control.
3. List of materials proposed for systems which are applicable to this project.
4. Any other information which the bidder considers pertinent in evaluating the proposal.

1.03 DESIGN-BUILD DESIGN APPROACH

A. Use this Specification as a guide for design/engineering requirements, workmanship and materials or construction. Utilize design-build concept throughout construction phase of project.

B. Investigate and be apprised of applicable codes, rules, and regulations as enforced by Authority Having Jurisdiction (AHJ).

C. Visit the Site of the proposed construction. Verify and inspect the existing site to determine conditions that affect this work.

1.04 DESIGN-BUILD DESIGN CRITERIA/CALCULATIONS

A. Related Work Specified Elsewhere:

1. Contents of Section apply to Division 23 Specifications.
2. Requirements of Section are a minimum for Division 23 Sections, unless otherwise stated in each Section, in which case that Section's requirements take precedence.

B. Design Criteria:

1. HVAC System: As noted on drawings.
   a) Cooling Temperatures:
      (1) 75 Degrees F DB, 63 Degrees F WB Inside Design
      (2) 91 Degrees F DB, 67 Degrees F WB Outside Design
   b) Heating Temperatures:
      (1) 70 Degrees F DB Inside Design
      (2) 21 Degrees F DB Outside Design
   c) Lighting: 1.6 w/sf (this exceeds w/sf requirements of energy code to allow to install luminaires which are exempt from calculation requirements.)
   d) Miscellaneous Electrical Load: 2 w/sf.
   e) Acoustical Requirements: Sound generated by HVAC system in occupied zone of a treated space not-to-exceed noise criterion of NC-35.

f) Provide exhaust systems to toilet and janitor's rooms. The exhaust systems provide a minimum of 10 air changes per hour.

g) Provide drawings with exhaust fans, A/C units, size, and description of equipment, heating/cooling load calculations, equipment selections, etc. for review and for permit process.

h) Outside air ventilation to be designed per current state ventilation code or ASHRAE recommendations, whichever is greater.

i) Provide calculations and installation details of equipment mounting to structure to conform to local seismic codes. Calculations and details to be included on Drawings as a part of submittal process.

j) Provide equipment and/or devices for pressure control of spaces so as not to over pressurize space.

2. Controls:

a) Complete bidder designed temperature control system as described in these specifications.

b) Materials and equipment used to be standard components, regularly manufactured for this and other systems and not custom designed specially for this project. Provide systems and components thoroughly tested and proven in actual use for at least 2 years.

c) Provide line and low voltage wiring for a complete and operable system. Wiring in accordance with local, State and National Codes.

d) Provide controllers for equipment unless specifically specified otherwise. Coordinate with equipment suppliers.

e) Provide system capable of handling equipment scheduled and shown on Drawings.

C. Calculations:

1. Submit heating and cooling load calculations per ASHRAE Standards for each HVAC zone.

2. Submit structural calculations for seismic bracing of HVAC equipment and piping. Structural calculations to be signed by a Registered Engineer in the State of Oregon.

1.05 SECTION INCLUDES

A. Work included in 23 00 00, HVAC Basic Requirements applies to Division 23, HVAC work to provide materials, labor, tools, permits, incidentals, and other services to provide and make ready for Owner's use of heating, ventilating and air conditioning systems for proposed project.

B. Contract Documents include, but are not limited to, Specifications including Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, Drawings, Addenda, Owner/Architect Agreement, and Owner/Contractor Agreement. Confirm requirements before commencement of work.

C. Definitions:

1. Provide: To furnish and install, complete and ready for intended use.

2. Furnish: Supply and deliver to project site, ready for unpacking, assembly and installation.

3. Install: Includes unloading, unpacking, assembling, erecting, installation, applying, finishing, protecting, cleaning and similar operations at project site as required to complete items of work provided.

4. Approved or Approved Equivalent: To possess the same performance qualities and characteristics and fulfill the utilitarian function without any decrease in

quality, durability or longevity. For equipment/products defined by the Contractor as "equivalent", substitution requests must be submitted to Engineer for consideration, in accordance with Division 01, General Requirements, and approved by the Engineer prior to submitting bids for substituted items.

5. Authority Having Jurisdiction (AHJ): Indicates reviewing authorities, including local fire marshal, Owner's insurance underwriter, Owner's Authorized Representative, and other reviewing entity whose approval is required to obtain systems acceptance.

1.06 RELATED SECTIONS

A. Contents of Section applies to Division 23, HVAC Contract Documents.

B. Related Work:

1. Additional conditions apply to this Division including, but not limited to:
   a) Specifications including Division 00, Procurement and Contracting Requirements and Division 01, General Requirements.
   b) Drawings
   c) Addenda
   d) Owner/Architect Agreement
   e) Owner/Contractor Agreement
   f) Codes, Standards, Public Ordinances and Permits

1.07 REFERENCES AND STANDARDS

A. References and Standards per Division 01, General Requirements, individual Division 23, HVAC Sections and those listed in this Section.

B. Codes to include latest adopted editions, including current amendments, supplements and local jurisdiction requirements in effect as of the date of the Contract Documents, of/from:

1. State of Oregon:
   a) OAR - Oregon Administrative Rules
   b) OESC - Oregon Electrical Specialty Code
   c) OFC - Oregon Fire Code
   d) OMSC - Oregon Mechanical Specialty Code
   e) OPSC - Oregon Plumbing Specialty Code
   f) OSSC - Oregon Structural Specialty Code
   g) OEESC - Oregon Energy Efficiency Specialty Code
   h) Oregon Elevator Specialty Code

C. Reference standards and guidelines include but are not limited to the latest adopted editions from:

1. ABA - Architectural Barriers Act
2. ABMA - American Bearing Manufacturers Association
3. ADA - Americans with Disabilities Act
4. AHRI - Air-Conditioning Heating & Refrigeration Institute
5. AMCA - Air Movement and Control Association
6. ANSI - American National Standards Institute
7. ASCE - American Society of Civil Engineers
8. ASHRAE - American Society of Heating, Refrigeration and Air-Conditioning Engineers
9. ASHRAE Guideline 0, The Commissioning Process

10. ASME - American Society of Mechanical Engineers
11. ASPE - American Society of Plumbing Engineers
12. ASSE - American Society of Sanitary Engineering
13. ASTM - ASTM International
14. AWWA - American Water Works Association
15. CFR - Code of Federal Regulations
16. CGA - Compressed Gas Association
17. CISPI - Cast Iron Soil Pipe Institute
18. EPA - Environmental Protection Agency
19. ETL - Electrical Testing Laboratories
20. IAPMO - International Association of Plumbing & Mechanical Officials
21. IFGC - International Fuel Gas Code
22. ISO - International Organization for Standardization
23. MSS - Manufacturers Standardization Society
24. NEC - National Electric Code
25. NEMA - National Electrical Manufactures Association
26. NFPA - National Fire Protection Association
27. NFGC - National Fuel Gas Code
28. NRCA - National Roofing Contractors Association
29. NSF - National Sanitation Foundation
30. OSHA - Occupational Safety and Health Administration
31. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association, Inc.
32. TEMA - Tubular Exchanger Manufactures Association
33. TIMA - Thermal Insulation Manufactures Association
34. UL - Underwriters Laboratories, Inc.

D. See Division 23, HVAC individual Sections for additional references.

1.08 SUBMITTALS

A. See Division 01, General Requirements for Submittal Procedures as well as specific individual Division 23, HVAC Sections.

B. Provide drawings in format and software release equal to the design documents. Drawings to be the same sheet size and scale as the Contract Documents.

C. In addition:

1. "No Exception Taken" constitutes that review is for general conformance with the design concept expressed in the Contract Documents for the limited purpose of checking for conformance with information given. Any action is subject to the requirements of the Contract Documents. Contractor is responsible for the dimensions and quantity and will confirm and correlate at the job site, fabrication processes and techniques of construction, coordination of the work with that of all other trades, and the satisfactory performance of the work.
2. Provide product submittals and shop drawings in format designated in Division 01. For electronic format, provide one file per division containing one bookmarked PDF file with each bookmark corresponding to each Specification Section. Arrange bookmarks in ascending order of Specification Section number. Individual submittals sent piecemeal in a per Specification Section method will be

returned without review or comment. All transmissions/submissions to be submitted to Architect. Deviations will be returned without review.

3. Product Data: Provide Manufacturer's descriptive literature for products specified in Division 23, HVAC Sections.

4. Identify/mark each submittal in detail. Note what differences, if any, exist between the submitted item and the specified item. Failure to identify the differences will be considered cause for disapproval. If differences are not identified and/or not discovered during the submittal review process, Contractor remains responsible for providing equipment and materials that meet the Specifications and Drawings.

    a) Label submittal to match numbering/references as shown in Contract Documents. Highlight and label applicable information to individual equipment or cross out/remove extraneous data not applicable to submitted model. Clearly note options and accessories to be provided, including field installed items. Highlight connections by/to other trades.

    b) Include technical data, installation instructions and dimensioned drawings for products, fixtures, equipment and devices installed, furnished or provided. Reference individual Division 23, HVAC Specification Sections for specific items required in product data submittal outside of these requirements.

    c) Provide pump curves, operation characteristics, capacities, ambient noise criteria, etc. for equipment.

    d) For vibration isolation of equipment, list make and model selected with operating load and deflection.

    e) See Division 23, HVAC individual Sections for additional submittal requirements outside of these requirements.

5. Maximum of two reviews of submittal package. Arrange for additional reviews and/or early review of long-lead items; Bear costs of these additional reviews at Engineer's hourly rates. Incomplete submittal packages/submittals will be returned to contractor without review.

6. Resubmission Requirements: Make corrections or changes in submittals as required, and in consideration of Engineer’s comments. Identify Engineer’s comments and provide an individual response to each of the Engineer’s comments. Cloud changes in the submittals and further identify changes which are in response to Engineer’s comments.

7. Structural/Seismic: Provide weights, dimensions, mounting requirements and like information required for mounting, seismic bracing, and support. Indicate manufacturer's installation and support requirements to meet ASCE 7-10 requirements for non-structural components. Provide engineered seismic drawings and equipment seismic certification. Equipment Importance Factor as specified in Division 01 and in Structural documents.

8. Trade Coordination: Include physical characteristics, electrical characteristics, device layout plans, wiring diagrams, and connections as required by Division 23, HVAC Coordination Documents. For equipment with electrical connections, furnish copy of approved submittal for inclusion in Division 26, Electrical submittals.

9. Make provisions for openings in building for admittance of equipment prior to start of construction or ordering of equipment.

10. Substitutions and Variation from Basis of Design:

    a) The Basis of Design designated product establishes the qualities and characteristics for the evaluation of any comparable products by other listed acceptable manufacturers if included in this Specification or

included in an approved Substitution Request as judged by the Design Professional.

b) If substitutions and/or equivalent equipment/products are being proposed, it is the responsibility of parties concerned, involved in, and furnishing the substitute and/or equivalent equipment to verify and compare the characteristics and requirements of that furnished to that specified and/or shown. If greater capacity and/or more materials and/or more labor is required for the rough-in, circuitry or connections than for the item specified and provided for, then provide compensation for additional charges required for the proper rough-in, circuitry and connections for the equipment being furnished. No additional charges above the Base Bid, including resulting charges for work performed under other Divisions, will be allowed for such revisions. Coordinate with the requirements of "Submittals". For any product marked "or approved equivalent", a substitution request must be submitted to Engineer for approval prior to purchase, delivery or installation.

11. Shop Drawings: Provide coordinated shop drawings which include physical characteristics of all systems, equipment, ductwork and piping layout plans, and control wiring diagrams. Reference individual Division 23, HVAC Specification Sections for additional requirements for shop drawings outside of these requirements.

    a) Provide Shop Drawings indicating access panel locations for items that require Code or maintenance access, size and elevation for approval prior to installation.

12. Samples: Provide samples when requested by individual Sections.

13. Resubmission Requirements:

    a) Make any corrections or change in submittals when required. Provide submittals as specified. The engineer will not be required to edit and/or interpret the Contractor's submittals. Indicate changes for the resubmittal in a cover letter with reference to page(s) changed and reference response to comment. Cloud changes in the submittals.

        (1) Resubmit for review until review indicates no exception taken or make "corrections as noted".

        (2) When submitting drawings for Engineers re-review, clearly indicate changes on drawings and "cloud" any revisions. Submit a list describing each change.

14. Operation and Maintenance Manuals, Owner's Instructions:

    a) Submit, at one time, electronic files (PDF format) of manufacturer's operation and maintenance instruction manuals and parts lists for equipment or items requiring servicing. Include valve charts. Submit data when work is substantially complete and in same order format as submittals. Include name and location of source parts and service for each piece of equipment.

        (1) Include copy of approved submittal data along with submittal review letters received from Engineer. Data to clearly indicate installed equipment model numbers. Delete or cross out data pertaining to other equipment not specific to this project.

        (2) Include copy of manufacturer's standard Operations and Maintenance for equipment. At front of each tab, provide routine maintenance documentation for scheduled equipment. Include manufacturer's recommended maintenance schedule and highlight maintenance required to maintain warranty. Furnish list of routine maintenance parts, including part numbers, sizes,

quantities, relevant to each piece of equipment: belts, motors, lubricants, and filters.

(3) Include Warranty per Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, Section 23 00 00, HVAC Basic Requirements and individual Sections.

(4) Include product certificates of warranties and guarantees.

(5) Include copy of complete parts list for equipment. Include available exploded views of assemblies and sub assemblies.

(6) Include copy of startup and test reports specific to each piece of equipment.

(7) Include copy of final air and water systems balancing log along with pump, fan and distribution system operating data.

(8) Include commissioning reports.

(9) Include copy of valve charts/schedules.

(10) Engineer will return incomplete documentation without review. Engineer will provide one set of review comments in Submittal Review format. Contractor must arrange for additional reviews; Contractor to bear costs for additional reviews at Engineer's hourly rates.

b) Thoroughly instruct Owner in proper operation of equipment and systems. Where noted in individual Sections, training will include classroom instruction with applicable training aids and systems demonstrations. Field instruction per Section 23 00 00, HVAC Basic Requirements Article titled "Demonstration".

c) Copies of certificates of code authority inspections, acceptance, code required acceptance tests, letter of conformance and other special guarantees, certificates of warranties, specified elsewhere or indicated on Drawings.

15. Record Drawings:

a) Maintain at site at least one set of drawings for recording “As-constructed” conditions. Indicate on drawings changes to original documents by referencing revision document, and include buried elements, location of cleanouts, and location of concealed mechanical items. Include items changed by field orders, supplemental instructions, and constructed conditions.

b) Record Drawings are to include equipment and fixture/connection schedules, control dampers, fire smoke dampers, fire dampers, valves, bottom of pipe, duct and equipment elevations and dimensioned locations for all distribution systems (hydronic and air).

c) At completion of project, show changes and deviations from the Drawings in red on one set of black-line drawings. Include written Addendums, RFIs, and change order items. Make changes to Drawings in a neat, clean, and legible manner.

d) See Division 23, HVAC individual Sections for additional items to include in record drawings.

1.09 QUALITY ASSURANCE

A. Regulatory Requirements: Work and materials installed to conform with all local, State and Federal codes, and other applicable laws and regulations. Where code requirements are at variance with Contract Documents, meet code requirements as a minimum requirement and include costs necessary to meet these in Contract. Machinery and equipment are to comply with OSHA requirements, as currently revised and interpreted

for equipment manufacturer requirements. Install equipment provided per manufacturer recommendations.

B. Whenever this Specification calls for material, workmanship, arrangement or construction of higher quality and/or capacity than that required by governing codes, higher quality and/or capacity take precedence.

C. Drawings are intended to be diagrammatic and reflect the Basis of Design manufacturer's equipment. They are not intended to show every item in its exact dimensions, or details of equipment or proposed systems layout. Verify actual dimensions of systems (i.e., piping) and equipment proposed to assure that systems and equipment will fit in available space. Contractor is responsible for design and construction costs incurred for equipment other than Basis of Design, including, but not limited to, architectural, structural, electrical, HVAC, fire sprinkler, and plumbing systems.

D. Manufacturer's Instructions: Follow manufacturer's written instructions. If in conflict with Contract Documents, obtain clarification. Notify Engineer/Architect, in writing, before starting work.

E. Items shown on Drawings are not necessarily included in Specifications or vice versa. Confirm requirements in all Contract Documents.

F. Provide products that are UL listed.

G. Piping and duct insulation products to contain less than 0.1 percent by weight PBDE in all insulating materials.

H. ASME Compliance: ASME listed water heaters and boilers with an input of 200,000 BTUH and higher, hot water storage tanks which exceed 120 gallons, and hot water expansion tanks which are connected to ASME rated equipment or required by code or local jurisdiction.

I. Provide safety controls required by National Boiler Code (ASME CSD 1) for boilers and water heaters with an input of 400,000 BTUH and higher.

1.10 WARRANTY

A. Provide written warranty covering the work for a period of one year from date of Substantial Completion in accordance with Division 00, Contracting and Procurement Requirements, Division 01, General Requirements, Section 23 00 00, HVAC Basic Requirements and individual Division 23, HVAC Sections.

B. Sections under this Division can require additional and/or extended warranties that apply beyond basic warranty under Division 01, General Requirements and the General Conditions. Confirm requirements in all Contract Documents.

1.11 COORDINATION DOCUMENTS

A. Prior to construction, coordinate installation and location of HVAC equipment, ductwork, grilles, diffusers, piping, equipment, fire sprinklers, plumbing, cable trays, lights, and electrical services with architectural and structural requirements, and other trades (including ceiling suspension, and tile systems), and provide maintenance access requirements. Coordinate with submitted architectural systems (i.e. roofing, ceiling, finishes) and structural systems as submitted, including footings and foundation. Identify zone of influence from footings and ensure systems are not routed within the zone of influence.

B. Advise Architect in event a conflict occurs in location or connection of equipment. Bear costs resulting from failure to properly coordinate installation or failure to advise Architect of conflict.

C. Verify in field exact size, location, invert, and clearances regarding existing material, equipment and apparatus, and advise Architect of discrepancies between that indicated on Drawings and that existing in field prior to installation related thereto.

D. Submit final Coordination Drawings with changes as Record Drawings at completion of project.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Articles, fixtures, and equipment of a kind to be standard product of one manufacturer, including but not limited to pumps, fans, valves, control devices, air handlers, vibration isolation devices, etc.

2.02 STANDARDS OF MATERIALS AND WORKMANSHIP

A. Base contract upon furnishing materials as specified. Materials, equipment, and fixtures used for construction are to be new, latest products as listed in manufacturer's printed catalog data and are to be UL or ETL approved or have adequate approval or be acceptable by State, County, and City authorities.

B. Names and manufacturer's names denote character and quality of equipment desired and are not to be construed as limiting competition.

C. Hazardous Materials:

1. Comply with local, State of Oregon, and Federal regulations relating to hazardous materials.
2. Comply with Division 00, Procurement and Contracting Requirements and Division 01, General Requirements for this project relating to hazardous materials.
3. Do not use any materials containing a hazardous substance. If hazardous materials are encountered, do not disturb; immediately notify Owner and Architect. Hazardous materials will be removed by Owner under separate contract.

PART 3 - EXECUTION

3.01 ACCESSIBILITY AND INSTALLATION

A. Confirm Accessibility and Installation requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, Section 23 00 00, HVAC Basic Requirements and individual Division 23, HVAC Sections.

B. Install equipment having components requiring access (i.e., drain pans, drains, control operators, valves, motors and vibration isolation devices) so that they may be serviced, reset, replaced or recalibrated by service people with normal service tools and equipment. Do not install equipment in obvious passageways, doorways, scuttles or crawlspaces which would impede or block intended usage.

C. Install equipment and products complete as directed by manufacturer's installation instructions including all appurtenances recommended in manufacturer's installation instructions, at no additional charge to Owner. Obtain installation instructions from manufacturer prior to rough-in of equipment and examine instructions thoroughly. When requirements of installation instructions conflict with Contract Documents, request clarification from Architect prior to proceeding with installation. This includes proper installation methods, sequencing and coordination with other trades and disciplines.

D. Firestopping:

1. Confirm Firestopping requirements in Division 07, Thermal and Moisture Protection. In absence of specific requirements, comply with individual Division 23, HVAC Sections and the following:
   a) Coordinate location and protection level of fire and/or smoke rated walls, ceilings, and floors. When these assemblies are penetrated, seal around piping, ductwork and equipment with approved firestopping material. Install firestopping material complete as directed by manufacturer's

installation instructions. Meet requirements of ASTM E814, Standard Test Method for Fire Tests of Through-Penetration Fire Stops.

E. Pipe Installation:

1. Provide installation of piping systems coordinated to account for expansion and contraction of piping materials and building, as well as anticipated settlement or shrinkage of building. Install work to prevent damage to piping, equipment, and building and its contents. Provide piping offsets, loops, seismic flexible joints, expansion joints, sleeves, anchors or other means to control pipe movement and minimize forces on piping. Verify anticipated settlement and/or shrinkage of building with Project Structural Engineer. Verify construction phasing, type of building construction products and rating for coordinating installation of piping systems.
2. Include provisions for servicing and removal of equipment without dismantling piping.

F. Plenums:

1. Plenums: Materials within plenums shall be noncombustible or shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723. Immediately notify Architect / Engineer of any discrepancy.

3.02 REVIEW AND OBSERVATION

A. Confirm Review and Observation requirements in Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, Section 23 00 00, HVAC Basic Requirements and individual Division 23, HVAC Sections.

B. Notify Architect, in writing, at following stages of construction so that they may, at their option, visit site for review and construction observation:

1. Underground system installation prior to backfilling.
2. Prior to covering walls.
3. Prior to ceiling cover/installation.
4. After major equipment is installed.
5. When main systems, or portions of, are being tested and ready for inspection by AHJ.

C. Final Punch:

1. Prior to requesting a final punch visit from the Engineer, request from Engineer the Mechanical Precloseout Checklist, complete the checklist confirming completion of systems' installation, and return to Engineer. Request a final punch visit from the Engineer, upon Engineer's acceptance that the mechanical systems are ready for final punch.
2. Costs incurred by additional trips required due to incomplete systems will be the responsibility of the Contractor.

3.03 CONTINUITY OF SERVICE

A. Confirm requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements. In absence of specific requirements, comply with individual Division 23, HVAC Sections and the following:

1. During remodeling or addition to existing structures, while existing structure is occupied, current services to remain intact until new construction, facilities or equipment is installed.
2. Prior to changing over to new service, verify that every item is thoroughly prepared. Install new piping and ductwork, and wiring to point of connection. Where existing systems are being utilized, clean existing distribution systems (ductwork, piping, fans, air handlers) prior to connecting new ductwork or piping.

3. Coordinate transfer time to new service with Owner. If required, perform transfer during off peak hours. Once changeover is started, pursue to its completion to keep interference to a minimum.
    a) If overtime is necessary, there will be no allowance made by Owner for extra expense for such overtime or shift work.
4. Organize work to minimize duration of power interruption.

3.04 CUTTING AND PATCHING

A. Confirm Cutting and Patching requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements. In absence of specific requirements, comply with individual Division 23, HVAC Sections and the following:

1. Proposed floor cutting/core drilling/sleeve locations to be approved by Project Structural Engineer. Submit proposed locations to Architect/Project Structural Engineer. Where slabs are of post tension construction, perform x-ray scan of proposed penetration locations and submit scan results including proposed penetration locations to Project Structural Engineer/Architect for approval. Where slabs are of waffle type construction, show column cap extent and cell locations relative to proposed penetration(s).
2. Cutting, patching and repairing for work specified in this Division including plastering, masonry work, concrete work, carpentry work, and painting included under this Section will be performed by skilled craftsmen of each respective trade in conformance with appropriate Division of Work.
3. Additional openings required in building construction to be made by drilling or cutting. Use of jack hammer is specifically prohibited. Patch openings in and through concrete and masonry with grout.
4. Restore new or existing work that is cut and/or damaged to original condition. Patch and repair specifically where existing items have been removed. This includes repairing and painting walls, ceilings, etc. where existing conduit and devices are removed as part of this project. Where alterations disturb lawns, paving, and walks, surfaces to be repaired, refinished and left in condition matching existing prior to commencement of work.
5. Additional work required by lack of proper coordination will be provided at no additional cost to the Owner.

3.05 EQUIPMENT SELECTION AND SERVICEABILITY

A. Replace or reposition equipment which is too large or located incorrectly to permit servicing, at no additional cost to Owner.

B. Maintain design intent where equipment other than as shown as Basis of Design in Contract Documents is provided. Where equipment requires ductwork or piping arrangement, controls/control diagrams, or sequencing different from that indicated in Contract Documents, provide at no additional cost to Owner.

3.06 DELIVERY, STORAGE AND HANDLING

A. Confirm requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements. In absence of specific requirements, comply with individual Division 23, HVAC Sections and the following:

1. Handle materials delivered to project site with care to avoid damage. Store materials on site inside building or protected from weather, dirt and construction dust. Insulation and lining that becomes wet from improper storage and handling to be replaced before installation. Products and/or materials that become damaged due to water, dirt, and/or dust as a result of improper storage to be replaced before installation.

2. Protect equipment and pipe to avoid damage. Close pipe openings with caps or plugs. Keep motors and bearings in watertight and dustproof covers during entire course of installation.

3. Protect bright finished shafts, bearing housings and similar items until in service.

3.07 DEMONSTRATION

A. Confirm Demonstration requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, Section 23 00 00, HVAC Basic Requirements and individual Division 23, HVAC Sections.

B. Upon completion of work and adjustment of equipment and test systems, demonstrate to Owner's Authorized Representative, Architect and Engineer that equipment furnished and installed or connected under provisions of these Specifications functions in manner required. Provide field instruction to Owner's Maintenance Staff as specified in Division 01, General Requirements, Section 23 00 00, HVAC Basic Requirements and individual Division 23, HVAC Sections.

C. Manufacturer's Field Services: Furnish services of a qualified person at time approved by Owner, to instruct maintenance personnel, correct defects or deficiencies, and demonstrate to satisfaction of Owner that entire system is operating in satisfactory manner and complies with requirements of other trades that may be required to complete work. Complete instruction and demonstration prior to final job site observations.

3.08 CLEANING

A. Confirm Cleaning requirements in Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, Section 23 00 00, HVAC Basic Requirements and individual Division 23, HVAC Sections.

B. Upon completion of installation, thoroughly clean exposed portions of equipment, removing temporary labels and traces of foreign substances. Throughout work, remove construction debris and surplus materials accumulated during work.

3.09 INSTALLATION

A. Confirm Installation requirements in Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, Section 23 00 00, HVAC Basic Requirements and individual Division 23, HVAC Sections.

B. Install equipment and fixtures in accordance with manufacturer's installation instructions, plumb and level and firmly anchored to vibration isolators. Maintain manufacturer's recommended clearances.

C. Start up equipment, in accordance with manufacturer's start-up instructions, and in presence of manufacturer's representative. Test controls and demonstrate compliance with requirements. Replace damaged or malfunctioning controls and equipment.

1. Do not place equipment in sustained operation prior to initial balancing of HVAC systems.

D. Provide miscellaneous supports/metals required for installation of equipment, piping and ductwork.

3.10 PAINTING

A. Confirm Painting requirements in Division 01, General Requirements and Division 09, Finishes. In absence of specific requirements, comply with individual Division 23, HVAC Sections and the following:

1. Ferrous Metal: After completion of work, thoroughly clean and paint exposed supports constructed of ferrous metal surfaces in mechanical rooms, i.e., hangers, hanger rods, equipment stands, with one coat of black asphalt varnish for exterior or black enamel for interior, suitable for hot surfaces.

2. After acceptance by Authority Having Jurisdiction (AHJ), In a mechanical room, on roof or other exposed areas, machinery and equipment not painted with

enamel to receive two coats of primer and one coat of rustproof enamel, colors as selected by Architect.

3. See individual equipment Specifications for other painting.
4. Structural Steel: Repair damage to structural steel finishes or finishes of other materials damaged by cutting, welding or patching to match original.
5. Piping and Ductwork: Clean, primer coat and paint exposed piping and ductwork on roof or at other exterior locations with two coats paint suitable for metallic surfaces and exterior exposures. Color selected by Architect.
6. Covers: Covers such as manholes, cleanouts and the like will be furnished with finishes which resist corrosion and rust.

3.11 DEMOLITION

A. Confirm requirements in Division 01, General Requirements and Division 02, Existing Conditions. In absence of specific requirements, comply with individual Division 23, HVAC Sections and the following:

1. Scope:
   a) It is the intent of these documents to provide necessary information and adjustments to the HVAC system required to meet code, and accommodate installation of new work.
   b) Coordinate with Owner so that work can be scheduled not to interrupt operations, normal activities, building access or access to different areas.
   c) Existing Conditions: Determine exact location of existing utilities and equipment before commencing work, compensate Owner for damages caused by failure to exactly locate and preserve utilities. Replace damaged items with new material to match existing. Promptly notify Owner if utilities are found which are not shown on Drawings.
2. Equipment: Unless otherwise directed, equipment, fixtures, or fittings being removed as part of demolition process are Owner's property. Remove other items not scheduled to be reused or relocated from job site as directed by Owner.
3. Unless specifically indicated on Drawings, remove exposed, unused ductwork and piping to behind finished surfaces (floor, walls, ceilings, etc.). Cap and patch surfaces to match surrounding finish.
4. Unless specifically indicated on Drawings, remove unused equipment, fixtures, fittings, rough-ins, and connectors. Removal is to be to a point behind finished surfaces (floors, walls, and ceilings).

3.12 ACCEPTANCE

A. Confirm requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements. In absence of specific requirements, comply with individual Division 23, HVAC Sections and the following:

1. System cannot be considered for acceptance until work is completed and demonstrated to Architect that installation is in strict compliance with Specifications, Drawings and manufacturer's installation instructions, particularly in reference to following:
   a) Testing and Balancing Reports
   b) Cleaning
   c) Operation and Maintenance Manuals
   d) Training of Operating Personnel
   e) Record Drawings
   f) Warranty and Guaranty Certificates
   g) Start-up/Test Document

h) Commissioning Reports

3.13 FIELD QUALITY CONTROL

A. Confirm Field Quality Control requirements in Division 01, General Requirements, Section 23 00 00, HVAC Basic Requirements and individual Division 23, HVAC Sections.

B. Tests:

1. Conduct tests of equipment and systems to demonstrate compliance with requirements specified. Reference individual Specification Sections for required tests. Document tests and include in Operation and Maintenance Manuals.

2. During site evaluations by Architect or Engineer, provide appropriate personnel with tools to remove and replace trims, covers, and devices so that proper evaluation of installation can be performed.

3.14 LETTER OF CONFORMANCE

A. Provide Letter of Conformance, copies of manufacturers' warranties and extended warranties with a statement that HVAC items were installed in accordance with manufacturer's recommendations, UL listings and FM Global approvals. Include Letter of Conformance, copies of manufacturers' warranties and extended warranties in Operation and Maintenance Manuals.

3.15 ELECTRICAL INTERLOCKS

A. Where equipment motors are to be electrically interlocked with other equipment for simultaneous operation, utilize equipment wiring diagrams to coordinate with electrical systems so that proper wiring of equipment involved is affected.

3.16 TEMPORARY HEATING, COOLING AND HUMIDITY CONTROL

A. Provide temporary heating, cooling, controls, humidification and dehumidification as required to facilitate the construction of the project. Size and select temporary system based on the requirements of the various trades during construction. This includes, but is not limited to, drywall, case work, wood flooring and wood finishes that are subject to warping. Size and install system to prevent mold growth. Coordinate the location of the temporary system. The house system can be used. Develop a procedure for how the house system will be used including a sketch depicting the house system, how filtration will be used to prevent construction debris from entering the system and how often the filters will be changed, how the ductwork will be cleaned after use to ensure a clean system is turned over to the Owner and how the units are sized. Submit this procedure to the Mechanical Engineer for review. Follow National Air Duct Cleaners Association (NADCA) duct cleaning procedures and guidelines. Warranties for the house system, if new, to commence when the Owner moves in if house system is used as the means to maintain the climate within the building during construction. Include this warranty requirement in the original bid or proposal amount. Coordinate and provide any temporary power, controls, ductwork, piping, plumbing anchorage, miscellaneous steel and structural supports required to support the temporary system. Installation of the system to comply with all applicable codes and be acceptable to the Authority Having Jurisdiction (AHJ).

END OF SECTION

SECTION 23 21 13

HVAC PIPING

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included:

1. Refrigerant Piping

1.02 RELATED SECTIONS

A. Contents of Division 23, HVAC and Division 01, General Requirements apply to this Section.

1.03 REFERENCES AND STANDARDS

A. References and Standards as required by Section 23 00 00, HVAC Basic Requirements and Division 01, General Requirements.

1.04 SUBMITTALS

A. Submittals as required by Section 23 00 00, HVAC Basic Requirements and Division 01, General Requirements.

B. In addition, provide:

1. Welding Certificates: Copies of certificates for welding procedures and personnel.
2. Field Test Reports: Written reports of tests specified in Part 3 of this Section. Include the following:
   a) Test procedures used.
   b) Test results that comply with requirements.
   c) Failed test results and corrective action taken to achieve requirements.

1.05 QUALITY ASSURANCE

A. Quality assurance as required by Section 23 00 00, HVAC Basic Requirements and Division 01, General Requirements.

1.06 WARRANTY

A. Warranty of materials and workmanship as required by Section 23 00 00, HVAC Basic Requirements and Division 01, General Requirements, General Requirements.

PART 2 - PRODUCTS

2.01 REFRIGERANT PIPING

A. Piping:

1. Copper Tube: ASTM B 280, Type ACR, drawn-temper tube, clean, dry and capped.
   a) Fittings: ASME B16.22 wrought copper.
   b) Joints: Braze, AWS A5.8 BCuP silver/phosphorus/copper alloy (15 percent Silver).
2. Copper Tube to 5/8-inch OD: ASTM B280. Tube ACR, annealed-temper copper tube, clean, dry and capped.
   a) Fittings: ASME B16.26 cast copper.
   b) Joints: Flared.

B. Moisture and Liquid Indicators:

1. Manufacturers:

a) Henry Technologies.

b) Parker Hannifin/Refrigeration and Air Conditioning.

c) Sporlan Valve Company.

d) Substitutions: See Section 23 00 00, HVAC Basic Requirements, Division 00, Procurement and Contracting Requirements and Division 01, General Requirements requirements.

2. Indicators: Single port type, UL listed, with copper or brass body, flared or solder ends, sight glass, color coded paper moisture indicator and plastic cap; for maximum temperature of 200 degrees F and maximum working pressure of 300 PSI.

2.02 PAINTING OF EXTERIOR PIPING

A. Paint exterior uninsulated steel piping with exterior latex, semi-gloss (AE), Master Painters Institute MPI 11, suitable for metallic surfaces B, Haze Gray color.

B. Use ready-mixed (including colors) paint. Prime paint with pigment and vehicle, compatible with substrate and finish coats specified. Volatile Organic Compounds (VOC) content of paint materials shall not exceed 50g/l for exterior latex paints and primers. Lead-based paint is not permitted.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

A. Install per manufacturer's written instructions and requirements.

B. Preparation:

1. Ream pipe and tube ends. Remove burrs.

2. Remove scale and dirt on inside and outside before assembly.

3. Prepare piping connections to equipment with flanges or unions.

4. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

3.02 REFRIGERANT PIPING INSTALLATION

A. Install systems in accordance with ASHRAE Standard 15.

B. Group piping whenever practical at common elevations and locations. Slope piping one percent in direction of oil return.

C. Arrange piping to return oil to compressor. Provide traps and loops in piping, and provide double risers as required. Slope horizontal piping 0.40 percent in direction of flow.

D. Flood piping system with nitrogen when brazing.

E. Follow ASHRAE Standard 15 procedures for charging and purging of systems and for disposal of refrigerant.

F. Provide replaceable cartridge filter-driers, with isolation valves and valved bypass.

G. Locate expansion valve sensing bulb immediately downstream of evaporator on suction line.

H. Fully charge completed system with refrigerant after testing.

I. Field Quality Control:

1. Test refrigeration system in accordance with ASME B31.5.

2. Pressure test system with dry nitrogen to 200 PSI. Perform final tests at 27-inches vacuum and 200 PSI using electronic leak detector. Test to no leakage.

END OF SECTION

SECTION 23 34 00

HVAC FANS

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included:

1. Roof Exhaust Fans

1.02 RELATED SECTIONS

A. Contents of Division 23, HVAC and Division 01, General Requirements apply to this Section.

1.03 REFERENCES AND STANDARDS

A. References and Standards as required by Section 23 00 00, HVAC Basic Requirements and Division 01, General Requirements.

1.04 SUBMITTALS

A. Submittals as required by Section 23 00 00, HVAC Basic Requirements and Division 01, General Requirements.

B. In addition, provide:

1. Certified fan performance curves with system operating conditions indicated.
2. Certified fan sound-power ratings.
3. Motor ratings and electrical characteristics, plus motor and electrical accessories.
4. Material gauges and finishes, including color charts.
5. Dampers, including housings, linkages, and operators.

1.05 QUALITY ASSURANCE

A. Quality assurance as required by Section 23 00 00, HVAC Basic Requirements and Division 01, General Requirements.

1.06 WARRANTY

A. Warranty of materials and workmanship as required by Section 23 00 00, HVAC Basic Requirements and Division 01, General Requirements.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver fans as factory-assembled unit, to the extent allowable by shipping limitations, with protective crating and covering.

B. Disassemble and reassemble units, as required for moving to final location, according to manufacturer's written instructions.

C. Lift and support units with manufacturer's designated lifting or supporting points.

1.08 COORDINATION

A. Coordinate size and location of structural-steel support members.

B. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases.

C. Coordinate installation of roof curbs, equipment supports, and roof penetrations.

1.09 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents. Belts: One set for each belt-driven unit.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Roof Exhaust Fans:
   1. Greenheck
   2. Cook
   3. Twin City

2.02 ROOF EXHAUST FANS

A. Description: Belt-driven or direct-driven centrifugal fans consisting of housing, wheel, fan shaft, bearings, motor and disconnect switch, drive assembly, curb base, and accessories.

B. Wheel:
   1. Single width, single inlet, backward inclined/airfoil blades
   2. Aluminum hub and wheel with steel inlet bell.
   3. Statically and dynamically balanced with its own bearings.

C. Housing:
   1. One piece heavy gauge spun aluminum dome, hinged for service.

D. Bearings and Drives:
   1. Bearings: Heavy duty pillow block type, self greasing ball bearings with ABMA 9 L-10 life at 100,000 hours.
   2. Shafts: Hot rolled steel, ground and polished, with keyway, protectively coated with lubricating oil.

E. Pulleys: Cast-iron, adjustable-pitch motor pulley.

F. Fan and motor isolated from exhaust airstream.

G. Curb: Field fabricated, insulated wooden roof curb, galvanized steel, mitered ad welded corners; 1-1/2-inch thick, rigid, fiberglass insulation adhered to inside walls; and 1-1/2-inch wood nailer, hinged with curb seal. Provide curb for flat roof as indicated.

H. Motor: Integrally mounted, 1800 RPM maximum, with pre-lubricated sealed ball bearings. ODP for motors located indoors and TEFC for motors exposed to moisture.
   1. Inverter duty motor for use with variable frequency drive where indicated on Fan Schedule on Drawings.

I. Accessories:
   1. Inlet/Outlet Screens: Galvanized steel welded grid, removable.
   2. Backdraft Damper: Parallel blade heavy duty steel or aluminum, where scheduled, damper assembly with blades constructed of two plates formed around and welded to shaft, channel frame, sealed ball bearings, with blades linked out of air stream to single control lever. Motorized where indicated and gravity actuated with counterweight, where motorized is not indicated.
   3. Disconnect Switch: Where not shown on Division 26, Electrical Drawings, provide nonfusible type, with thermal-overload protection mounted inside fan housing factory wired through an internal aluminum conduit.
   4. Vibration Isolation: Wheel and motor mounted on integral double deflection neoprene isolators.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

A. Install in accordance with manufacturer's instructions.

B. Install power ventilators level and plumb.

C. Install units with clearances for service and maintenance.

D. Provide fixed sheaves required for final air balance.

E. Provide safety screen where inlet or outlet is exposed.

F. Provide backdraft dampers on discharge of exhaust fans and as indicated on Drawings.

G. Ground equipment.

H. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

I. Equipment Startup Checks:

1. Verify that shipping, blocking, and bracing are removed.
2. Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.
3. Verify that cleaning and adjusting are complete.
4. Disconnect fan drive from motor, verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operation. Reconnect fan drive system, align and adjust belts, and install belt guards.
5. Verify lubrication from bearings and other moving parts.
6. Verify that manual and automatic volume control and fire and smoke dampers in connected ductwork systems are in fully open position.
7. Disable automatic temperature-control operators.

J. Starting Procedures:

1. Energize motor and adjust fan to indicated rpm.
2. Measure and record voltage and amperage.

K. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation. Remove malfunctioning units, replace with new units, and retest.

L. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

M. Shut unit down and reconnect automatic temperature-control operators.

N. Replace fan and motor pulleys as required to achieve design airflow.

O. Provide totally enclosed fan cooled motors when motor is located outdoors, whether under a cover or not, or exposed to moisture. Provide protective covering for electronically commutated motors located in outdoor or wet/wash-down locations.

P. Repair or replace malfunctioning units. Retest as specified above after repairs or replacements are made.

Q. Adjust damper linkages for proper damper operation.

R. Adjust belt tension.

S. Lubricate bearings.

T. On completion of installation, internally clean fans according to manufacturer's written instructions. Remove foreign material and construction debris. Vacuum fan wheel and cabinet.

U. After completing system installation, including outlet fitting and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finishes.

V. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain HVAC fans. Train Owner's maintenance personnel on procedures and schedules for starting and stopping, troubleshooting, servicing, and maintaining equipment and schedules.

3.02 ROOF EXHAUST FANS

A. Secure roof exhaust fans to roof curbs with cadmium-plated hardware.

END OF SECTION

SECTION 23 81 26

SMALL SPLIT SYSTEM AND UNITARY HVAC EQUIPMENT

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included: Materials, installation and testing of:

1. Split System Condensing Unit
2. Split System Indoor Fan Coil Unit
3. Accessory Equipment

1.02 RELATED SECTIONS

A. Contents of Section 23 00 00, HVAC Basic Requirements and Division 1, General Requirements apply to this Section.

1.03 REFERENCES AND STANDARDS

A. References and Standards as required by Section 23 00 00, HVAC Basic Requirements and Division 1, General Requirements.

B. In addition, meet the following:

1. ARI 210

1.04 SUBMITTALS

A. Submittals as required by Section 23 00 00, HVAC Basic Requirements and Division 1, General Requirements.

1.05 QUALITY ASSURANCE

A. Quality assurance as required by Section 23 00 00, HVAC Basic Requirements and Division 1, General Requirements.

1.06 WARRANTY

A. Warranty of materials and workmanship as required by Section 23 00 00, HVAC Basic Requirements and Division 1, General Requirements.

B. In addition, provide:

1. Refrigeration compressor(s): 5-year warranty.
2. Furnace heat exchanger: 5-year warranty.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Split System Condensing Unit:

1. Bryant
2. Trane
3. York
4. Rheem
5. Luxaire
6. Lennox International
7. Or approved equivalent.

B. Split System Indoor Fan Coil Unit:

1. Trane
2. York
3. Greenheck

4. International Environmental
5. Or approved equivalent.

2.02 SPLIT-SYSTEM CONDENSING UNIT

A. Description: Cooling operation, Energy Star labeled. Unit matched to indoor unit.

B. Cabinet: Fabricated of galvanized steel and finished with powder coated baked enamel.

C. Refrigeration System:
1. HFC Refrigerant or other refrigerant with zero ozone depletion potential (ODP).
2. Hermetically sealed compressor, high-efficiency, variable speed compressor, integral high/low pressure and temperature protection, liquid line filter dryer.
3. Options:
a) Long Line Accessory Kit
b) Solenoid Valve
c) Crankcase Heater

D. Condenser Air System:
1. Condenser Fan: Propeller type with direct drive motor, low sound generator, .
2. Condenser Fan Motor: Premium efficiency, permanently lubricated, totally enclosed with built-in current and thermal overload protection.
3. Condenser Coil: Copper tubes mechanically bonded into aluminum fins.
a) Provide corrosion protection coating.
b) Provide Hail Guard.

E. Condensate: Collection in galvanized steel drain pan sloped to drain away from the unit.

F. Controls: Completely internally wired, microprocessor, high and low pressure cutouts, contractors and internal overload protection on all motors. Provide low ambient operation to 40 degrees F outside to maintain condensing temperature on part load operation. Provide anti-short cycle timer and time delay between compressor operation.

2.03 SPLIT-SYSTEM INDOOR FAN COIL UNIT

A. Indoor fan unit matched to outdoor condensing unit. Self-contained, packaged, factory-assembled, pre-wired unit with direct expansion evaporator coil, cabinet supply fan, filter housing and controls. Accessories, economizer assembly, etc. as scheduled and shown on Drawings.

B. Components:
1. Steel cabinet with baked enamel finish or galvanized steel; minimum 1/2-inch thick, 1-1/2# liner with cleanable facing or solid interior metal panel, filter housing suitable for 2-inch thick filter. Easily removed access panels.
2. Economizer/Mixing Box with damper actuator.

C. Refrigeration System: HFC Refrigerant or other refrigerant with zero ozone depletion potential (ODP).

D. Air System:
1. Supply Fan (Evaporator Fan): centrifugal multi-speed direct drive, ECM motor drive, or V-belt with internal vibration isolation.
2. Evaporator Motor: Premium efficiency with permanently lubricated bearings thermal overload protection.
3. Evaporator Coil: Seamless copper tubes expanded into aluminum fins. Galvanized or polymer drain pan sloped in all directions.
4. Filter: MERV 8, 2-inch thick, pleated, throw-away.
5. Supplemental Heat Coil:

a) Electric Heat Coil: UL Listed with helix wound bare nichrome wire heating elements. Heat output and staging as scheduled. Power usage per stage is not to exceed 5 kilowatts. Staging of coil heat internally controlled.

b) Hot water coil: copper tubes mechanically bonded into aluminum fins, arranged for counter flow.

E. Condensate:

1. Condensate pump kit.
2. Secondary drain pan; Condensate overflow shut-off float switch and external alarm.

F. Controls: Factory-wired to internal terminal strip or board for connection to programmable thermostat.

G. Electrical: Furnish magnetic contactors. Arrange for single point electrical connection. Provide all associated field wiring.

2.04 ACCESSORY EQUIPMENT

A. Room Thermostat: Wall-mounted, electric solid state microcomputer based room thermostat with remote sensor to maintain temperature setting; low-voltage; with following features:

1. Thermostat Display:
   a) Time of Day
   b) Actual Room Temperature
   c) Programmed Temperature
   d) Programmed Time
   e) Duration of Timed Override
   f) Day of Week
   g) System mode indication: heating, cooling, fan auto, off, and on, auto or on, off.
2. System selector switch (heat-off-cool) and fan control switch (auto-on).
3. Automatic switching from heating to cooling.
4. Preferential rate control to minimize overshoot and deviation from setpoint.
5. Set-up for four separate temperatures per day.
6. Instant override of setpoint for continuous or timed period from one hour to 31 days.
7. Short cycle protection.
8. Programming based on weekdays, Saturday and Sunday.
9. Selection features including degree F or degree C display, 12 or 24 hour clock, keyboard disable, remote sensor, fan on-auto.
10. Battery replacement without program loss.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

A. Install with required clearances and access for maintenance.

B. Install factory furnished devices for field installation.

C. Inspect for and remove shipping bolts, blocks and tie-down straps.

D. After energizing units: Test units for proper fan rotation. Test and adjust controls and internal safeties. Replace malfunctioning units and retest.

E. Thoroughly clean exposed portions of equipment. Install new filters prior to final test and balance and again prior to final acceptance.

3.02 SPLIT SYSTEM CONDENSING UNIT INSTALLATION

A. Provide vibration isolation: As scheduled.

B. Provide Seismic restraint.

3.03 SPLIT SYSTEM INDOOR FAN COIL UNIT INSTALLATION

A. Provide Seismic restraint.

B. Condensate piped to indirect waste connection; cleanouts at changes of direction; sized and sloped to drain per Code. Secondary drain pan with float switch.

3.04 ACCESSORY EQUIPMENT INSTALLATION

A. Maintain code required separation between outside air intake and plumbing vents and exhaust fan discharge.

END OF SECTION