Technical Specifications

Justice Center
Horseshoe Reception 2024 Remodel
Douglas County Government
4000 Justice Way, Castle Rock, CO

Douglas County Government
August 1, 2024

Prepared By:

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Douglas County Justice Center – Horseshoe Reception Remodel
Douglas County Government

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All Pages in this Specification are numbered. If any section of the specifications is missing or if the last page in any section does not say "End of Section" Please notify the Architect immediately.

SPECIFICATIONS:

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SECTION 010100 – SUMMARY OF WORK

PART 1 - GENERAL

1.01 CONDITIONS AND REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This section includes the following:
   1. Schedule of drawings, specifications, and addenda.
   2. Project contacts & location.
   3. Project description
   4. Type of contract.
   5. Examination of site.
   6. Contractor's use of premises.
   7. Owner's occupancy requirements.
   8. Work restrictions.
   9. Specification formats and conventions.
   10. Exclusions

1.03 SCHEDULE OF DRAWINGS, SPECIFICATIONS AND ADDENDA

A. Drawings: See the Drawing Title Sheet for the Drawings Index

B. Project Manual: Douglas County Justice Center – Horseshoe Reception Remodel 2024

C. Addenda: All Addenda issued prior to bidding.

1.04 PROJECT CONTACTS & LOCATION

A. Project: Douglas County Justice Center – Horseshoe Reception Remodel
   1. Project Location: 4000 Justice Way, Castle Rock, CO 80109

B. Owner: Douglas County Government.
   1. Contact: Walter Schmidt: wschmidt@douglas.co.us
   2. Phone: 303.663.7207
   3. Address: 4000 Justice Way, Castle Rock, CO 80109.

C. Architect: DLH Architecture.
   1. Project Architect: Nathan Albers: nalbers@dlharchitecture.com
   2. Address: 200 Front Street, Castle Rock, CO 80104.
   3. Phone: 303.688.5273 x1

1.05 PROJECT DESCRIPTION

A. This project consists of the remodel of the reception area and control area for detentions on the second floor of the Douglas County Justice Center. Affecting approximately 5,000 square feet of existing space, the project will include, but is not limited to, demolition of portions of the existing building, creation of new customer service spaces for the conceal and carry permit desk, the control entry area for detentions, new file rooms and modifications to existing offices.

B. Security protocol must be maintained and all contractors, and their subcontractor will need to pass background security checks to be allowed to work in the building.

1.06 TYPE OF CONTRACT

A. This project will be constructed under one single bid package by one General Contractor. The bid package will be for limited site work, and the interior building remodel. All work under these documents will be executed under one prime contract between the Owner and the General Contractor.

1.07 EXAMINATION OF SITE

A. Failure to visit site will in no way relieve any Contractor from the necessity of furnishing materials or performing all work that may be required to complete the project in accordance with Drawings and Specifications without additional cost to Owner.

1.08 CONTRACTOR USE OF PREMISES

A. Limitations: Operations of the Contractor shall be limited to areas where work is indicated on the drawings.

1.09 OWNER'S OCCUPANCY REQUIREMENTS

A. Owner Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed areas of building, before Substantial Completion, provided such occupancy does not interfere with completion of the work. Such placement of equipment and partial occupancy shall not constitute acceptance of the total work.
   1. Architect will prepare a Certificate of Substantial Completion for each specific portion of the work to be occupied before Owner occupancy.
   2. Before partial Owner occupancy, electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will operate and maintain electrical systems serving occupied portions of building.
   3. Obtain a Certificate of Occupancy from authorities having jurisdiction before final Owner occupancy.

1.10 WORK RESTRICTIONS

A. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet (8 m) of entrances.

B. Follow local ordinances for work restrictions.

1.11 SPECIFICATION FORMATS AND CONVENTIONS

A. Specification Format: The Specifications are organized into Divisions and Sections using the 2016 Version-Division Format and CSI/CSC's "MasterFormat" numbering system.
   1. Section Identification: The Specifications use Section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete because all available section numbers are not used. Consult the table of contents at the beginning of the Project Manual to determine the applicable numbers and names of sections in the Contract Documents.
   2. Division 1: Sections in Division 1 govern the execution of the Work of all Sections in the Specifications.

B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
   1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.

2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
    a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

1.12 EXCLUSIONS

A. The following areas of work are specifically excluded from this contract.
    1. Low voltage work.
    2. Security work.
    3. IT Cabling
    4. Fixtures and Furniture.
    5. Appliances

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 010100

SECTION 012600 – CONTRACT MODIFICATON PROCEDURES

PART 1 - GENERAL

1.01 CONDITIONS AND REQUIREMENTS

A. Drawings and general provisions of the contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section specifies administrative and procedural requirements for handling and processing contract modifications.

B. Related Sections include the following:
   1. Division 1 Section "Product Requirements" for administrative procedures for handling requests for substitutions made after contract award.

1.03 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on "Architect's Supplemental Instructions." (ASI)

1.04 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests (PR): Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
   1. Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
   2. Within time specified in Proposal Request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
      a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
      b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
      c. Include costs of labor and supervision directly attributable to the change.
      d. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to Architect.
   1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
   2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
   3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
   4. Include costs of labor and supervision directly attributable to the change.

5. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Division 1 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.

C. Proposal Request Form: Use DCG forms provided by Owner.

1.05 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on DCG forms provided by Owner.

1.06 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Architect may issue a Construction Change Directive on DCG forms provided by the Owner. A Construction Change Directive instructs the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
   1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
   1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

SECTION 012900 – PAYMENT PROCEDURES

PART 1 - GENERAL

1.01 CONDITIONS AND REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Related Sections include the following:
   1. Division 1 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
   2. Division 1 Section "Construction Progress Documentation" for administrative requirements governing preparation and submittal of Contractor's Construction Schedule and Submittals Schedule.

1.03 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.04 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule. Cost-loaded CPM Schedule may serve to satisfy requirements for the Schedule of Values.
   1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
      a. Application for Payment forms with Continuation Sheets.
      b. Submittals Schedule.
      c. Contractor's Construction Schedule.
   2. Submit the Schedule of Values to Architect at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.

B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.
   1. Identification: Include the following Project identification on the Schedule of Values:
      a. Project name and location.
      b. Name of Architect.
      c. Architect's project number.
      d. Contractor's name and address.
      e. Date of submittal.
   2. Submit draft of DCG payment request form.

3. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
    a. Related Specification Section or Division.
    b. Description of the Work.
    c. Name of subcontractor.
    d. Name of manufacturer or fabricator.
    e. Name of supplier.
    f. Change Orders (numbers) that affect value.
    g. Dollar value.
        1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate. Include separate line items under required principal subcontracts for operation and maintenance manuals, punch list activities, Project Record Documents, and demonstration and training in the amount of 5 percent of the Contract Sum.
5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
6. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
    a. Differentiate between items stored on-site and items stored off-site. If specified, include evidence of insurance or bonded warehousing.
7. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
8. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
    a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.
9. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.05 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications and payments as signed by Architect and Owner’s Representative and paid for by Owner.
    1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.

C. Payment Application Forms: Use DCG forms provided by the Owner as form for Applications for Payment.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
    1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
    2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

E. Transmittal: Submit 3 signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
   1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

F. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
   1. List of subcontractors.
   2. Schedule of Values.
   3. Contractor's Construction Schedule (preliminary if not final).
   4. Products list.
   5. Schedule of unit prices.
   6. Submittals Schedule (preliminary if not final).
   7. List of Contractor's staff assignments.
   8. List of Contractor's principal consultants.
   9. Copies of building permits.
   10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
   11. Initial progress report.
   12. Report of preconstruction conference.
   13. Certificates of insurance and insurance policies.
   14. Performance and payment bonds.
   15. Data needed to acquire Owner's insurance.
   16. Initial settlement survey and damage report if required.

G. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
   1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
   2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

H. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
   1. Evidence of completion of Project closeout requirements.
   2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
   3. Updated final statement, accounting for final changes to the Contract Sum.
   4. Contractor's Affidavit of Payment of Debts and Claims.
   5. Contractor's Affidavit of Release of Liens.
   6. Evidence that claims have been settled.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 013100 – PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.01 CONDITIONS AND REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on the Project including, but not limited to, the following:
   1. Coordination drawings.
   2. Requests for Information (RFIs).
   3. Project Web site.
   4. Project meetings.

B. Related Requirements:
   1. Section 017300 "Execution Requirements" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.

1.03 DEFINITIONS

A. RFI: Request from Owner, Architect or Contractor seeking information required by or clarifications of the Contract Documents.

B. RFI Forms: Software-generated form with substantially the same content as indicated below, acceptable to Architect.
   1. RFI documentation shall be delivered in Adobe Acrobat PDF format.

1.04 INFORMATIONAL SUBMITTALS

A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
   1. Name, address, and telephone number of entities performing subcontract or supplying products.
   2. Number and title of related Specification Section(s) covered by subcontract.
   3. Drawing number and detail references, as appropriate, covered by subcontract.

1.05 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.
   1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
   2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
   3. Make adequate provisions to accommodate items scheduled for later installation.

B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
   1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
   1. Preparation of Contractor's construction schedule.
   2. Preparation of the schedule of values.
   3. Installation and removal of temporary facilities and controls.
   4. Delivery and processing of submittals.
   5. Progress meetings.
   6. Preinstallation conferences.
   7. Project closeout activities.
   8. Startup and adjustment of systems.

1.06 COORDINATION DRAWINGS

A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
   1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
      a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
      b. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

B. Coordination Drawing Organization: Organize coordination drawings as follows:
   1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid.
   2. Plenum Space: Indicate sub-framing for support of ceiling and wall systems, electrical equipment, and related Work. Locate components to accommodate layout of light fixtures indicated on Drawings.
   3. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
   4. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
   5. Review: Architect will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility.

1.07 REQUESTS FOR INFORMATION (RFIs)

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
   1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
   2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
   1. Project name.
   2. Project number.
   3. Date.
   4. Name of Contractor.
   5. Name of Architect.
   6. RFI number, numbered sequentially.
   7. RFI subject.
   8. Specification Section number and title and related paragraphs, as appropriate.
   9. Drawing number and detail references, as appropriate.
   10. Field dimensions and conditions, as appropriate.
   11. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
   12. Contractor's signature.
   13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

C. RFI Forms: Software-generated form with substantially the same content as indicated above, acceptable to Architect.

D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow ten working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
   1. The following RFIs will be returned without action:
      a. Requests for approval of submittals.
      b. Requests for approval of substitutions.
      c. Requests for coordination information already indicated in the Contract Documents.
      d. Requests for adjustments in the Contract Time or the Contract Sum.
      e. Requests for interpretation of Architect's actions on submittals.
      f. 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 Change Proposal according to Section 012600 "Contract Modification Procedures."
      a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.

E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Use Software log with not less than the following:
   1. Project name.
   2. Name and address of Contractor.
   3. Name and address of Architect.
   4. RFI number including RFIs that were dropped and not submitted.
   5. RFI description.
   6. Date the RFI was submitted.

7. Date Architect's response was received.

F. 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.
   1. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
   2. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

1.08 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.
   1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
   2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
   3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.

B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
   1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
   2. Agenda: Discuss items of significance that could affect progress, including the following:
      a. Tentative construction schedule.
      b. Phasing.
      c. Critical work sequencing and long-lead items.
      d. Designation of key personnel and their duties.
      e. Procedures for processing field decisions and Change Orders.
      f. Procedures for RFIs.
      g. Procedures for testing and inspecting.
      h. Procedures for processing Applications for Payment.
      i. Distribution of the Contract Documents.
      j. Submittal procedures.
      k. Preparation of record documents.
      l. Use of the premises and existing building.
      m. Work restrictions.
      n. Working hours.
      o. Owner's occupancy requirements.
      p. Responsibility for temporary facilities and controls.
      q. Procedures for moisture and mold control.
      r. Procedures for disruptions and shutdowns.
      s. Construction waste management and recycling.
      t. Parking availability.
      u. Office, work, and storage areas.
      v. Equipment deliveries and priorities.
      w. First aid.
      x. Security.
      y. Progress cleaning.
   3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
   1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
   2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
      a. Contract Documents.
      b. Options.
      c. Related RFIs.
      d. Related Change Orders.
      e. Purchases.
      f. Deliveries.
      g. Submittals.
      h. Review of mockups.
      i. Possible conflicts.
      j. Compatibility problems.
      k. Time schedules.
      l. Weather limitations.
      m. Manufacturer's written instructions.
      n. Warranty requirements.
      o. Compatibility of materials.
      p. Acceptability of substrates.
      q. Temporary facilities and controls.
      r. Space and access limitations.
      s. Regulations of authorities having jurisdiction.
      t. Testing and inspecting requirements.
      u. Installation procedures.
      v. Coordination with other work.
      w. Required performance results.
      x. Protection of adjacent work.
      y. Protection of construction and personnel.
   3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
   4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
   5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Progress Meetings: Conduct progress meetings at weekly intervals.
   1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
   2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
      a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
         1) Review schedule for next period.
         2) Use DUR 14 point agenda.
   3. Minutes: Meeting minutes per Architect. Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
      a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013126 - MECHANICAL AND ELECTRICAL COORDINATION

PART 1 - GENERAL

1.01 CONDITIONS AND REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 DESCRIPTION

A. Responsibility: Unless otherwise indicated, all motors and controls shall be furnished, set in place, and wired in accordance with the following schedule:

ITEM	FURNISHED BY	SET BY	POWER WIRING	CONTROL WIRING
Equipment Motors	MC	MC	EC	--
Motor Starters & Overload Heaters (See Note 1)	MC	EC	EC	MC
Fused & Unfused Disconnection Switches, Thermal Overload & Heaters	EC	EC	EC	--
Manual Operating & Speed Switches, (carrying load currents) (See Notes 3 and 4)	MC	EC	EC	EC
Control Relays & Transformer (See Note 2)	MC	MC	EC	MC
Thermostats (Line Voltage)	MC	EC	EC	EC
Temperature Control Panels	MC	MC	EC	MC
Fire & Smoke Detectors, including Relays for Fan Shutdown (See Notes 7 & 8)	EC	EC	EC	EC
Motor & Solenoid Valves, Damper Motors, Fan Interlocking Wiring, Low Voltage Thermostats	MC	MC	--	MC
Temporary Heating Connections	MC	MC	EC	MC

MC = Mechanical Contractor Under Division 23,EC = Electrical Contractor under Division 26

1. All starters, other than those in Motor Control Centers shall be furnished under Division 15. All starters furnished under Division 15 shall be complete with three O.L. heaters and shall conform to NEC and NEMA requirements.

2. Control relays and control transformers shall be furnished under Division 15 except where furnishing such items are specifically required under Division 16 specifications and/or drawings.

3. Pushbutton stations carrying full load current are to be wired under Division 16 of the work.

4. Exhaust Fans: The County under Division 16 of the work will furnish and install circuits, feeders and disconnect switches, and make all connections to motors and controls unless interlocked with other mechanical equipment or exhaust fans in locations indicated. Where exhaust fans are switched with lights, a two-pole toggle switch will be provided by the Electrical Contractor under Division 16. Where exhaust fans are controlled by sixty (60) minute time switches, electrical contractor shall provide and install the switch. Where exhaust fans are interlocked with other mechanical equipment, the interlock wiring will be furnished by the Mechanical Contractor under Division 15.

5. If disconnect switches are furnished as part of factory wired equipment, wiring and connections only by EC.

6. If float switches, line thermostats, PE switches, time switches, etc., carry the FULL LOAD CURRENT to any motor, they shall be furnished by the Mechanical Division, but they shall be set in place and connected under the Electrical Division, except that where such items are an integral part of the mechanical equipment or directly attached to ducts, piping, etc., they shall be set in place under the MC and connected by EC. If they do not carry the FULL LOAD CURRENT to any motor, they shall be furnished, set in place, and wired under the MC.

7. Wiring from alarm contacts to alarm system by EC; all control function wiring by MC.

8. Fire and smoke detectors in ductwork on mechanical equipment are mounted under MC. All others are mounted under EC.

9. Connections: Connections to all controls directly attached to ducts, piping and mechanical equipment shall be made with flexible connections.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013126

SECTION 013300 – SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 CONDITIONS AND REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

B. Related Requirements:
   1. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, warranty, final paperwork, and record Product Data.
   2. General Conditions: for submitting progress schedules, schedule of values, applications for payment.

1.03 GENERAL

A. Submittals shall be made early enough to account for processing described below and a 15 day period for thorough review by the Architect and/or Engineer from received date. In conjunction with the Progress Schedule the Contractor shall submit to the Architect a Shop Drawing Submittal Schedule.

B. Shop drawings submitted for this work will make particular note of field-measured dimensions, as-built conditions, and conditions requiring special coordination with other Contractors and/or the requirements of the activities by the Owner.

1.04 SHOP DRAWINGS

A. Subcontractor: Submittals for all product data or shop drawings shall be done electronically. Paper copies of submittals other than color samples will not be accepted without prior notification and permission from the Owner and the architect.

B. Contractor:
   1. Review all shop drawings and product data for accuracy, completeness, and conformity with the Contract Documents. Make electronic notes and corrections on the electronic submittal and stamp with Contractor's electronic stamp/date. An electronic signature of the individual who reviewed the shop drawings is required, and located below the Contractor's stamp.
   2. Shop drawings not electronically stamped and signed by the Contractor will be returned.
   3. Verify all existing conditions and dimensions.
   4. All and each sheet of structural submittals shall be stamped and signed.

C. Architect:
   1. Electronically check drawings by making notes and corrections on sepia tracings and prints, stamp "No Exceptions Taken", "Revise and Resubmit", "Rejected", etc., as required.
   2. In the event that the drawings require a consultant's check, route the electronic submittal through the consultant and back to the Architect as necessary. Consultant will retain one set of prints.
   3. Retain an electronic copy and transmit one set to Owner.
   4. Return an electronic copy back to Contractor.

D. Contractor:
   1. Electronically distribute the plans to the subcontractors.

E. Resubmittal: In the event the drawings have to be resubmitted to the Architect, The contractor shall make the corrections required and resubmit the plans electronically.

F. References: Shop drawings shall be referenced to applicable drawings or specification sections to facilitate ease and accuracy of checking.

G. Shop Drawing Schedule: The shop drawings listed in the individual sections of the specifications must be submitted.

1.05 PRODUCT DATA

A. Subcontractor: Subcontractor shall submit an electronic copy of brochure material and any required samples.

B. Routing: Routing will be as indicated above for shop drawings with the Architect and Engineer retaining an electronic copy for file and returning an electronic copy to the Contractor for his file and distribution to the subcontractor as applicable.

C. Reference: Product data shall be referenced to applicable drawings or specification sections to facilitate ease and accuracy of checking.

D. Product Data Schedule: The product data listed in the individual sections of the specifications must be submitted.

1.06 JOB SITE DOCUMENTS

A. Only accepted shop drawings or product data shall be kept at the job site. The Contractor shall keep a complete set of such documents on file at the job site.

1.07 FIELD MEASUREMENTS

A. Required field measurements are the responsibility of the Contractor and will be made before shop drawings have been reviewed by the Architect.

1.08 SAMPLES

A. The Architect will provide the Contractor with a checklist indicating all materials where color, texture or finish is subject to selection by the Architect. Certain other samples will also be requested for use by the Architect in preparation of color and material sample presentations by the Owner. Promptly after receipt of checklist, the Contractor shall assemble and deliver to the Architect two complete collections of all required samples.

B. Upon receipt of such a complete collection of samples the Architect will, with reasonable promptness, make the selections and prepare and deliver to the Contractor a schedule covering all items subject to selection.

C. The Architect reserves the right not to make individual determination or selections until all materials are furnished.

PART 2 – PRODUCTS (Not Used).

PART 3 – EXECUTION (Not Used).

END OF SECTION 013300

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.01 CONDITIONS AND REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve the Contractor of responsibility for compliance with the Contract Document requirements.
   1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
   2. Specified tests, inspections, and related actions do not limit Contractor's other quality assurance and control procedures that facilitate compliance with the Contract Document requirements.
   3. Requirements for Contractor to provide quality assurance and control services required by the Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

C. Related Sections include the following:
   1. Division 01 Section "Cutting and Patching" for repair and restoration of construction disturbed by testing and inspecting activities.
   2. Divisions 02 through 33 Sections for specific test and inspection requirements.

D. Conflicting Requirements.
   1. If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.

   2. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.03 TESTING

A. Contractor shall provide equipment and facilities required for conducting field tests and for collecting and forwarding samples. Contractor shall not use any materials or equipment represented by samples until tests, if required, have been made and the materials or equipment are found to be acceptable. Any product deemed unfit for use shall not be incorporated into the work.

B. All materials or equipment proposed for use may be tested at any time during their preparation or use. Contractor shall furnish the required samples without charge and shall give sufficient notice of the placing of orders to permit the testing. Products may be sampled either prior to shipment or after being received at the site of the work.

C. Tests shall be made by an accredited testing laboratory. Except as otherwise provided, sampling and testing of materials and the laboratory methods and testing equipment shall be in accordance with the latest standards and methods of the American Society of Testing and Materials (ASTM).

D. Where additional or specific information concerning testing methods, sample sizes, etc., is required, requirements are included under the applicable sections of the specifications.

E. Any modification to, or elaboration of, these test procedures, which may be included for specific materials under their respective sections in the specifications, shall take precedence over these procedures.

1.04 CONCRETE TESTS

A. Control tests of concrete work shall be made at the Owner's expense at such times and number prescribed by Section 033000.

1.05 OTHER TESTING

A. If required, the following testing shall be performed at the expense of the Contractor:
   1. Material Substitution: Testing of basic material or fabricated equipment offered as a substitute for specified item may be required in order to prove its compliance with the specifications.

   2. Mechanical / Electrical: Tests on mechanical or electrical systems required to ensure their proper installation and operation.

B. Any test that fails shall be paid for by the Contractor:
   1. Quantity and nature of tests will be determined by the Architect.
   2. Proof of noncompliance will make the Contractor liable for any corrective action which the Architect feels is prudent including complete removal and replacement of defective material.

C. Nothing contained herein is intended to imply that the Contractor does not have the right to have tests performed on any material at any time for his own information and job control so long as the Owner does not assume responsibility for costs or for giving them consideration when appraising quality of materials.

1.06 TEST REPORTS

A. Reports of tests conducted by testing laboratories shall be distributed by the testing laboratory as follows:
   1. 1 copy - Contractor
   2. 1 copy - Applicable supplier or subcontractor
   3. 1 copy - Owner
   4. 1 copy - Applicable Consulting Engineer
   5. 1 copy - Architect
   6. Other copies - as directed

1.07 QUALITY CONTROL SYSTEM

A. General: Contractor shall establish a quality control system to perform sufficient inspection and tests of all items of work, including that of all subcontractors, to ensure conformance to the Contract Documents for materials, workmanship, construction, finish, functional performance and identification. This control shall be established for all construction except where the Contract Documents provide for specific compliance tests by testing laboratories or engineers employed by the Owner. The quality control system shall specifically include all testing assigned to subcontractors by various Sections of the specifications.

B. The quality control system shall be the means by which the Contractor is assured that the construction complies with the requirements of the Contract Documents. Control shall be adequate to cover all construction operations and should be keyed to the proposed construction schedule.

C. Records: The Contractor shall maintain correct records on an appropriate form for all inspections and tests performed, instructions received from the Architect, and actions taken as a result of those instructions. These records shall include evidence that the required inspections or tests have been performed (including type and number of inspections or tests, nature of defects, causes for rejection, etc.) proposed or directed remedial action, and corrective action taken. The Contractor shall document inspections and tests as required by 3.01.

1.08 QUALITY CONTROL PLAN SUBMITTAL

A. The Contractor shall furnish quality control plan to Architect which shall include the personnel, procedures, instructions, and records to be used. The plan shall specifically include the following:
   1. A list of control tests which the Contractor understands Contractor or subcontractors are to perform.
   2. Procedures for reviewing shop drawings, product data, samples or other submittals before submission to Architect. Include procedures for obtaining required field measurements.
   3. Method of documenting quality control operation, inspection and testing including samples of proposed forms.

1.09 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

C. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.

F. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
   1. Requirement for specialists shall not supersede building codes and regulations governing the Work.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
   1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
   2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
   1. Contractor responsibilities include the following:
      a. Provide test specimens representative of proposed products and construction.
      b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
      c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
      d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
      e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
      f. When testing is complete, remove test specimens, assemblies, mockups, and laboratory mockups; do not reuse products on Project.
   2. Testing Agency Responsibilities:
      a. Submit a certified written report of each test, inspection, and similar quality-assurance service to the Owner and Architect with copy to the Contractor.
      b. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

PART 2 – PRODUCTS (Not Used).

PART 3 – EXECUTION

3.01 TEST AND INSPECTION LOG

A. Prepare an electronic record of tests and inspections. Include the following:
   1. Date test or inspection was conducted.
   2. Description of the Work tested or inspected.
   3. Date test or inspection results were transmitted to Architect.
   4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain a log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

3.02 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
   1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
   2. Comply with the Contract Document requirements for Division 01 Section "Cutting and Patching."

B. Protect construction exposed by or for quality-control service activities.

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

END OF SECTION 014000

SECTION 014100 - REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.01 CONDITIONS AND REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 PERMITS AND FEES

A. Refer to the General Conditions of the Contract Section 12 for clarification on the building permits required for this project.

1.03 APPROVAL AND RECOMMENDATION AGENCIES

A. The Douglas County Building Department has jurisdiction for approval and inspection of this project.

B. Codes which have been adopted by Douglas County, Safety Inspection Branch are:

International Building Code, 2021
International Fire Code, 2021 (Ord. #0-016-001)
International Plumbing Code, 2021
International Mechanical Code, 2021
International Energy Conservation Code, 2018
International Existing Building Code 2021
National Electrical Code, 2023
2017 ICC/ANSI - A17.5

C. Comply with all requirements and codes adopted by the Castle Rock Fire Department.

D. Comply with all other requirements of any other local, state or federal requirements which are applicable.

E. In case of a conflict between referenced applicable codes, or other requirements, the one having the more stringent requirements shall govern. Where governing codes or requirements indicate that the drawings or specifications do not comply with the minimum requirements of the codes or requirements, the Contractor shall be responsible for providing an installation which will comply with code requirements. Drawings and specifications shall be followed where they are superior to code requirements.

1.04 OSHA AND EEO COMPLIANCE

A. The Contractor shall have sole responsibility for compliance on the job site to all applicable portions of the Occupational Safety and Health Act and compliance with the Equal Employment Opportunity Act.

B. Protection of life, health and public welfare as it relates to the execution of the construction contract is the responsibility of the Contractor. The Owner will not provide observation, inspection, supervisor or any comment on plans, procedures or actions employed at the project as they relate to safety of life, health or public welfare. If conditions are imposed by the Owner which interfere with, or imply actions detrimental to safety, written notice shall be provided by the Contractor for action prior to effecting any unsafe conditions.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014100

SECTION 014200 - REFERENCE STANDARDS AND ABBREVIATIONS

PART 1 - GENERAL

1.01 CONDITIONS AND REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 QUALITY ASSURANCE

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

B. The date of the standard is that in effect as of the bid date except when a specific date is specified or when the standard is part of an applicable code which includes an edition date.

C. When required by individual sections, obtain a copy of standard. Maintain copy at job site during the work.

1.03 RELATED REQUIREMENTS

A. Drawing Symbols - See Drawings.

1.04 SPECIFICATION LANGUAGE EXPLANATION

A. Specifications are of abbreviated, simplified or streamlined type and include incomplete sentences. Omissions of words or phrases such as "the Contractor shall", "in conformity therewith", "shall be", "as noted on the drawings", "a", "the" are intentional. Supply omitted words or phrases by inference in same manner as they are when "NOTE" occurs on Drawings. Supply words "shall be" or "shall" by inference when colon is used within sentences or phrases. Supply words " on the Drawings" by inference when "as indicated" is used with sentences or phrases.

B. Imperative language is directed to the Contractor. The term "provide" used in the text is defined to mean "furnish and install complete, in place, and ready for operation and use", unless specifically indicated otherwise.

1.05 ABBREVIATIONS

A. Trade Associations: Reference in Contract Documents to trade associations, technical societies, recognized authorities and other institutions include following organizations, which are sometimes referred to only by corresponding abbreviations:

AA	Aluminum Association
AAMA	Architectural Aluminum Manufacturer's Association
ACI	American Concrete Institute
AIMA	Acoustical and Insulating Materials Association
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMA	Acoustical Materials Association
ANSI	American National Standards Institute
APA	American Plywood Association
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers.
ASTM	American Society for Testing and Materials
AWI	Architectural Woodwork Institute
AWPA	American Wood Preservers Association

AWS	American Welding Society
BIA	Brick Institute of America
CRSI	Concrete Reinforcing Steel Institute
FGMA	Flat Glass Marketing Association
FIA	Factory Insurance Association
FM	Factory Mutual Engineering Division
NAAMM	The National Association of Architectural Metal Manufacturers
NCMA	National Concrete Masonry Association
NEC	National Electric Code (of NFPA)
NEMA	National Electrical Manufacturer's Association
NFPA	National Fire Protection Association
NWMA	National Woodwork Manufacturer's Association
PCA	Portland Cement Association
PCI	Prestressed Concrete Institute
SDI	Steel Deck Institute
SJI	Steel Joist Institute
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SSPC	Steel Structures Painting Council
SWI	Steel Window Institute
TCA	Tile Council of America
UL	Underwriters' Laboratories, Inc.
WWPA	Western Wood Products Association

1.06 DRAWINGS AND SCHEDULES

A. The following abbreviations are commonly used on drawings and schedules. Drawings and Schedules may contain other abbreviations as listed in Specific Legends. Not all of the following abbreviations may apply to this project.

AB	Anchor Bolt
ACT	Acoustical Tile
AD	Area Drain
AFF	Above Finish Floor
ALT	Alternate
ALUM	Aluminum
ARCH	Architect
AUD	Auditorium
AV	Audio-Visual
BLDG	Building
BLK	Block (CMU)
BLKG	Blocking
BM	Beam
BM	Bench Mark
BO	Bottom of
BOT	Bottom
BRK	Brick
BRG	Bearing
BUR	Built-Up Roof
C	Channel
CB	Chalkboard
CF	Cubic Foot
CG	Corner Guard
CI	Cast Iron
CJ	Construction Joint
CLG	Ceiling
CMP	Corrugated Metal Pipe
CMS	Compression Seal
CMU	Concrete Masonry Unit
CO	Clean Out
COL	Column
CONC	Concrete
CONST	Construction
CONT	Continues, Continuous
CONTR	Contractor
CORR	Corridor
CPT	Carpet
CR	Classroom
CT	Ceramic Tile
CTR	Counter
CTSK	Countersink, Countersunk
CY	Cubic Yard
D	Deep
DBL	Double
DEMO	Demolish, Demolition
DF	Drinking Fountain

DIA	Diameter
DIM	Dimension
DR	Door
DS	Downspout
DTL	Detail
DWG	Drawing, Drawings
E	East
EA	Each
EB	Expansion Bolt
EBL	Existing Block
EBR	Existing Brick
EC	Existing Concrete
ECT	Existing Ceramic Tile
EGB	Existing Gypsum Board
EHD	Electric Hand Dryer
EJ	Expansion Joint
EL	Elevation
ELEC	Electrical
ELEV	Elevator
EMER	Emergency
EN	Enamel
ENC	Enclose(ure)
ENG	Engineer
EP	Epoxy Paint
EPB	Electric Panel Board
EPWD	Existing Plywood
EQ	Equal
EQUIP	Equipment
ESAG	Existing Suspended Acoustical Grid Ceiling
EWC	Electric Water Cooler
EXG	Existing
EXH	Exhaust
EXP	Expansion
EXT	Exterior
FA	Fire Alarm
FD	Floor Drain
FDN	Foundation
FE	Fire Extinguisher
FEC	Fire Extinguisher Cabinet
FF	Factory Finish
F&I	Furnish and Install
FIN	Finish(ed)
FLG	Flashing
FLR	Floor
FND	Foundation(s)
FO	Face of
FPP	Folding Panel Partition
FS	Floor Sink
FTG	Footing
GA	Gauge
GB	Grab Bar
GB	Gypsum Board
GC	General Contract(or)
GCO	Grade Clean-Out
GI	Galvanized Iron
GL	Glass, Glazing
GS	Gypsum Sheathing
GT	Grout
GV	Galvanized
H	High
HB	Hose Bib
HBD	Hardboard
HC	Hollow Core
HDWR	Hardware
HM	Hollow Metal
HOR	Horizontal
HR	Hour
HT	Height
HVAC	Heating/Ventilating/Air Conditioning
ID	Inside Diameter
IE	Invert Elevation
IMC	Instruction Media Center
INCL	Include (d/ing)
INSUL	Insulation
INT	Interior
INV	Invert
JST	Joist
JT	Joint
KIT	Kitchen
L	Length, Long
LAM	Laminate
LAV	Lavatory
LF	Linear Feet
LG	Large
LH	Left Hand
LT	Light
M	Meter
MAS	Masonry
MAT	Floor Mat
MATL	Material
MAX	Maximum
MB	Markerboard
MECH	Mechanical
MFR	Manufacture(er)
MH	Manhole
MIN	Minimum
MISC	Miscellaneous

MO	Masonry Opening
MTD	Mounted
MTL	Metal
Mull	Mullion
N	North
NIC	Not in Contract
NO	Number
NOM	Nominal
NRC	Noise Reduction Coefficient
NTS	Not to Scale
OA	Overall
OC	On Center
OD	Outside Diameter
OH	Overhead
OPG	Opening
OPP	Opposite
ORCH	Orchestra
PT	Paint
PBD	Particleboard
PE	Porcelain Enamel
PER	Perimeter
PFB	Prefabricated
PFN	Prefinished
PL	Plate
PLAM	Plastic Laminate
PLAS	Plaster
PREP	Preparation
PSF	Pounds Per Square Foot
PSI	Pounds Per Square Inch
PT	Paint
PTN	Partition
PVC	Polyvinylchloride
PWD	Plywood
QT	Quarry Tile
R	Radius
R	Risers
RA	Return Air
RB	Rubber Base
RBF	Rubber Floor
RD	Roof Drain
RDL	Roof Drain Leader
REF	Refrigerator
REM	Remove
REQ'D	Required
REV	Revise (d/ion)
RFG	Roofing
RFH	Roof Hatch
RFL	Reflected
RH	Right Hand
RM	Room
RNF	Reinforce, Reinforcing
RO	Rough Opening
ROW	Right-of-Way
RST	Resilient Stair Tread
RVR	Reversed
S	South
SAG	Suspended Acoustical Grid
SC	Solid Core
SCHED	Schedule
SEA	Sealer
SECT	Section
SEF	Seamless Epoxy Flooring
SF	Square Feet
SHT	Sheet
SHTH	Sheathing
SIM	Similar
SKL	Skylight
SM	Small
SNT	Sealant
SPEC(S)	Specification(s)
SQ	Square
SRF	Seamless Resin Flooring
SS	Stainless Steel
STD	Standard
STL	Steel
STO(R)	Storage
STRUCT	Structure, Structural
SUSP	Suspended, Suspension
SVF	Sheet Vinyl Flooring
SYN	Synthetic
SYS	System
T	Treads
TB	Tackboard
TEL	Telephone
T&G	Tongue and Groove
THK	Thick(ness)
TO	Top of
TOW	Top of Wall
TYP	Typical
UR	Urinal
UNO	Unless Noted Otherwise
VB	Vapor Barrier
VCT	Vinyl Composition Tile
VERT	Vertical
VWF	Vinyl Wall Fabric
W	West

W	Wide
W/	With
WC	Water Closet
WD	Wood
WDW	Window
W/O	Without
WP	Water Proofing
WR	Water Repellent (Resistant)
WWF	Welded Wire Fabric

PART 2 – PRODUCTS - Not Used.

PART 3 – EXECUTION - Not Used.

END OF SECTION 014200

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 CONDITIONS AND REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Sections include the following:
   1. Division 1 Section "Summary" for limitations on utility interruptions and other work restrictions.
   2. Division 1 Section "Submittal Procedures" for procedures for submitting copies of implementation and termination schedule and utility reports.
   3. Division 1 Section "Execution Requirements" for progress cleaning requirements.
   4. Divisions 2 through 33 Sections for temporary heat, ventilation, and humidity requirements for products in those Sections.

1.03 SUBMITTALS

A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

1.04 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.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Materials that constitute temporary facilities are the property of Contractor except as otherwise provided.

B. Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.76-mm-) thick, galvanized steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top rails.

C. Portable Chain-Link Fencing: Minimum 2-inch (50-mm), 9-gage, galvanized steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top and bottom rails. Provide concrete bases for supporting posts.

D. Lumber and Plywood: Comply with requirements in Division 6 Section "Miscellaneous Carpentry."

E. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

F. Paint: Comply with requirements in Division 9 painting Sections.

2.02 TEMPORARY FACILITIES

A. General: Contractor shall provide and pay for all temporary facilities and services required for construction purposes except otherwise provided. Allow other entities to use temporary services and facilities without cost, including, but not limited to, the following:
   1. Owner's construction forces.
   2. Occupants of project.
   3. Architect.
   4. Testing agencies.
   5. Personnel of authorities having jurisdiction.

B. Field Offices: Field office to be on site as determined by Owner.
   1. Common-Use Field Office: Of sufficient size to accommodate needs of construction personnel. Keep office clean and orderly. Furnish and equip offices as follows:
      a. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
      b. Conference room of sufficient size to accommodate meetings of 10 individuals. Provide electrical power service and 120-V ac duplex receptacles, with not less than 1 receptacle on each wall. Furnish room with conference table, chairs, and 4-foot-(1.2-m-) square tack board.
      c. Drinking water and private toilet.
      d. Coffee machine and supplies.
      e. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F (20 to 22 deg C).
      f. Lighting fixtures capable of maintaining average illumination of 20 fc (215 lx) at desk height.
      g. Miscellaneous equipment: six adjustable band protective helmets for visitors.
      h. Drinking Water Fixture: Locate for convenient access by workers.
      i. Fire Extinguisher.
      j. One first aid kit.
      k. Other furnishings: Contractor's option.

C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
   1. Store combustible materials apart from building.

2.03 EQUIPMENT

A. Materials and equipment that constitute facilities are the property of Contractor except as otherwise provided. Owner reserves right to take possession of project identification signs.

B. Provide new or used equipment. Undamaged, previously used equipment in serviceable condition may be used if approved by Architect. Provide equipment suitable for use intended.

C. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

D. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
   1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
   2. Heating Units: Listed and labeled for type of fuel being consumed, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.02 TEMPORARY ELECTRICITY AND LIGHTING

A. Service and Distribution: The County will provide temporary electrical power using the existing service. Provide temporary wiring, outlets, lights, etc., from the load side of the meter, as required for construction power and lighting during construction period. Remove all temporary wiring upon completion of work.

B. The Contractor will provide, install, and maintain necessary temporary overhead wiring to the building providing temporary power and lighting service. Service shall be 120/240 volt, 1 phase, 3 wire. Temporary service and distribution system shall be properly grounded in accordance with the NEC. Provide ground fault interrupters as required by Code. Distribution equipment and wiring devices for temporary power and lighting need not be new, however, the installation shall conform to good safe general practice as required by the Occupational Safety and Health Administration.

C. Temporary Power: The Contractor will provide double duplex 120V outlets. Each subcontractor shall furnish extension cords necessary to convey electricity from double duplex outlets to portions of the building in which their work is in progress.

D. Special power required for welders or the trade requiring such power shall provide other special equipment.

E. Temporary Lighting: The Contractor will provide one (1) light for every 750 square feet or major portion thereof. Each trade using plug-in portable lights shall provide working lights required by trades.

F. Contractor shall be responsible for seeing that temporary lighting is turned off at times when no work is in progress, unless required for security.

G. Contractor shall be responsible for any damage done to the permanent wiring or fixtures as a result of use of same.

H. Permanent branch circuit wiring may be used to supply pigtail lights if protected by properly sized circuit breaker or fuse.

I. Permanently installed light fixtures shall be cleaned using method and materials recommended by the manufacturer.

3.03 TEMPORARY HEAT AND ENCLOSURES

A. Contractor shall provide temporary heat necessary for the execution of the work on the project. Temporary heating apparatus shall be installed, maintained, and operated by the Contractor in a safe manner to facilitate the continuation and protection of the work.

B. The trade requiring same shall provide temporary enclosures necessary for holding temporary heat such as enclosures for masonry or concrete work or for thawing frozen ground.

C. After the building is entirely permanently enclosed, glazing of exterior openings completed, permanent or temporary doors on exterior openings, and permanent heating system installed and capable of being adequately controlled, the permanent heating system may be used to provide heat for the building subject to approval of the Owner and Architect. Contractor shall pay for gas and electricity used in connection with the operation of same up to the date set in the Certificate of Substantial Completion.

D. In using the permanent heating system, Contractor shall assume complete responsibility for its proper operation and for correction of any damage that may occur to permanent heating system. Use of permanent heating system by Contractor shall in no manner compromise the warranty of the system. Warranty of the system will commence at date set in the Certificate of Substantial Completion.

E. Temporary structures or storage areas used for storage and offices for contractors shall be located on the site in an orderly manner as determined by the Contractor.

3.04 TEMPORARY WATER

A. Contractor shall provide water required in the work as well as temporary connection, plumbing, piping, etc., necessary to convey same to places needed. Bulk water for site grading shall be provided by site grading subcontractor.

3.05 TEMPORARY SANITARY FACILITIES

A. Contractor shall provide and maintain, in a neat and sanitary condition, adequate chemical toilet facilities for the use of employees engaged in the work, in strict compliance with the requirements of applicable codes, regulations, laws, and ordinances.

3.06 TEMPORARY PROTECTIVE FACILITIES

A. Contractor shall provide and maintain protective devices and facilities for the protection of the public and the general protection of workers on the project including, but not limited to, the following:

B. Danger signs warning against hazards created by such features of construction such as protruding nails, hoists, and falling materials.

C. 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 hazardous fire-exposure 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. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

D. Security Enclosure and Lockup: Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.

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

F. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
1. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures.

G. Danger lights shall be kept lighted each night from sunset to sunrise.

3.07 SCAFFOLDING AND RUNWAYS

A. Scaffolding shall be the responsibility of the trade requiring same who shall include its cost in his bid and shall be responsible for its maintenance.

B. Contractor shall furnish, erect, and maintain runways, guard rails, platforms, and similar temporary construction, as he may deem necessary for the safe performance of the contract. Such facilities shall be of type and arrangement as required for their specific use; shall be substantially constructed throughout, strongly supported, well secured, and shall comply with applicable rules and regulations or applicable state and local codes.

3.08 CLOSURES

A. Contractor shall erect temporary closures over openings when weather conditions render such action necessary for proper installation of any portion of the work.

3.09 PROTECTION FOR WORK IN PLACE

A. Work in place that is subject to injury because of adjacent operations shall be covered, boarded up, or substantially enclosed with adequate protection. Permanent openings used as thoroughfares for the introduction of work and materials to the structure shall have heads, jambs, and sills well blocked and boarded. All forms of protection shall be constructed in a manner such that, upon completion, the entire work will be delivered to the Owner in undamaged condition.

3.10 ACCESS

A. Limit access to necessary routes to perform the work.

3.11 TEMPORARY CONTROLS

A. General: Comply with applicable codes, ordinances, and regulations.

B. Noise Control: Minimize noise at all times near residential areas. Equipment shall be properly muffled. Do not operate equipment after hours.

C. Dust Control: When construction procedures result in dust that becomes a nuisance to the Owner, private property, or traffic, Contractor shall control said dust.

D. Water Control: Provide means necessary to control flow of water at the work to prevent damage to the Owner's property and adjacent property.

E. Debris Control: Contractor shall continually police the work area to prevent collection and scattering of debris, loosened, uncovered or caused by execution of the work. Contractor shall provide and maintain, in a neat and orderly condition, adequate trash and debris containers of sufficient size for the use of the Contractor and subcontractors on this project. Contractor shall allow and accommodate use of the trash and debris containers by the Owner's separate contractors.

F. Pollution Control: Take extreme caution to prevent spilling or littering of water polluting substances. Do not pump foreign materials into any portion of the sanitary or storm sewer collection systems. Provide labor, equipment, and materials necessary to remedy such pollution. No burning of debris, or any other air polluting methods or equipment, shall be allowed.

G. Erosion Control: Provide such facilities as might be necessary to prevent erosive damage to the Owner's property or to adjacent properties and as required by Erosion Control Plan.

H. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.

3.12 CLEAN-UP DURING CONSTRUCTION

A. Clean-Up During Construction: Contractor shall keep the building and premises free from surplus material, waste material, dirt and rubbish caused by the work. At the completion of work, Contractor shall remove surplus material, waste material, dirt and rubbish, tools, equipment, scaffolding, and shall leave the project premises clean.

B. Contractor shall perform clean-up daily and transport rubbish to an on-site trash and debris container as described in the Contract at a location designated by Contractor, who shall arrange for its maintenance and removal.

END OF SECTION 015000

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.

B. Related Sections include the following:
   1. Division 1 Section "References" for applicable industry standards for products specified.
   2. Division 1 Section "Closeout Procedures" for submitting warranties for Contract closeout.
   3. Divisions 2 through 33 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.03 PRODUCTS

A. Products: Include material, equipment and systems.
   1. Comply with Specifications and referenced standards as minimum requirements.
   2. Components supplied in quantity within a specification section should be compatible and interchangeable.

1.04 TRANSPORTATION AND HANDLING

A. Transportation: Transport products by methods to avoid product damage; deliver in undamaged condition in manufacturer’s unopened containers or packaging, dry.

B. Handling: Provide equipment and personnel to handle products by methods to prevent soiling or damage.

C. Inspection: Inspect shipments to assure products comply with requirements, quantities are correct, and products are undamaged.
   1. Reject damaged and defective items.

D. Each subcontractor: Be responsible for hoisting and stocking of his materials and equipment on site.
   1. Material Stocked on Asphalt: Palletized or packaged in appropriate containers to protect existing asphalt.
   2. Material Stocking: Coordinated with General Contractor.

1.05 STORAGE AND PROTECTION

A. Storage: Store products in accordance with manufacturer’s recommendations, with seals and labels intact and legible. Store sensitive products in weathertight enclosures; maintain within temperature and humidity ranges required by manufacturer’s recommendations.
   1. Store loose granular materials on solid surfaces in well drained area; prevent mixing with foreign matter.

B. Exterior Storage Protection:
   1. Fabricated Products: Place on sloped supports above ground.
   2. Cover products subject to deterioration with impervious sheet covering and provide ventilation to avoid condensation.

C. Inspection: Arrange storage to provide access for inspection. Periodically inspect to assure products are undamaged, and are maintained under recommended conditions.

1.06 INSTALLATION

A. Inspection of Substrates: Require installer of each major unit of work to inspect substrate to receive work and conditions under which work is to be performed.
   1. Installer: Report unsatisfactory conditions to Contractor in writing.
   2. Do not proceed with work until unsatisfactory conditions have been corrected to satisfaction of installer.

B. Manufacturer's Instructions: Where installation includes manufacturer products, comply with manufacturer's applicable instructions and recommendations for installation, to extend that these instructions and recommendations are more explicit or more stringent than the requirements specified or indicated.

C. Attachment: Provide attachment and connection devices and methods for securing work.
   1. Secure work true to line and level, and within specified tolerances, or if not specified, industry recognized tolerances.
   2. Allow for expansion and building movement.
   3. Exposed joints:
      a. Provide uniform joint width
      b. Arrange layout of joints to obtain best visual effect prior to execution of work.
      c. Refer questionable visual-effect choices to Owner for final decision.

D. Measurements and Dimensions: Recheck as integral step of starting each installation.

E. Climatic Conditions and Project Status: Install each unit of work under conditions to ensure best possible results in coordination with entire project.
   1. Isolate each unit of work from incompatible work as necessary to prevent deterioration.
   2. Coordinate enclosure of work with required inspections and tests to minimize necessity of uncovering work for those projects.

1.07 PRODUCTS OPTIONS

A. Products Specified by Reference Standards or by Description Only:
   1. Any product meeting those standards

B. Products Specified by Naming One or More Manufacturers with Substitution Paragraph: Products of named manufacturers meeting specifications. Submit request for substitution for any manufacturer not specifically named.
   1. Products of acceptable manufacturers are subject to requirements of specifications for specified product.

C. Products Specified by Naming One or More Manufacturers: Products of named manufacturers meeting specifications; no options, no substitutions.
   1. Products of acceptable manufacturers are subject to requirements or specifications for specified product.

D. Products Specified by Naming Only One Manufacturer: No option; no substitution allowed.

1.08 LIMITATION ON SUBSTITUTIONS

A. After Bidding Period: Requests for substitutions of products after date of Owner-GC Agreement will be considered only in case of product unavailability or other conditions described in the General Conditions of the Contract.

1.09 REQUESTS FOR SUBSTITUTION

A. Submittal: Submit two copies of each request. Submit separate request for each substitution.
   1. Identify products by Specifications Section and Article numbers.
   2. Provide manufacturer's name and address, trade name of products, and model or catalog number.

3. List fabricators and suppliers as appropriate.

B. Documentation: Document each request with complete data substantiating compliance of proposed substitution with requirements of Contract documents:
   1. Attach Product Data.
   2. Give itemized comparison of proposed substitution with specified product, listing variation, and reference to Specification Section and Article numbers.
   3. Give quality and performance comparison between proposed substitution and specified product.
   4. List availability of maintenance services and replacement materials.
   5. State effect of substitution on construction schedule, and changes required in other work or products.

1.10 GC REPRESENTATION

A. Request for Substitution: Representation that GC has investigated proposed product and has determined that it is equal to or superior in all respects to specified product:
   1. GC will provide same warranty for substitution as for specified product.
   2. GC will coordinate installation of accepted substitute, making such changes as may be required for work to be completed in all respects.
   3. GC waives claims for additional costs related to substitution which may later become apparent.

B. Replacement: If substituted products do not meet or exceed above requirements, whether before, during, or after incorporated into work, GC shall, at no additional cost to Owner, replace substituted products with products originally specified.

1.11 SUBMITTAL PROCEDURES

A. Architect: Will review the General Contractor’s requests for substitutions with reasonable promptness.
   1. If accepted by Architect, products proposed for substitution will be accepted subject to modifications by manufacturer, if necessary, to meet detailed requirements of Drawings, and Specification.
   2. Architect will not make exhaustive attempt to determine that products proposed for substitution are equal to, or can be modified in order to be equal to specified products.

B. Architect’s Acceptance:
   1. After Architect’s Acceptance: Owner will notify GC, in writing, of decision to accept or reject requested substitution.

C. For Accepted Products: Submit Shop Drawings, Product Data, and Samples as applicable.

1.12 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: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
   2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
   1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.

2. Specified Form: When specified forms are included with the Specifications, prepare a written document using appropriate form properly executed.
3. Refer to Divisions 2 through 16 Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Division 1 Section "Closeout Procedures."

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 017300 – EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.01 CONDITIONS AND REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
   1. Construction layout.
   2. General installation of products.
   3. Coordination of Owner-installed products.
   4. Progress cleaning.
   5. Starting and adjusting.
   6. Protection of installed construction.
   7. Correction of the Work.

B. Related Sections include the following:
   1. Division 1 Section "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
   2. Division 1 Section "Submittal Procedures" for submitting surveys.
   3. Division 1 Section "Cutting and Patching" for procedural requirements for cutting and patching necessary for the installation or performance of other components of the Work.
   4. Division 1 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

1.03 SUBMITTALS

A. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 EXAMINATION

A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
   1. Before construction, verify the location and points of connection of utility services.

B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.
   1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
   2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, 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 roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
   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. Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: 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. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.03 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.

B. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.

C. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

D. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.04 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
   1. Make vertical work plumb and make horizontal work level.
   2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
   3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
   4. Maintain minimum headroom clearance of 9’-6” in spaces without a suspended ceiling.

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

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

D. 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.

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

F. 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.

G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
   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.

H. 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.

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

3.05 OWNER-INSTALLED PRODUCTS

A. Site Access: Provide access to Project site for Owner's construction forces.

B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction forces.
   1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
   2. Preinstallation Conferences: Include Owner's construction forces at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction forces if portions of the Work depend on Owner's construction.

3.06 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. 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 materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F (27 deg C).
   3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

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: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

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. Adjust and lubricate operable components to ensure operability without damaging effects.

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.

3.07 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 1 Section "Quality Requirements."

3.08 PROTECTION OF INSTALLED CONSTRUCTION

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

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

3.09 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 1 Section "Cutting and Patching."
   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.

END OF SECTION 017300

SECTION 017329 - CUTTING AND PATCHING

PART 1 - GENERAL

1.01 CONDITIONS AND REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 DESCRIPTION

A. Related Work:
   1. Divisions 2 through 33 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

B. Work Included: The Contractor shall be responsible for all cutting, fitting and patching required to complete the work or to:
   1. Make its parts fit together properly.
   2. Uncover portions of the work to provide for installation of ill-timed work.
   3. Remove and replace defective work.
   4. Remove and replace work not conforming to requirements of Contract Documents.
   5. Remove samples of installed work as specified for testing.
   6. Provide routine penetrations of non-structural surfaces for installation of piping
   7. Install piping or conduit under existing concrete floors on grade or in existing walls.

1.03 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of other Work.

B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.04 QUALITY ASSURANCE

A. Notify Architect well in advance of executing any cutting or alteration which affects:
   1. The work of the Owner or any separate contractor.
   2. The structural value or integrity of any element to the Project.
   3. The integrity or effectiveness of weather-exposed or moisture-resistant elements or systems.
   4. The efficiency, operational life, maintenance or safety of operational elements.
   5. The visual qualities of sight-exposed elements.
   6. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Comply with specifications and standards for each specific product involved.

B. In-Place Materials: Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
   1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.01 EXAMINATION

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

B. After uncovering work, inspect the conditions affecting the installation of products, or performance of the work.

C. Report unsatisfactory or questionable conditions to the Architect; do not proceed with the work until the Architect has provided further instructions.

3.02 PREPARATION

A. Provide adequate temporary support as necessary to assure the structural value or integrity of the affected portion of the work.

B. Provide devices and methods to protect other portions of the project from damage.

C. Provide protection from the elements for that portion of the project which may be exposed by cutting and patching work.

3.03 CUTTING AND PATCHING

A. General: Openings in construction which are required by other contractors shall be left by crafts involved. It is the responsibility of various contractors to supply in advance, proper and sufficiently detailed information. In event of failure to supply this advance information, all cutting as may be required shall be done only after concurrence of Architect and at expense of negligent party.

B. Cutting: Execute cutting and demolition by methods which will prevent damage to other work, and will provide proper surfaces to receive installation or repairs. Employ the installer or fabricator of work on this project to perform cutting and patching for:
   1. Weather-exposed or moisture-resistant elements.
   2. Sight-exposed finished surfaces.

C. Fitting: Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances and finishes. Fit work airtight to pipes, sleeves, ducts, conduit and other penetrations through surfaces.

D. Patching: Wherever any pipe, conduit, duct, steel member, bracket, equipment, or other material penetrates or passes through wall, ceiling or floor, completely seal voids in construction with cement grout, plaster, or fire-resistant material, embedding sealing material full thickness of wall, ceiling or floor.

E. Finishing: Where surfaces are exposed, finish with same materials specified in finish schedule or material that is on constructed surfaces. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes:
   1. For continuous surfaces, refinish to nearest intersection.
   2. For an assembly, refinish the entire unit.

F. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION 017329

SECTION 017700 – CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.01 CONDITIONS AND REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
   1. Inspection procedures.
   2. Warranties.
   3. Final cleaning.

B. Related Sections include the following:
   1. Division 1 Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.
   2. Division 1 Section "Execution Requirements" for progress cleaning of Project site.
   3. Division 1 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
   4. Divisions 2 through 33 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.03 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
   1. 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 specific warranties, 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, operating certificates, and similar releases.
   5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.
   6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
   7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
   8. Complete startup testing of systems.
   9. Submit test/adjust/balance records.
   10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
   11. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
   12. Complete final cleaning requirements, including touchup painting.
   13. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit an electronic request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
   1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
   2. Results of completed inspection will form the basis of requirements for Final Completion.

1.04 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
   1. Submit a final Application for Payment according to Division 1 Section "Payment Procedures."
   2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
   3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
   4. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

B. Inspection: Submit an electronic request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
   1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.05 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Preparation: Submit electronic 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, starting with exterior areas first and proceeding from lowest floor to highest floor.
   2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.

1.06 WARRANTIES

A. Warranty starts at Substantial Completion.

B. Submit electronic warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

C. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

D. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

PART 2 - PRODUCTS

2.01 MATERIALS

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

PART 3 - EXECUTION

3.01 FINAL CLEANING

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

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. 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 inspection 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 snow and ice to provide safe access to building.
    f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
    g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
    h. Sweep concrete floors broom clean in unoccupied spaces.
    i. Remove labels that are not permanent.
    j. 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 similar labels, including mechanical and electrical nameplates.
    k. Wipe surfaces of electrical equipment, lift equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
    l. Replace parts subject to unusual operating conditions.
    m. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
    n. Leave Project clean and ready for occupancy.

C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 017700

SECTION 017839 – PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 CONDITIONS AND REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes administrative and procedural requirements for Project Record Documents to be prepared by General Contractor, including the following:
   1. Record Drawings.
   2. Record Specifications.
   3. Record Product Data.

B. Related Sections include the following:
   1. Division 1 Section "Closeout Procedures" for general closeout procedures.
   2. Divisions 2 through 33 Sections for specific requirements for Project Record Documents of the Work in those Sections.

1.03 SUBMITTALS

A. Record Drawings: Comply with the following:
   1. Number of Copies: Submit one set of marked-up record prints to Architect.

B. Record Specifications: Submit one copy of project's specifications, including addenda and contract modifications.

C. Record Product Data: Submit one copy of each product data submittal.
   1. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in manual instead of submittal as Record Product Data.

PART 2 - PRODUCTS

2.01 RECORD DRAWINGS

A. Record Prints: Maintain one set of blue- or black-line white prints of the Contract Drawings and shop drawings.
   1. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
      a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
      b. Accurately record information in an understandable drawing technique.
      c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.

2. 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. Depths of foundations below first floor.
    d. Locations and depths of underground utilities.
    e. Revisions to routing of piping and conduits.
    f. Revisions to electrical circuitry.
    g. Actual equipment locations.
    h. Locations of concealed internal utilities.
    i. Changes made by Change Order or Construction Change Directive.
    j. Changes made following Architect's written orders.
    k. Details not on the original Contract Drawings.
    l. Field records for variable and concealed conditions.
    m. Record information on the Work that is shown only schematically.
3. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize Record Prints and newly prepared Record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Identification: As follows:
    a. Project name.
    b. Date.
    c. Designation "PROJECT RECORD DRAWINGS."
    d. Name of Architect.
    e. Name of Contractor.

2.02 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
5. Note related Change Orders, Record Product Data, and Record Drawings where applicable.

2.03 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.

2.04 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

PART 3 - EXECUTION

3.01 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.

B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 017839

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:
   1. Cutting, Fitting & Patching
   2. Demolition of selected interior elements shown on plans

1.03 REQUIREMENTS INCLUDE

A. Coordinate work of trades and schedule elements of alterations and renovation work by procedures and methods to expedite completion of the work.

B. In addition to demolition specifically shown, cut, move and remove items as necessary to provide access or to allow alterations and new work to proceed. Include such items as:
   1. Repair or removal of hazardous or unsanitary conditions.
   2. Removal of abandoned items and items serving no useful purpose, such as abandoned piping, conduit and wiring.
   3. Removal of unsuitable or extraneous materials not marked for salvage, such as abandoned furnishings and equipment, and debris such as rotted wood, rusted metals and deteriorated concrete.
   4. Cleaning of surfaces, and removal of surface finishes, as needed to install new work and finishes.
   5. Make its parts fit together properly.
   6. Uncover portions of the work to provide for installation of ill-timed work.

C. Patch, repair and refinish existing items to remain, to the specified conditions for each material, with a workmanlike transition to adjacent new items of construction.

1.04 ALTERATIONS, CUTTING & PROTECTION

A. Assign the work of moving, removal, cutting and patching to trades qualified to perform the work in a manner to cause least damage to each type of work, and provide means of returning surfaces to appearance of new work.

B. Perform cutting and removal work to remove minimum necessary, and in a manner to avoid damage to adjacent work. Cut finish surfaces such as paving, concrete slabs, masonry, tile, plaster or metals by methods to terminate surfaces in a straight line at a natural point of division.

C. Protect existing finishes, equipment and, adjacent work which is scheduled to remain, from damage.

1.05 QUALITY ASSURANCE

A. Notify Architect well in advance of executing any cutting or alteration which affects:
   1. The work of the Owner or any separate contractor.
   2. The structural value or integrity of any element to the Project.
   3. The integrity or effectiveness of weather-exposed or moisture-resistant elements or systems.
   4. The efficiency, operational life, maintenance or safety of operational elements.
   5. The visual qualities of sight-exposed elements.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Dust Containment Kit: Zipper closed tarps or plastic sheating
   1. Surface Shield
   2. Approved Equal

B. General Requirements that Work be Complete:
   1. Provide same products or types of construction as that in existing structure, as needed to patch, extend or match existing work.
      a. Generally Contract Documents will not define products or standards of workmanship present in existing construction; Contractor shall determine products by inspection and any necessary testing, and workmanship by use of the existing as a sample of comparison.
   2. Presence of a product, finish, or type of construction, requires that patching, extending or matching shall be performed as necessary to make Work complete and consistent.

PART 3 - EXECUTION

3.01 PERFORMANCE

A. Patch and extend existing work using skilled mechanics that are capable of matching existing quality of workmanship. Quality of patched or extended work shall be not less than that specified for new work.

3.02 LAYING OUT WORK

A. Verify dimensions and elevations indicated in layout of existing work. Refer discrepancies between drawings, specifications and existing conditions to Architect for adjustment before work affected is performed. Failure to make such notification shall place responsibility upon Contractor to carry out work in satisfactory, workmanlike manner.

B. The Contractor shall be held responsible for the location and elevation of the construction contemplated by the Construction Documents.

C. Prior to commencing work, carefully compare and check Architectural, Structural, Mechanical and Electrical Drawings, each with the other that in any way affects the location or elevation of the work to be executed, and should any discrepancy be found, immediately report the same to the Architect for verification and adjustment.

3.03 LOCATION OF EQUIPMENT AND PIPING

A. Drawings showing location of equipment, piping, ductwork, etc., are diagrammatic and job conditions shall not always permit their installation in the location shown. When this situation occurs, it shall be brought to the Architect's attention immediately and the relocation determined in a joint conference.

B. If the Contractor removes/relocates any items not required by Contract without first obtaining Architect's approval, he shall reinstall items to original condition and location.

3.04 PATCHING EXISTING FACILITIES

A. Existing structures, facilities, etc., that are damaged or removed due to required construction work, shall be patched, repaired or replaced and be left in their original state of repair by the Contractor, to satisfaction of the Architect.

3.05 INTEGRATING EXISTING WORK

A. Protect existing improvements from damage.

B. Contractor's operations shall be confined to the immediate vicinity of the new work and shall not in any way interfere with or obstruct the ingress or egress to and from adjacent facilities.

C. Where new work is to be connected to existing work, special care shall be exercised not to disturb or damage the existing work more than necessary. All damaged work shall be replaced, repaired and restored to its original condition at no cost to the Owner.

3.06 TRANSITION EXISTING TO NEW WORK

A. When new work abuts or finishes flush with existing work, make a smooth and workmanlike transition. Patch work shall match existing adjacent work in texture and appearance so that the patch or transition is invisible at a distance of five feet.
   1. When finished surfaces are cut in such a way that a smooth transition with new work is not possible, terminate existing surface in a neat manner along a straight line at a natural line of division, and provide trim appropriate to finished surface.

3.07 DUST CONTROL

A. Precaution shall be exercised at all times to control dust created as a result of any operations during the construction period. If serious problems arise due to air borne dust, and when directed by Architect, operations causing such problems shall be temporarily discontinued and necessary steps taken to control the dust.

END OF SECTION 024119

SECTION 061053 – MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following for wood work at new roof curb and new door:
   1. Wood Blocking and Nailers.
   2. Fasteners
      a. Use of percussion actuated fasteners is prohibited.

1.03 DEFINITIONS

A. Lumber grading agencies, and the abbreviations used to reference them, including the following,
   1. NELMA – Northeastern Lumber Manufacturers Association.
   2. NLGA – National Lumber Grades Authority
   3. SPIB – Southern Pine Inspection Bureau
   4. WCLIB – West Coast Lumber Inspection Bureau
   5. WWPA – Western Wood Products Association

1.04 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber, plywood, and other panels; place spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.01 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 fire rated and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.
   1. Factory mark each piece of lumber with a grade stamp of grading agency.
   2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.
   3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20for moisture specific content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
   4. Provide dressed number, S4S, unless otherwise indicated.
   5. Provide dry lumber with 19 percent maximum moisture content at time of dressing.
   6. Provide preservative treated lumber at roof parapets and curbs.

2.02 MISCELLANEOUS LUMBER

A. General: Provide kiln dried nominal dimensioned fire rated Doug-Fir for support or attachment of other construction, including the following:
   1. Blocking.

B. For items of dimension lumber size, provide No. 2 grade lumber with 19 percent maximum moisture content.

2.03 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.

B. Nails, Wire, Brads and Staples: FS FF-N-105.

C. Wood Screws: ASME B18.6.1

D. Screws for Fastening to Cold-Formed Metal Framing: ASTM C954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for being material fastened.

E. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, with out failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspection agency.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

A. Discard units of material with defects that impair quality of carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.

B. Set carpentry to required levels and lines, with members plumb, true to line, cut and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

C. Apply field treatment complying with AWPA M4 to cut surfaces of preservation-treated lumber and plywood. Brush apply specified preservative solution liberally to all field cuts in pressure-treated material.

D. Securely attach carpentry work as indicated and according to applicable codes and recognized standards.

E. Countersink fastener heads on exposed carpentry work and fill holes with wood filler.

F. Use fasteners of appropriate type and length. Predrill members when necessary to avoid splitting wood.

END OF SECTION 061053

SECTION 064000 - CUSTOM CASEWORK

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Custom manufactured wood, plastic laminate faced and/or wood casework
   2. Solid Surface Countertops

B. Related Sections:
   1. Miscellaneous Rough Carpentry: Section 061053
   2. Joint Sealants: Section 079200

1.02 REFERENCE STANDARDS

A. “Architectural Woodwork Quality Standards and Guide Specifications”, Latest edition, as published by Architectural Woodwork Institute. Comply with Custom Grade if not otherwise specified.

1.03 DEFINITIONS

A. Custom casework is defined as custom fabricated counters, cabinets, casework, and shelving. Other woodwork not considered as counters, cabinets, casework, and shelving is considered finish carpentry.

1.04 SUBMITTALS

A. Shop Drawings: Submit in accordance with Section 013300.

B. Samples: Submit complete set of solid surface and wood veneer samples for color selection in accordance with Section 013300. Veneer samples shall include all available solids, matrix, nebulas, and wood grains for Architect's color selection, except metallic colors.

C. Submit full range of solid surface material samples do not limit price selection.

1.05 DELIVERY, STORAGE AND HANDLING

A. Do not deliver custom casework until the building or storage area is enclosed and sufficiently dry to prevent damage from excessive changes in moisture content.

PART 2 - PRODUCTS

2.01 MAUFACTURERS

A. Casework
   1. Sidney Millwork
   2. Columbine Kitchen and Bath
   3. JBD Inc.
   4. Nelson Interior Construction, Inc.
   5. Construction Design Associates

2.02 MATERIALS

A. Acceptable Plastic Laminate Manufacturers:
   1. Formica
   2. Wilsonart
   3. Nevamar
   4. Laminart
   5. approved substitute

B. Acceptable Solid Surface Manufacturers:
   1. Staron
   2. Wilsonart

C. Trim Material: Trim material shall be free of defects to the extent required by AWI Custom Grade allowances for the species used. Trim material shall be: Kiln Dried, Natural Maple.

D. Plywood: Plywood used in custom casework shall be as follows or as indicated on drawings:
   1. Maple: Plain sliced natural maple with lumber or particleboard core. Face veneers exposed side shall be HPVA Grade A.
   2. Duraply: Champion Plywood Duraply, Cabinet Grade.
   3. Cabinet Interiors: Willamette Industries Kortrom II.

E. Particleboard: Medium density (45 lb. / cu. Ft.) particleboard, minimum 3/4" thick.

F. Plastic Laminate Faced Casework:
   1. Exposed Surfaces (Including Inside Surfaces of Open Shelving Units): Comply with NEMA LD-3 Performance Test, vertical grade, High Pressure Decorative Laminate .030" thick.
   2. Semi-Exposed (Backs of doors and Inside Surfaces of Cabinets with Doors): Melamine Laminate .020" thick, cabinet liner type. Painted surfaces not acceptable. Color: Neutral White.
   3. Concealed Surfaces: Melamine Laminate, .020" thick, liner or backer type.
   4. Exposed Edges: Exposed cabinet body edges shall be covered with 1 mm PVC edge-banding. Plastic laminate is not acceptable. Door and drawer front edges shall be covered with 3 mm PVC edge-banding. PVC edge-banding must be applied with hot melt glue, no exceptions. A maximum of four colors may be selected.

G. Countertops: Solid Surface Material
   1. Countertop thickness solid material surface shall be 1” and plywood material shall be 1”.
   2. Edges ¼” round top and bottom.

H. Adhesive:
   1. Provide selected laminate manufacturer’s recommended adhesive for plastic laminate faced casework. Do not use adhesives that contain urea formaldehyde.

I. Countertops shall contain no asbestos materials.

J. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, fire-retardant-treated at exterior walls, kiln-dried to less than 15 percent moisture content.

2.03 HARDWARE AND ACCESSORY ITEMS

A. Hinges: Five knuckle, 2-3/4" high, overlay type, .095" thick steel hinge with standard color epoxy powder coat or metallic finish as selected by Architect. Hinges shall have a minimum of eight (8) edge and leaf fastenings. Doors 48" and over in height shall have three (3) hinges per door.

B. Back-Mounted Pulls: BHMA A156.9, B02011.

C. Drawer Pulls: Provide Mfg. Standard samples for Architect’s selection

D. Drawer Suspensions: Each drawer shall be equipped with one pair of ball bearing nylon roller suspensions which shall be self-closing from a four (4) inch extension, have a minimum load capacity of seventy-five (75) pounds, and be constructed of zinc coated rolled steel. Knee space drawers shall be equipped with suspensions with a minimum load capacity of fifty (50) pounds each. Heavy duty paper storage and file drawers shall be equipped with full extension suspensions with a minimum load capacity of one hundred (100) pounds each.

E. Drawer Stops: Drawers shall be equipped with two (2) drawer stops attached to the cabinet ends. The cabinet drawer stops shall be metal with attached rubber bump and be installed to prevent the drawer face from touching the cabinet body when the drawer is in a closed position.

F. Catches: Magnetic catches, BHMA A156.9, B03141.
   1. Minimum (7) lb. pull.
   2. Color: To match interior of cabinet.
   3. Provide a minimum of two (2) catches for doors over 4' high.
   4. Provide magnetic catch for each door leaf.

G. Shelf Supports: Heavy duty, self-locking nylon or polycarbonate, designed for installation in pre-drilled holes in cabinet ends and vertical partitions. Supports shall carry up to 1,500 pounds without failure.

H. Door and Drawer Locks: Five (5) disc tumbler, cam type, keyed alike or differently and master keyed. Each different lock shall be furnished with two keys. Fifty (50) lock changes available.

I. Exposed Hardware Finishes: Use only US26D Silver Finish

2.04 FABRICATION

A. Construct custom casework to dimensions, profiles, and details shown on the drawings and herein specified. Conform to the workmanship Standards for Custom Grade Work according to the Architectural Woodwork Institute.

B. Hardware for custom cabinets and casework shall be provided under this Section as indicated on the drawings.

C. Where selected plastic laminate color / pattern for door / drawer faces is directional, door / drawer faces shall run same direction. Indicate direction of color / pattern on submittals per Architect approval.

D. Construction: Frame counters in substantial manner with necessary blocking, braces, etc.
   1. Supports Under Countertops: Sufficiently heavy to carry weight of large man without sagging.
   2. Frames: Pinned, glued or screwed together in accordance with AWI Custom Grade standards.

E. Solid-Surfacing Material: Homogeneous solid sheets of filled plastic resin complying with ISSFA-2.

2.05 SHOP FINISHING

A. Finish architectural woodwork at fabrication shop. Defer only final touchup, cleaning, and polishing until after installation.

PART 3 - EXECUTION

3.01 DELIVERY, STORAGE AND HANDLING

A. General: Comply with Section 016000
Do not deliver material until building or storage area is enclosed and sufficiently dry to prevent damage from excessive changes in moisture content.

B. Allow laminate to acclimate for a minimum of 7 days before installation

3.02 EXAMINATION

A. Verification of Conditions:
1. Layout: Verify layout of work before beginning installation.
2. Blocking: Ensure proper blocking provided under Section 06100.
3. Existing Conditions: Examine spaces and substrate before beginning installation.
4. Notification: Notify General Contractor of unsatisfactory conditions in writing with copy to Owner.

B. Acceptance: Beginning or work means acceptance of existing conditions by installer.

3.03 BASES AND SUPPORTS

A. Construct bases for cabinets as indicated, securely anchored to the floor.

B. Rubber base shall be provided as specified under resilient floor & base specification.

3.04 INSTALLATION

A. Securely attach cabinets, shelving, and casework, to bases and walls. Install cabinets plumb and level and hardware operating properly.

END OF SECTION 064000

SECTION 064023 – INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Interior Architectural Wood Trim
   2. Shop finishing of woodwork

B. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips unless concealed within other construction before woodwork installation.

1.3 SUBMITTALS

A. Product Data:
   1. Submit color options (full range all price categories) for stained wood lumber.

B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

C. Samples:
   1. Lumber and panel products for transparent finish, for each species and cut, finished on one side and one edge.
   2. Lumber and panel products with shop-applied opaque finish, for each finish system and color, with exposed surface finished.

D. Conform to requirements of the National Particleboard Association (NPA).

1.4 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 WOOD TRIM GENERAL

A. Quality Standard: Unless otherwise indicated, comply with the “Architectural Woodwork Standards” for grades of wood trim indicated for construction, finishes, installation and other requirements.

B. Match to the existing trim.

2.2 INTERIOR STANDING AND RUNNING TRIM

A. Grade: Custom

B. Certified Wood: Interior trim for finish shall be certified as “FSC Pure”, or “FSC Mixed Credit” according to FSC STD-01-001 V5-2, “FSC Principles and Criteria for Forest Stewardship,” and FSC STD 40-004 “FSC Standard for Chain of Custody Certification.”

C. Wood Species and Cut: Cherry, select red (no sapwood).

2.3 WOOD MATERIALS

A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of wood trim and quality grade specified unless otherwise indicated.

2.4 FIRE RETARDANT-TREATED MATERIALS

A. Fire Retardant-Treated Materials, General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Identify fire-retardant-treated materials with appropriate classification marking of qualified testing agency in the form of removable paper label or imprint on surfaces that will be concealed from view after installation.

C. Fire-Retardant-Treated-Lumbar: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
   1. For exterior applications, use materials that comply with testing requirements after being subjected to accelerated weathering according to ASTM D 2898.
   2. Kiln dry lumber after treatment to a maximum moisture content of 19 percent.

2.5 MISCELLANEOUS MATERIALS

A. Interior, Furring, Blocking, Shims, and Hanging Strips: Fire-retardant-treated softwood lumber, kiln dried to less than 15 percent moisture content.

B. Provide self-drilling screws for metal-framing supports.

C. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post installed anchors and inserts at inside face of exterior walls and at floors.

D. Adhesives: Do not use adhesives that contain formaldehyde.

E. VOC Limits for Installation Adhesives and Sealants: Use products that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
   1. Wood Glues: 30 g/L.
   2. Multipurpose Construction Adhesives: 70g/L.
   3. Structural Wood Member Adhesive: 140 g/L.
   4. Architectural Sealants: 250 g/L.

2.6 FABRICATION

A. Sand fire-retardant-treated wood lightly to remove raised grain on exposed surfaces before fabrication.

B. Fabricate wood trim to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
   1. Edges of Solid-Wood (Lumber) Members: 1/16 inch unless otherwise indicated.
   2. Edges of Rails and Similar Members More Than 3/4 inch thick: 1/8 inch.

C. Backout or groove backs of flat trim members kerf backs of other wide, flat members except for members with ends exposed in finished work.

D. Assemble casings in shop except where shipping limitations require field assembly.

2.7 SHOP FINISHING

A. General: Finish wood trim at fabrication shop as specified in this Section. Defer only to final touchup, cleaning, and polishing until after installation.

B. Preparation for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing woos trim, as applicable to each unit of work.

C. Backpriming: Apply one coat or sealer or primer, compatible with finish coats, to concealed surfaces of wood trim. Apply two coats to end grain surfaces.

D. Match finish for interior trim: As indicated on Drawings.

PART 3 - EXECUTION

3.1 PREPARATION

A. Field-verify dimensions prior to fabrication. Examine the substrata and the conditions under which the work in this Section is to be performed. Do not proceed with work under this Section until unsatisfactory conditions have been corrected.

B. Coordinate with other trades for proper location of grounds and blocking.

C. Verify rough-in locations, sizes and adequacy for mechanical and electrical services.

D. Condition with operating HVAC system plastic-faced casework to average prevailing humidity conditions in installation areas prior to installing.
   1. Provide continuous fire treated wood blocking at anchorage of upper and lower casework. Metal strap backing is prohibited.

3.2 FIELD MEASUREMENTS

A. Verify dimensions of all areas.

3.3 INSTALLATION

A. Trim and Moldings: Install in single, non-jointed lengths for openings and for runs less than maximum length of material available. For longer runs, use only one piece, less than maximum length available in any single straight run. Stagger joints in adjacent members. Scribe backsplashes to uneven surfaces of walls. Scribe and fillers to be equal size at each end of a wall to wall run.

B. Caulk joints between walls and scribes.

C. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.

END OF SECTION 064023

SECTION 072100 - INSULATION

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:
   1. Sound attenuation insulation

B. Location of Work:
   1. Sound attenuation insulation:
      a. Between interior studs as indicated.

C. Related Sections:
   1. Gypsum Wallboard: Section 092900
   2. Non-Structural Metal Framing: Section 092216

1.03 SUBMITTALS

A. Submit product data of each component and material to be furnished under this Section in accordance with Section 013300.

1.04 DELIVERY, STORAGE AND HANDLING

A. Store insulation under cover to prevent damage from weather.

PART 2 - PRODUCTS

2.01 GLASS-FIBER BLANKET INSULATION

A. Interior Stud Walls:
   1. Walls: 3-5/8" to 6’ thick insulation. Widths to fit stud spacing. Use Class A, flame spread rating shall be 25 or less.

C. Acceptable Manufacturers and Type:
   1. CertainTeed Corp.
   2. Owens-Corning Fiberglas
   3. Johns-Manville Fiberglass
   4. Guardian Fiberglass

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine areas to receive insulation to assure conditions are satisfactory for installation.

3.02 INSTALLATION

A. Blanket or Batt Insulation: Install insulation in full conformity with best practice. Fit tight to adjoining work and adjoining insulation so that a completely tight enclosure free from open joints, holes, cracks, and voids, is achieved. Tape batt flanges to face of studs to form continuous vapor barrier. Attach insulation in place in a manner ensuring stability and to eliminate sagging.

END OF SECTION 072100

SECTION 079200 - JOINT SEALANTS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes joint sealants for the following applications:
   1. Exterior joints in the following vertical surfaces and horizontal nontraffic surfaces.
      a. Joints between different materials.
      b. Perimeter joints between frames of doors and windows.
      c. Expansion joints in all exterior concrete.
      d. Other joints indicated.
   2. Interior joints in the following vertical surfaces and horizontal nontraffic surfaces:
      a. Perimeter joints of exterior openings where indicated.
      b. Perimeter joints between interior wall surfaces and frames.
      c. Joints between plumbing fixtures and adjoining walls, floors, and counters.
      d. Other joints indicated.

1.03 PERFORMANCE REQUIREMENTS

A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

B. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.04 SUBMITTALS

A. Product Data: For each joint sealed product indicated.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

C. Warranties: Special warranties specified in this Section.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized Installer who is approved or licensed for installation of elastomeric sealants required for this Project.

1.06 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:
   1. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 40 deg F.
   2. When joint substrates are wet.
   3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
   4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.07 WARRANTY

A. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in the Section within specified warranty period.
   1. Warranty Period: Two years from Date of Substantial Completion

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.

2.02 MATERIAL, GENERAL

A. 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 sealant manufacturer, based on testing and field experience.

B. Colors of Exposed Joint Sealants as selected by Engineer from manufacturer's full range.

2.03 LATEX JOINT SEALANTS

A. Latex Sealant: Comply with ASTM C 834, Type P, Grade NF.

B. Manufacturer:
   1. Bostik Findley Chem-Calk 600
   2. Pecora Corporation; AC-20+
   3. Schnee-Morehead, Inc.; SM 8200
   4. Sonneborn, Division of ChemRex Inc.; Sonolac
   5. Tremco; Tremflex 834

2.04 JOINT-SEALANT BACKING

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing material, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerance, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Acoustical Sealant Application Standard: Comply with recommendations in ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.

D. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths 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.

3.03 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occurs.

3.04 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.

END OF SECTION 079200

SECTION 081100 - STEEL FRAMES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:
   1. Hollow metal frames

B. Related Sections
   1. Hardware: Section 087100 Door Hardware
   2. Job Finish: Section 099123 Painting

1.03 SYSTEM DESCRIPTION

A. Interior Design Requirements: Interior hollow metal frames shall be designed by a professional to resist heavy interior usage. Provide internal reinforcing as required to meet these requirements. Design calculations shall be available to the Architect on request.

1.04 REFERENCES

A. Standards:
   1. NFPA 80 – Fire Doors and Windows
   2. ANSI/SDI-100 – Recommended Specifications for Standard Steel Doors and Frames
   3. SDI-105 – Recommended Erection Instructions for Steel Frames
   4. SDI-107 – Hardware on Steel Doors (reinforcement application)
   5. ANSI-A250.4 – Steel Doors and Frames Physical Endurance
   6. UL10C - Standard for Positive Pressure Fire Tests of Door Assemblies

B. Codes:
   1. NFPA-101 – Life Safety Code
   2. IBC 2003 – International Building Code
   3. ANSI-A117.1 – Accessible and Usable Building and Facilities
   4. ADA – Americans with Disabilities Act

1.05 SUBMITTALS

A. Shop Drawings: Submit shop drawings for all items under this section. See Section 013300 Submittals.

B. Templates: Hardware templates for all hardware mounted on hollow metal work shall be submitted by the hardware supplier directly to the hollow metal manufacturer immediately after approval of the hardware schedule. Failure to receive templates with reasonable promptness shall be reported to the General Contractor.

1.06 QUALITY ASSURANCE

A. Regulatory Requirements: Provide UL label or other label acceptable to local building official on all doors and frames as required in the door schedule.

B. Manufacturer Qualifications
   1. Manufacturer shall be a member in good standing of the Steel Door Institute (SDI).

1.07 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping: Provide protective packaging on steel doors and frames as required to resist shipping damage.

B. Storage and Protection: Store doors on edge. Store frames in such a position as to prevent twisting. Doors with dimples or dents shall be refinished as necessary.

1.08 WARRANTY

A. All doors and frames shall be warranted in writing by the manufacturer against defects in materials and workmanship for a period of two (2) years commencing on the date of final completion and acceptance.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers:
   1. Curries Manufacturing
   2. CECO Door Division
   3. Southwestern Hollow Metal
   4. Steelcraft
   5. Mesker Door

2.02 MATERIALS

A. All doors and frames shall be manufactured of the best quality full cold-rolled furniture stock, free from scale, buckles and pits and meet all NAAMM/HMMA Specifications.

B. Supports and anchors shall be fabricated of not less that 20-gauge sheet steel.

C. Rust inhibitive enamel or paint primer shall be used, baked on, and suitable as a base for specified finish paints complying with ANSI A224.1, “Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces on Steel Doors and Frames.”

D. Grout: ASTM C 476, except with a maximum slump of 4 inches (102 mm), as measured according to ASTM C 143/C 143M. Grout guards shall be same material as frame.

2.03 HOLLOW METAL FRAMES

A. Frames for hollow metal and wood doors, borrowed lights and steel window walls, etc., indicated on the schedule or drawings to be steel shall be of design sections as detailed and assembled as indicated. All frames on interior walls shall be 14 gauge steel. Exterior frames shall be 14 gauge steel and grouted.

B. Provide internal reinforcing as required to comply with heavy-duty usage requirements of Article 1.02. Construct frames encompassing one or more doors with sidelights or transoms, and steel window walls, etc., in rigid units of a large size as practical to reduce to a minimum the number of job-fabricated joints. All joints and connections including job-fabricated joints shall be welded and ground and the entire assembly reinforced and braced as required to insure absolute rigidity. Provide expansion joints as indicated or required. Where so indicated or as required, provide channel stiffening within the securely welded to frame member.

C. Machine frames for attachment of hardware, including mortising, reinforcing, drilling and tapping for hinges. Furnish anchors of type and number required for anchoring frames to structure, partitions, etc., as follows:
   1. 3 jamb anchors on 7' high jamb
   2. 4 jamb anchors on jambs over 7' or 3’ wide
   3. 1 floor anchor on each jamb at metal stud partitions

D. Wire anchors will not be allowed.

E. Provide such installation instructions as are necessary to insure proper installation of anchors.

F. Drill stop of lock jamb of each interior frame for installation of pneumatic rubber door silencers. Silencers are to be furnished under hardware, numbers as indicated on schedule.

G. Conceal welded joints in two-sided mullions or similar sections behind glazing stops. Exposed joints shall be continuous welded and ground smooth.

H. Provide removable metal stops, screwed to frame, borrowed lights and window walls. See Section 088000 for glazing clearance requirements.

I. Unless indicated otherwise, glazing stops shall be 5/8" x 3/4" or 3/4" x 3/4" cold-rolled channel, shaped as required or detailed and hand fitted to each opening. Butt joints shall be square and true and tightly fitted. Fasten to frame with metal screws 1'-6" o.c., oval head, countersunk.

2.04 FABRICATION: FRAMES

A. Fabricate frames with mitered and faces continuously electric-welded corners at all exposed joints, miters and stops. Re-prime at the welded areas. All welds to be flush with neatly mitered or butted material cuts.

B. Hinge reinforcement for metal frames:
   1. Thickness: ¼”.
   2. Length: 18”.
   3. Width: full width of frame (frame face to frame face).
   4. Number of spot welds above and below each cutout: 8, and shall be 3/16" in diameter.
   5. For continuous hinged door, reinforcing shall be full width and full length of frame. Reinforcing shall have minimum thickness of 1/8", welds shall be 1” long located on 8" centers at each face of frame.
   6. Strike, flush bolt, hold-open and all surface-mounted hardware: 12-gauge.
   7. Closer and brackets: 3/16" on frame. 12-gauge angle on door.
   8. For door openings wider than 42" and for multiple openings, head members shall be reinforced full-length with 12-gauge angle or channel stiffeners.

C. Provide temporary shipping bars to be removed before setting frames.

D. Except on weatherstripped frames, drill stops to receive three (3) silencers on strike jambs of single frames and two (2) silencers on heads of double frames.

E. Provide minimum 0.0179” thick steel plaster guards or mortar boxes at back of hardware cutouts where mortar or other materials might obstruct hardware operation and to close off interior of openings.

2.05 FABRICATION: DOORS AND FRAMES

A. Fabricate steel door and frame units to be rigid, neat in appearance, and free from defects, warp, or buckle. Where practical, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory assembled before shipment, to assure proper assembly at Project site. Comply with ANSI/SDI 100 requirements.
   1. Clearances shall be no more than 1/8” at jambs and heads except between non fire rated pairs of doors which may be no more than 1/4.” Not more than 3/4” at the bottom of the doors.

B. Fabricate exposed faces of doors and panels, including stiles and rails of non-flush units, from only cold-rolled steel sheet.

C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."

D. Fabricate concealed stiffeners, reinforcement, edge channels, louvers, and moldings from either cold- or hot-rolled steel sheet.

E. Unless otherwise indicated, provide exposed fasteners with countersunk flat or oval heads for exposed screws and bolts.

F. Prepare doors and frames to receive mortised and concealed hardware according to final door hardware schedule and templates provided by hardware supplier. Comply with applicable requirements of SDI-107 and ANSI-A115 Series specifications for door and frame preparation for hardware.

G. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at Project site. Provide internal reinforcements for all doors to receive door closers and exit devices.

H. Locate hardware as indicated on Shop Drawings or, if not indicated, according to the Door and Hardware Institute's (DHI) "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."

I. Glazing stops shall be located on the occupied (room) side of frames, unless otherwise indicated.
   1. Unless otherwise indicated by DPS, glazing stops shall be either 3/4" x 5/8", 20-gauge standard glazing beads, continuous single piece for each length, and butted at corner joints. Secure glazing beads to frame with countersunk cadmium or counter sunk zinc-plated screws. Stops to be fabricated for installation on the inside (occupied side) of frames.

J. Provide non-removable stops on outside of exterior doors and on secure side of interior doors for glass, louvers, and other panels in doors.

K. Provide screw-applied, removable, glazing beads on inside of glass and other panels in doors.

L. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.

2.06 FINISH

A. Thoroughly clean all surfaces of grease, rust and scale to insure paint adherence. Following cleaning, apply one coat of manufacturer's standard factory primer. Apply filler to doors where required to produce a smooth surface prior to application of primer.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Frames: Set steel frames accurately in accordance with details, straight and free of twist with head level and jambs plumb. Rigidly anchor to walls and partitions and securely brace until surrounding work is completed. Provide deflection clearances at frame heads where indicated. Wherever possible leave spreader bars in place until frames are securely anchored. Install steel doors, frames, and accessories according to shop drawings, manufacturer's data, and as specified.

B. Comply with provisions of SDI-105, “Recommended Erection Instructions for Steel Door Frames,” unless otherwise indicated. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.
   1. Except for frames located in existing concrete, masonry, or gypsum board assembly construction, place frames before constructing enclosing walls and ceilings.
   2. At existing concrete or masonry construction, install at least 3 completed opening anchors per jamb adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Set frames and secure to adjacent construction with bolts and masonry anchorage devices.
   3. Provide three (3) masonry anchors for frames up to 7'-6" in height, and four (4) anchors for frames up to 8'-0" in height. For masonry and frame openings over 8'-0" in height, add one (1) anchor for each 2'-0" in height or fraction thereof.
   4. Provide four (4) stud frame anchors for frames up to 7'-6" in height and five (5) anchors for frames up to 8'-0". For stud openings over 8'-0" in height, add one (1) anchor for each 2'-0" in height or fraction thereof.
   5. Install fire-rated frames according to NFPA 80.

C. Fit hollow-metal doors accurately in frames, within clearances specified in ANSI/SDI 100. Install fire rated doors with clearances specified in NFPA 80.

D. Concrete or Masonry Walls: Solidly fill space between frames and concrete with grout. Take precautions, including bracing frames, to ensure that frames are not deformed or damaged by grout forces.
   1. UL welded-on 16-gauge adjustable strap anchors at least 2-½" x 10". Stirrup straps shall be appropriately corrugated and/or perforated.

E. In-Place Concrete or Masonry Construction: Secure frames in place with post installed expansion anchors.

F. Countersink anchors shall be countersunk and shall have flat-head countersunk screw heads filled and ground smooth invisible on exposed faces prior to painting.

G. In-Place Gypsum Board Partitions: Secure frames in place with post installed expansion anchors through floor anchors at each jamb. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.

H. Metal stud wall: 18-gauge "Z" anchors securely welded to frame.

3.02 ADJUSTING AND CLEANING

A. Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touchup of compatible air-drying primer

B. Immediately before final inspection, remove protective wrappings from doors and frames.

END OF SECTION 081100

SECTION 081416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.01 CONDITIONS AND REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:
   1. Solid-core doors with wood-veneer faces, to match existing door grade, stain, and finish.
   2. Factory finishing flush wood doors.
   3. Factory fitting flush wood doors to frames and factory machining for hardware.

B. Related Sections:
   1. Steel Frames: Section 081100
   2. Door Hardware: Section 087100

1.03 REFERENCES

A. Architectural Woodwork Quality Standards, latest Edition,, as published by the Architectural Woodwork Institute (AWI).

B. National Wood Window and Door Association (NWWDA) Industry Standards IS-1A Series.

1.04 SUBMITTALS

A. Product Data: For each type of door indicated. Include factory-finishing specifications.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.
   1. Indicate dimensions and locations of mortises and holes for hardware.
   2. Indicate dimensions and locations of cutouts.
   3. Indicate requirements for veneer matching.
   4. Indicate doors to be factory finished and finish requirements.

C. Quality Control Submittals: Templates: Hardware templates for hardware mounted on wood doors shall be submitted by the hardware supplier directly to the wood door manufacturer immediately after approval of the hardware schedule. Failure to receive templates with reasonable promptness shall be reported to the Contractor. Wood doors shall be pre-fit and pre-machined for hardware.

D. Submit full range of wood stain samples for color selection.

E. Contract Closeout Submittals: Submit door warranty as specified in Article 1.06.

1.05 QUALITY ASSURANCE

A. Regulatory Requirements: Fire rated doors and panels shall meet the requirements of ASTM E152. Provide UL label or other certifying label of independent testing agency acceptable to local building official on doors indicated in the door schedule to be fire rated.

B. Reference Standards: Wood doors shall comply with AWI Quality Standard, Custom Grade. Factory finish of wood doors shall meet the performance standards of AWI Quality Standard, Custom Grade.

1.06 DELIVERY, STORAGE AND HANDLING

A. Delivery: Do not deliver doors until building is entirely enclosed and humidity in the building has reached average relative humidity to the locality.

B. Storage: Stack doors flat and off the floor. Do not drag doors across one another.

1.07 WARRANTY

A. Prefinished wood doors shall be warranted for the life of the installation to include reasonable cost of rehanging. Doors that are replaced during the one (1) year warranty period shall be rehung by the Contractor. After the building warranty has expired, replacement doors shall be furnished and installed by the door manufacturer.

PART 2 – PRODUCTS

2.01 DOOR MANUFACTURERS

A. Acceptable Manufacturers:
   1. Marshfield Door Systems, Inc.
   2. Eggers Industries
   3. Oshkosh Architectural Door Co.
   4. approved substitute

2.02 NON-RATED SOLID CORE WOOD DOORS

A. Manufacturer and Type:
   1. Marshfield DPC-1 with Particle Board Core
      or equivalent of other acceptable manufacturer

B. General: Non-rated wood doors shall be 1-3/4" thick, solid core construction with rails and stiles bonded to the core. Width and height as indicated in the Door Schedule. Doors shall be 5 ply construction conforming to AWI with cross banding and solid particleboard core (PC-5 ME). Manufacture doors with 3/4" undercut to preserve full bottom rail. Doors shall be factory pre-machined for hardware including drilled pilot holes for screws.

C. Veneers and Edge Strips: Doors shall have custom grade, book-matched face veneers of plain sliced Grade AA wood to match existing doors with running match assembly both sides. Provide 1-3/8" matching vertical hardwood edges. Veneer to be laminated to core in a hot-press method after core (with bonded rails and stiles) has been planed as a unit.

2.03 FACTORY FINISH

A. Wood doors shall receive factory finish of water base stain and ultraviolet (UV) cured polyurethane sealer. Finish shall meet or exceed performance standards of AWI TR-6 catalyzed polyurethane finish system, custom grade. System shall include initial wash coat of reduced sealer, transparent stain (color as selected by Architect), vinyl sealer, sanding, and topcoat (satin gloss). Match existing door finish.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Before installation, verify that frames are proper size and type for the door and are installed as required for proper installation of doors.

3.02 INSTALLATION

A. Installation shall be by skilled finish carpenters or factory authorized installers in accordance with AWI Quality Standards and NFPA 80 Standards. Tolerances shall meet requirements of AWI. Installation of factory finished wood doors shall not occur until just prior to final completion to avoid damage to door panels by adjacent construction operations.

B. Hang doors to be free of binding with all hardware functioning properly.

C. Installer shall be thoroughly familiar with the door manufacturer's warranty requirements and assure compliance with all provisions.

D. Touch up and repair factory finishes in accordance with door manufacturer’s recommendations using approved materials and methods.

END OF SECTION 081416

SECTION 087100 – DOOR HARDWARE

PART 1 - GENERAL

1.01 CONDITIONS AND REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section includes:
   1. Mechanical and electrified door hardware for:
      a. Swinging doors.
   2. Field verification, preparation and modification of existing doors and frames to receive new door hardware.
   3. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.

B. Exclusions: Unless specifically listed in hardware sets, hardware is not specified in this section for:
   1. Windows
   2. Cabinets (casework), including locks in cabinets
   3. Signage
   4. Toilet accessories
   5. Overhead doors

C. Related Sections:
   1. Division 09 sections for touchup, finishing or refinishing of existing openings modified by this section.
   2. Division 26 sections for connections to electrical power system and for low-voltage wiring.
   3. Division 28 sections for coordination with other components of electronic access control system.

1.03 REFERENCES

A. UL - Underwriters Laboratories
   1. UL 10B - Fire Test of Door Assemblies
   2. UL 10C - Positive Pressure Test of Fire Door Assemblies
   3. UL 1784 - Air Leakage Tests of Door Assemblies
   4. UL 305 - Panic Hardware

B. DHI - Door and Hardware Institute
   1. Sequence and Format for the Hardware Schedule
   2. Recommended Locations for Builders Hardware
   3. Key Systems and Nomenclature

C. ANSI - American National Standards Institute
   1. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties.

1.04 SUBMITTALS

A. General:
   1. Submit in accordance with Conditions of Contract and Division 01 requirements.

2. Highlight, encircle, or otherwise specifically identify on submittals deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.
3. Prior to forwarding submittal, comply with procedures for verifying existing door and frame compatibility for new hardware, as specified in PART 3, “EXAMINATION” article, herein.

B. Action Submittals:
1. Product Data: Technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:
    a. Wiring Diagrams: For power, signal, and control wiring and including:
        1) Details of interface of electrified door hardware and building safety and security systems.
        2) Schematic diagram of systems that interface with electrified door hardware.
        3) Point-to-point wiring.
        4) Risers.
3. Samples for Verification: If requested by Architect, submit production sample or sample installations of each type of exposed hardware unit in finish indicated, and tagged with full description for coordination with schedule.
    a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.
4. Door Hardware Schedule: Submit schedule with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule as published by the Door and Hardware Institute. Indicate complete designations of each item required for each door or opening, include:
    a. Door Index; include door number, heading number, and Architects hardware set number.
    b. Opening Lock Function Spreadsheet: List locking device and function for each opening.
    c. Quantity, type, style, function, size, and finish of each hardware item.
    d. Name and manufacturer of each item.
    e. Fastenings and other pertinent information.
    f. Location of each hardware set cross-referenced to indications on Drawings.
    g. Explanation of all abbreviations, symbols, and codes contained in schedule.
    h. Mounting locations for hardware.
    i. Door and frame sizes and materials.
    j. Name and phone number for local manufacturer's representative for each product.
    k. Operational Description of openings with any electrified hardware (locks, exits, electromagnetic locks, electric strikes, automatic operators, door position switches, magnetic holders or closer/holder units, and access control components). Operational description should include operational descriptions for: egress, ingress (access), and fire/smoke alarm connections.
        1) Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work that is critical in Project construction schedule.
5. Key Schedule:
    a. After Keying Conference, provide keying schedule listing levels of keying as well as explanation of key system's function, key symbols used and door numbers controlled.

b. Use ANSI/BHMA A156.28 “Recommended Practices for Keying Systems” as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion.
1) Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
f. Prepare key schedule by or under supervision of supplier, detailing Owner’s final keying instructions for locks.

6. Templates: After final approval of hardware schedule, provide templates for doors, frames and other work specified to be factory or shop prepared for door hardware installation.

C. Informational Submittals:
1. Qualification Data: For Supplier, Installer and Architectural Hardware Consultant.
2. Product data for electrified door hardware:
a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
3. Warranty: Special warranty specified in this Section.

D. Closeout Submittals:
1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:
a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
b. Catalog pages for each product.
c. Factory order acknowledgement numbers (for warranty and service)
d. Name, address, and phone number of local representative for each manufacturer.
e. Parts list for each product.
f. Final approved hardware schedule, edited to reflect conditions as-installed.
g. Final keying schedule
h. Copies of floor plans with keying nomenclature
i. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.
j. Copy of warranties including appropriate reference numbers for manufacturers to identify project.

1.05 QUALITY ASSURANCE

A. Supplier Qualifications and Responsibilities: Recognized architectural hardware supplier with record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that provides certified Architectural Hardware Consultant (AHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.
1. Warehousing Facilities: In Project's vicinity.
2. Scheduling Responsibility: Preparation of door hardware and keying schedules.
3. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
4. Coordination Responsibility: Assist in coordinating installation of electronic security hardware with Architect and electrical engineers and provide installation and technical data to Architect and other related subcontractors.

a. Upon completion of electronic security hardware installation, inspect and verify that all components are working properly.

B. Architectural Hardware Consultant Qualifications: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:
   1. For door hardware, DHI-certified, Architectural Hardware Consultant (AHC).
   2. Can provide installation and technical data to Architect and other related subcontractors.
   3. Can inspect and verify components are in working order upon completion of installation.
   4. Capable of producing wiring diagrams.
   5. Capable of coordinating installation of electrified hardware with Architect and electrical engineers.

C. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.

D. Fire-Rated Door Openings: Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed products tested by Underwriters Laboratories, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.

E. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.

F. Accessibility Requirements: For door hardware on doors in an accessible route, comply with governing accessibility regulations cited in “REFERENCES” article, herein.

G. Keying Conference
   1. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
      a. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
      b. Preliminary key system schematic diagram.
      c. Requirements for key control system.
      d. Requirements for access control.
      e. Address for delivery of keys.

H. Pre-installation Conference
   1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   2. Inspect and discuss preparatory work performed by other trades.
   3. Inspect and discuss electrical roughing-in for electrified door hardware.
   4. Review sequence of operation for each type of electrified door hardware.
   5. Review required testing, inspecting, and certifying procedures.

I. Coordination Conferences:
   1. Installation Coordination Conference: Prior to hardware installation, schedule and hold meeting to review questions or concerns related to proper installation and adjustment of door hardware.
   2. Electrified Hardware Coordination Conference: Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site.

B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.
   1. Deliver each article of hardware in manufacturer's original packaging.

C. Project Conditions:
   1. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
   2. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.

D. Protection and Damage:
   1. Promptly replace products damaged during shipping.
   2. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work.
   3. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.

E. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

F. Deliver keys to Owner by registered mail or overnight package service.

1.07 COORDINATION

A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.

B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.

D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

E. Existing Openings: Where existing doors, frames and/or hardware are to remain, field verify existing functions, conditions and preparations and coordinate to suit opening conditions and to provide proper door operation.

1.08 WARRANTY

A. Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
   1. Warranty Period: Beginning from date of Substantial Completion, for durations indicated.
      a. Closers:
         1) Mechanical: 30 years.
      b. Locksets:
         1) Mechanical: 3 years.

2) Electrified: 1 year.
c. Key Blanks: Lifetime
2. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. The Owner requires use of certain products for their unique characteristics and project suitability to insure continuity of existing and future performance and maintenance standards. After investigating available product offerings, the Awarding Authority has elected to prepare proprietary specifications. These products are specified with the notation: “No Substitute.”
1. Where “No Substitute” is noted, submittals and substitution requests for other products will not be considered.

B. Approval of manufacturers and/or products other than those listed as “Scheduled Manufacturer” or “Acceptable Manufacturers” in the individual article for the product category shall be in accordance with QUALITY ASSURANCE article, herein.

C. Approval of products from manufacturers indicated in “Acceptable Manufacturers” is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer’s product.

D. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.02 MATERIALS

A. Fasteners
1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
2. Furnish screws for installation with each hardware item. Finish exposed (exposed under any condition) screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
3. Provide concealed fasteners for hardware units exposed when door is closed except when no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless thru-bolts are required to fasten hardware securely. Review door specification and advise Architect if thru-bolts are required.
4. Install hardware with fasteners provided by hardware manufacturer.

B. Modification and Preparation of Existing Doors: Where existing door hardware is indicated to be removed and reinstalled.
1. Provide necessary fillers, Dutchmen, reinforcements, and fasteners, compatible with existing materials, as required for mounting new opening hardware and to cover existing door and frame preparations.
2. Use materials which match materials of adjacent modified areas.
3. When modifying existing fire-rated openings, provide materials permitted by NFPA 80 as required to maintain fire-rating.

C. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.
1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

2.03 HINGES

A. Manufacturers and Products:
   1. Scheduled Manufacturer and Product: Ives 5BB series.
   2. Acceptable Manufacturers and Products: Hager BB series, Stanley FBB Series.

B. Requirements:
   1. Provide hinges conforming to ANSI/BHMA A156.1.
   2. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:
      a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
      b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high
   3. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:
      a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
      b. Interior: Heavy weight, steel, 5 inches (127 mm) high
   4. 2 inches or thicker doors:
      a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
      b. Interior: Heavy weight, steel, 5 inches (127 mm) high
   5. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
   6. Where new hinges are specified for existing doors or existing frames, provide new hinges of identical size to hinge preparation present in existing door or existing frame.
   7. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
      a. Steel Hinges: Steel pins
      b. Non-Ferrous Hinges: Stainless steel pins
      c. Out-Swinging Exterior Doors: Non-removable pins
      d. Out-Swinging Interior Lockable Doors: Non-removable pins
      e. Interior Non-lockable Doors: Non-rising pins
   8. Width of hinges: 4-1/2 inches (114 mm) at 1-3/4 inch (44 mm) thick doors, and 5 inches (127 mm) at 2 inches (51 mm) or thicker doors. Adjust hinge width as required for door, frame, and wall conditions to allow proper degree of opening.

2.04 ELECTRIC POWER TRANSFER

A. Manufacturers:
   a. Scheduled Manufacturer: Von Duprin EPT-10.
   b. Acceptable Manufacturers: ABH PT1000, Securitron CEPT-10.

B. Provide power transfer with electrified options as scheduled in the hardware sets. Provide with number and gage of wires sufficient to accommodate electric function of specified hardware.

C. Locate electric power transfer per manufacturer's template and UL requirements, unless interference with operation of door or other hardware items.

2.05 FLUSH BOLTS

A. Manufacturers:
   1. Scheduled Manufacturer: Ives.
   2. Acceptable Manufacturers: Burns, Rockwood.

B. Requirements:
   1. Provide automatic, constant latching, and manual flush bolts with forged bronze or stainless-steel face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch (305 mm) steel or brass rods at doors up to 90 inches (2286 mm) in height. For doors over 90 inches (2286 mm) in height increase top rods by 6 inches (152 mm) for each additional 6 inches (152 mm) of door height. Provide dust-proof strikes at each bottom flush bolt.

2.06 COORDINATORS

A. Manufacturers:
   1. Scheduled Manufacturer: Ives.
   2. Acceptable Manufacturers: Burns, Rockwood.
B. Requirements:
   1. Where pairs of doors are equipped with automatic flush bolts, an astragal, or other hardware that requires synchronized closing of the doors, provide bar-type coordinating device, surface applied to underside of stop at frame head.
   2. Provide filler bar of correct length for unit to span entire width of opening, and appropriate brackets for parallel arm door closers, surface vertical rod exit device strikes or other stop mounted hardware. Factory-prepared coordinators for vertical rod devices as specified.

2.07 MORTISE LOCKS

A. Manufacturers and Products:
   1. Scheduled Manufacturer and Product: Schlage L9000 series.
   2. Acceptable Manufacturers and Products: No substitution

B. Requirements:
   1. Provide mortise locks conforming to ANSI/BHMA A156.13 Series 1000, Grade 1, and UL Listed for 3 hour fire doors.
   2. Indicators: Where specified, provide indicator window measuring a minimum 2 inch x 1/2 inch with 180 degree visibility. Provide messages color-coded with full text and/or symbols, as scheduled, for easy visibility.
      a. Outside Occupancy Indicator: Provide indicator above cylinder or emergency release for visibility while operating the lock that identifies an occupied/unoccupied status of the lock or latch.
   3. Provide locks manufactured from heavy gauge steel, containing components of steel with a zinc dichromate plating for corrosion resistance.
   4. Provide lock case that is multi-function and field reversible for handing without opening case. Cylinders: Refer to “KEYING” article, herein.
   5. Provide locks with standard 2-3/4 inches (70 mm) backset with full 3/4 inch (19 mm) throw stainless steel mechanical anti-friction latchbolt. Provide deadbolt with full 1 inch (25 mm) throw, constructed of stainless steel.
   6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
   7. Provide electrified options as scheduled in the hardware sets. Where scheduled, provide switches and sensors integrated into the locks and latches.
   8. Provide motor based electrified locksets with electrified options as scheduled in the hardware sets and comply with the following requirements:
      a. Universal input voltage – single chassis accepts 12 or 24V DC to allow for changes in the field without changing lock chassis.
      b. Fail Safe/Fail Secure – changing mode between electrically locked (fail safe) and electrically unlocked (fail secure) is field selectable without opening the lock case
      c. Low maximum current draw – maximum 0.4 amps to allow for multiple locks on a single power supply.
      d. Low holding current – maximum 0.01 amps to produce minimal heat, eliminate “hot levers” in electrically locked applications, and to provide reliable operation in wood doors that provide minimal ventilation and air flow.
      e. Request to Exit Switch (RX) –
         1) Modular Design – provide electrified locks capable of using, adding, or changing a modular RX switch without opening the lock case.
         2) Monitoring – where scheduled, provide a request to exit (RX) switch that detects rotation of the inside lever.
      f. Connections – provide quick-connect Molex system standard.

9. Lever Trim: Solid brass, bronze, or stainless steel, cast or forged in design specified, with wrought roses and external lever spring cages. Provide thru-bolted levers with 2-piece spindles.
    a. Lever Design: Schlage 17A

2.08 CYLINDERS

A. Manufacturers:
    1. Scheduled Manufacturer: Schlage

B. Requirements:
    1. Provide permanent cylinders/cores to match Owner's existing key system, compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset, manufacturer's series as indicated. Refer to "KEYING" article, herein.
    2. Provide the following keyway: Match existing as directed by Owner.

2.09 KEYING

A. Provide a factory registered keying system, complying with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

B. Provide cylinders/cores keyed into Owner's existing factory registered keying system.

C. Comply with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

D. Requirements:
    1. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.
        a. Master Keying system as directed by the Owner.
    2. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
    3. Provide keys with the following features:
        a. Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
    4. Identification:
        a. Mark permanent cylinders/cores and keys with applicable blind code per DHI publication "Keying Systems and Nomenclature" for identification. Do not provide blind code marks with actual key cuts.
        b. Identification stamping provisions must be approved by the Architect and Owner.
        c. Stamp cylinders/cores and keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
        d. Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.
        e. Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.

2.10 DOOR CLOSERS

A. Manufacturers and Products:
    1. Scheduled Manufacturer and Product: LCN 4010/4110 series.
    2. Acceptable Manufacturers and Products: No substitution

B. Requirements:
    1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. Certify surface mounted mechanical closers to

meet fifteen million (15,000,000) full load cycles. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with high strength cast iron cylinder, and full complement bearings at shaft.
3. Cylinder Body: 1-1/2 inch (38 mm) diameter with 11/16 inch (17 mm) diameter double heat-treated pinion journal.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.
7. Provide closers with solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers. When closers are parallel arm mounted, provide closers which mount within 6-inch (152 mm) top rail without use of mounting plate so that closer is not visible through vision panel from pull side.
8. Pressure Relief Valve (PRV) Technology: Not permitted.
9. Finish for Closer Cylinders, Arms, Adapter Plates, and Metal Covers: Powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI/BHMA Standard A156.4 and ASTM B117, or has special rust inhibitor (SRI).
10. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.11 PROTECTION PLATES

A. Manufacturers:
1. Scheduled Manufacturer: Ives.
2. Acceptable Manufacturers: Burns, Rockwood.

B. Requirements:
1. Provide kick plates, mop plates, and armor plates minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
2. Sizes of plates:
a. Kick Plates: 10 inches (254 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs
b. Mop Plates: 4 inches (102 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs
c. Armor Plates: 36 inches (914 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs

2.12 OVERHEAD STOPS

A. Manufacturers:
1. Scheduled Manufacturers: Glynn-Johnson.
2. Acceptable Manufacturers: Rixson, Sargent.

B. Requirements:
1. Provide heavy duty concealed mounted overhead stop or holder as specified for exterior and interior vestibule single acting doors.
2. Provide heavy duty concealed mounted overhead stop or holder as specified for double acting doors.
3. Provide heavy or medium duty and concealed or surface mounted overhead stop or holder for interior doors as specified. Provide medium duty surface mounted overhead stop for interior doors and at any door that swings more than 140 degrees before striking

wall, open against equipment, casework, sidelights, and where conditions do not allow wall stop or floor stop presents tripping hazard.
4. Where overhead holders are specified provide friction type at doors without closer and positive type at doors with closer.

2.13 DOOR STOPS

A. Manufacturers:
1. Scheduled Manufacturer: Ives.
2. Acceptable Manufacturers: Burns, Rockwood.

B. Provide door stops at each door leaf:
1. Provide wall stops wherever possible. Provide convex type where mortise type locks are used and concave type where cylindrical type locks are used.
2. Where a wall stop cannot be used, provide universal floor stops for low or high rise options.
3. Where wall or floor stop cannot be used, provide medium duty surface mounted overhead stop.

2.14 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

A. Manufacturers:
1. Scheduled Manufacturer: Zero International.
2. Acceptable Manufacturers: National Guard, Reese.

B. Requirements:
1. Provide thresholds, weather-stripping (including door sweeps, seals, and astragals) and gasketing systems (including smoke, sound, and light) as specified and per architectural details. Match finish of other items.
2. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
3. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.

2.15 SILENCERS

A. Manufacturers:
1. Scheduled Manufacturer: Ives.
2. Acceptable Manufacturers: Burns, Rockwood.

B. Requirements:
1. Provide "push-in" type silencers for hollow metal or wood frames.
2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
3. Omit where gasketing is specified.

2.16 FINISHES

A. Finish: BHMA 626/652 (US26D); except:
1. Hinges at Exterior Doors: BHMA 630 (US32D)
2. Continuous Hinges: BHMA 630 (US32D)
3. Continuous Hinges: BHMA 628 (US28)
4. Push Plates, Pulls, and Push Bars: BHMA 630 (US32D)
5. Protection Plates: BHMA 630 (US32D)
6. Overhead Stops and Holders: BHMA 630 (US32D)
7. Door Closers: Powder Coat to Match
8. Wall Stops: BHMA 630 (US32D)
9. Latch Protectors: BHMA 630 (US32D)

10. Weatherstripping: Clear Anodized Aluminum
11. Thresholds: Mill Finish Aluminum

PART 3 - EXECUTION

3.01 EXAMINATION

A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Field verify existing doors and frames receiving new hardware and existing conditions receiving new openings. Verify that new hardware is compatible with existing door and frame preparation and existing conditions.

C. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Where on-site modification of doors and frames is required:
   1. Carefully remove existing door hardware and components being reused. Clean, protect, tag, and store in accordance with storage and handling requirements specified herein.
   2. Field modify and prepare existing door and frame for new hardware being installed.
   3. When modifications are exposed to view, use concealed fasteners, when possible.
   4. Prepare hardware locations and reinstall in accordance with installation requirements for new door hardware and with:
      a. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.
      b. Wood Doors: DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."
      c. Doors in rated assemblies: NFPA 80 for restrictions on on-site door hardware preparation.

3.03 INSTALLATION

A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.
   1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
   2. Custom Steel Doors and Frames: HMMA 831.
   3. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."

B. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.

C. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.

D. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.

E. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

F. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.

G. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated or one hinge for every 30 inches (750 mm) of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.

H. Wiring: Coordinate with Division 26, ELECTRICAL sections for:
   1. Conduit, junction boxes and wire pulls.
   2. Connections to and from power supplies to electrified hardware.
   3. Connections to fire/smoke alarm system and smoke evacuation system.
   4. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.
   5. Testing and labeling wires with Architect's opening number.

I. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.

J. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.

K. Closer/Holders: Mount closer/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.

L. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.

M. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

N. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

3.03 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
   1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, Installer's Architectural Hardware Consultant must examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

3.04 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.05 DOOR HARDWARE SCHEDULE

A. Hardware items are referenced in the following hardware. Refer to the above-specifications for special features, options, cylinders/keying, and other requirements.

B. Hardware Sets:

HARDWARE GROUP NO. 01
FOR USE ON MARK/DOOR #(S):
2260 2251

REUSE EXISITNG HARDWARE, MODIFIY DOORS FOR RELOCATED CYLINDER HOLES.

END OF SECTION 087100

SECTION 088000 – GLAZING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
   1. Office Windows
   2. Door lites

1.03 DEFINITIONS

A. Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or a specified gas.

B. Deterioration of Coated Glass: Defects developed from normal uses that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in metallic coating.

C. Deterioration of Insulating Glass: Failure of hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1.04 PERFORMANCE REQUIREMENTS

A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Glass Design: Glass thickness designations indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites in the thickness designations indicated for various size openings, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:
   1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:
      a. Design Wind Loads: Determine design wind loads applicable to Project from basic wind speed indicated in miles per hour at 33 feet above grade, according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 6.5, "Method 2-Analytical Procedure," based on mean roof heights above grade indicated on Drawings.
      b. Probability of Breakage for Vertical Glazing: 8 lites per 1000 for lites set vertically or not more than 15 degrees off vertical and under wind action.
         1) Load Duration: 60 seconds or less.
      c. Minimum Glass Thickness for Exterior Lites: Not less than 4.5 mm.

C. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

1.05 SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

B. Samples: 12-inch-square, for each type of glass product indicated, other than monolithic clear float glass.

C. Glazing Schedule: Use same designations indicated on Drawings.

1.06 QUALITY ASSURANCE

A. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201 and, for wired glass, ANSI Z97.1.

B. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
   1. GANA Publications: GANA's "Laminated Glazing Reference Manual" and GANA's "Glazing Manual."
   2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "Glazing Guidelines for Sealed Insulating Glass Units."

C. Fire-Protection-Rated Glazing Labeling: Permanently mark fire-protection-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, test standard, whether glazing is for use in fire doors or other openings, whether or not glazing passes hose-stream test, whether or not glazing has a temperature rise rating of 450 deg F (250 deg C), and the fire-resistance rating in minutes.

D. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the Insulating Glass Certification Council or Associated Laboratories, Inc.

1.07 WARRANTY

A. Manufacturer’s Warranty for Coated-Glass Products: Manufacturer's standard form, made out to Owner and signed by coated-glass manufacturer agreeing to replace coated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
   1. Warranty Period: not less than five (5) years from date of Substantial Completion.

B. Manufacturer's Special Warranty on Laminated Glass: Manufacturer's standard form in which laminated-glass manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
   1. Warranty Period: 10 years from date of Substantial Completion.

C. Manufacturer's Warranty on Insulating Glass: Manufacturer's standard form, made out to Owner and signed by insulating-glass manufacturer agreeing to replace insulating-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
   1. Warranty Period: not less than five (5) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 GLASS PRODUCTS, GENERAL

A. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.

B. Strength: Where float glass is indicated, provide annealed float glass, Kind HS heat-treated float glass, or Kind FT heat-treated float glass. Where heat-strengthened glass is indicated, provide Kind HS heat-treated float glass or Kind FT heat-treated float glass. Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.

C. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
   1. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F (W/sq. m x K).
   2. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
   3. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.03 TEMPERED GLASS

A. Tempered Clear Float Glass: As specified for clear annealed float glass except fully tempered to conform to ASTM C 1048, Kind FT.

B. Acceptable Suppliers - Tempered Glass:
   1. Temp Safe, Inc.
   2. Kwik Temp
   3. Oldcastle
   4. Guardian Industries Corp.
   5. PPG Industries, Inc.
   6. AFGD, Inc.
   7. HGP Industries, Inc.
   8. Tempglass
   9. Interpane Glass Co.

2.04 LAMINATED GLASS

A. Laminated Glass: ASTM C 1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
   1. Construction: Laminate glass with polyvinyl butyral interlayer to comply with interlayer manufacturer's written instructions.
   2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
   3. Interlayer Color: Clear unless otherwise indicated.

B. Windborne-Debris-Impact-Resistant Laminated Glass: Comply with requirements specified above for laminated glass except laminate glass with the following to comply with interlayer manufacturer's written instructions:
   1. Polyvinyl butyral interlayers reinforced with polyethylene terephthalate film.

C. Bullet Resistant Security Glazing
   1. **Type SG-FE/BR4 -** Laminated Polycarbonate, *Clear*: Two pieces of 1/8" polycarbonate laminated to a 1/2" polycarbonate core bonded together with urethane interlayers. Exposed polycarbonate shall have a mar resistant coating. Overall nominal thickness shall be 3/4". Product shall comply with:
      a. HPW-TP-0500Forced Entry Level 4 (step 38) and Ballistics Level B, .9mm.

b. Earlier versions of the HP White standard will not be accepted.
c. Basis for design Oldcastle BuildingEnvelope® ArmorProtect® Max #134000.

2.05 GLAZING GASKETS

A. Dense Compression Gaskets: Molded or extruded gaskets of material indicated below, complying with standards referenced with name of elastomer indicated below, and of profile and hardness required to maintain watertight seal:
1. Neoprene, ASTM C 864.
2. EPDM, ASTM C 864.
3. Silicone, ASTM C 1115.
4. Thermoplastic polyolefin rubber, ASTM C 1115.
5. Any material indicated above.

B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned gaskets of material indicated below; complying with ASTM C 509, Type II, black; and of profile and hardness required to maintain watertight seal:
1. Neoprene.
2. EPDM.
3. Silicone.
4. Thermoplastic polyolefin rubber.
5. Any material indicated above.

2.06 GLAZING SEALANTS

A. General: Provide products of type indicated, complying with the following requirements:
1. Compatibility: Select glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

B. Elastomeric Glazing Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
1. Single-Component Silicone Glazing Sealants:
a. Type and Grade: S (single component) and NS (nonsag).
b. Class: 100/50.
c. Use Related to Exposure: NT (nontraffic).
d. Uses Related to Glazing Substrates: M, G, A, and, as applicable to glazing substrates indicated, O.

2.07 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based elastomeric tape with a solids content of 100 percent; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
1. AAMA 804.3 tape, where indicated.

2.08 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions with a Shore, Type A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

2.09 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

2.10 GLASS TYPES

Glass types indicated on the drawings shall be one of the following types of glass. Glass thickness indicated below is nominal.

TYPE	DESCRIPTION
A	Level 3 Bullet Resistant Glass
B	3/8” laminated security glass.

PART 3 - EXECUTION

3.01 GLAZING

A. General: Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
   1. Glazing channel dimensions, as indicated on Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.
   2. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
   3. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.

4. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
5. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
6. Provide spacers for glass lites where length plus width is larger than 50 inches.
7. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

B. Tape Glazing: Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
1. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.
2. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
3. Apply heel bead of elastomeric sealant.
4. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
5. Apply cap bead of elastomeric sealant over exposed edge of tape.

C. Gasket Glazing (Dry): Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
1. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
2. Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
3. Install gaskets so they protrude past face of glazing stops.

D. Sealant Glazing (Wet): Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
1. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
2. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.02 CLEANING AND PROTECTION

A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended by glass manufacturer.

B. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

END OF SECTION 088000

SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:
   1. Drywall studs framing & furring
   2. Interior suspension systems

B. Related Sections:
   1. Section 072100 - Insulation
   2. Section 092100 – Gypsum Board

1.03 REFERENCE STANDARDS

A. Comply with ASTM Standards referenced within the text of this specification.

1.04 SUBMITTALS

A. Submit copies of manufacturer's product data and specifications with each material component and accessory. Include manufacturers typical bracing details and unsupported lengths and gauges.

1.05 DELIVERY, STORAGE AND HANDLING

A. Store materials in a clean, dry area until ready for use. Store framing members in horizontal (flat) position.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Acceptable Manufacturers - Drywall Studs:
   1. United States Gypsum Company
   2. Domtar Gypsum, Inc.
   3. Western Metal Lath Company
   4. Unimast Inc.
   5. American Studco, Inc.
   6. CEMCO
   7. Dale / Incor Industries
   8. Dietrich
   9. Clark Steel Framing

2.02 DRYWALL STUDS AND RELATED COMPONENTS

A. Drywall Studs: Provide 20 gauge (.0329”) No. 358ST20 studs at door jambs and tile backed walls. Provide 25 gauge (.0179”) No. 358CR25 at typical walls.

B. Stud Runners: USG match gauge of drywall studs No. 358CR25 (3-5/8") metal runners conforming to ASTM C645. Provide runners to accommodate other stud widths where indicated on drawings.

C. Slip Track System: Fire Trak Corp. “ShadowLine” 20 gauge ceiling runner and clip fastener system, UL Classified for required fire rating of wall, or approved substitute of acceptable manufacturer.

D. Stud Fasteners: USG Type S or Type S-12 pan head screws; or equivalent of other acceptable manufacturer. Use proper type for gauge of stud or channel.

E. Hat-Shaped, Rigid Furring Channels: ASTM C 645.

2.03 SUSPENSION SYSTEM COMPONENTS

A. Metal Studs: Use 30 mil metal studs throughout project for non-load bearing ceilings.

B. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inch- (1.59-mm-) diameter wire, or double strand of 0.0475-inch- (1.21-mm-) diameter wire.

C. Hanger Attachments to Concrete:
   1. Powder-Actuated Fasteners: Suitable for application indicated, fabricated from corrosion-resistant materials with clips or other devices for attaching hangers of type indicated, and capable of sustaining, without failure, a load equal to 10 times that imposed by construction as determined by testing according to ASTM E 1190 by an independent testing agency.

D. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.162-inch (4.12-mm) diameter.

E. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0538 inch (1.37 mm) and minimum 1/2-inch- (12.7-mm-) wide flanges.

F. Furring Channels (Furring Members):
   1. Cold-Rolled Channels: 0.0538-inch (1.37-mm) bare-steel thickness, with minimum 1/2-inch- (12.7-mm-) wide flanges, 3/4 inch (19.1 mm) deep.
   2. Steel Studs: ASTM C 645; 25 gauge (0.0179”).
   3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch (22.2 mm) deep.
   4. Resilient Furring Channels: 1/2-inch- (12.7-mm-) deep members designed to reduce sound transmission.

G. Grid Suspension System for Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.
   1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
      a. Armstrong World Industries, Inc.; Drywall Grid Systems.
      b. Chicago Metallic Corporation; Fire Front 650-C Drywall Furring System.
      c. USG Corporation; Drywall Suspension System.

PART 3 - EXECUTION

3.01 ERECTION OF DRYWALL STUD PARTITIONS

A. Align partitions accurately according to partition layout. Anchor runner channels to concrete slabs with concrete stub nails or powder-activated anchors at 24" on center. Anchor runner channels to ceiling where occurs with stove bolts. Install headers where required to receive runners where studs extend above ceiling system.

B. Position studs vertically in runners, spacing studs 16" on center, maximum. Anchor studs to top and bottom runners with stud fasteners. Locate studs no more than 2" from frame jambs, abutting partitions, corners, etc. Anchor studs to frame anchor clips by bolt or screw attachment. Install headers over openings as recommended by the manufacturer.

C. Provide diagonal bracing at head of stud walls that terminate above the ceiling. Bracing shall consist of 1-1/2" cold-rolled channels bent to V shape or studs extending at 45 degrees from partition head to structure above. Locate bracing 4'-0" on center, maximum.

D. Install each steel framing and furring member so that fastening surfaces do not vary more than 1/8 inch from plumb and from the plane formed by the faces of adjacent framing.

E. Install steel framing components for suspended ceilings so that cross-furring members are level to within 1/8 inch in 12 feet as measured both lengthwise on each member and transversely between parallel members.

F. Maximum out-of-plumb or line of framing permissible is 1/8" in 12' and ¼" overall.

G. Maximum out-of-square or designated line permissible is 1/8" in first 15' from corner and maximum ¼" overall.

H. Stud splicing is prohibited.

I. Do not connect or support steel framing from ducts, pipes, conduit or metal deck. Do not bridge structure.

3.02 INSTALLING SUSPENSION SYSTEMS

A. Install suspension system components in sizes and spacing indicated on Drawings, but not less than those required by referenced installation standards for assembly types and other assembly components indicated.

B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

C. Suspend hangers from building structure as follows:
   1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
      a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
   2. Where width of ducts and other construction within ceiling plenum produces hanger spacing that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
   3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
   4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
   5. Do not attach hangers to steel roof deck.
   6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
   7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
   8. Do not connect or suspend steel framing from ducts, pipes, or conduit.

D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

E. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

F. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

3.03 MISCELLANEOUS FRAMING AND FURRING

A. Provide necessary framing and furring for special framing at recesses, specialty items, etc.

B. Install furring channels over back-up material. Position channels 24" on center vertically or horizontally as indicated. Use powder-activated fasteners or stub nails at 24" on center along alternating flanges. Shim channels plumb as required.

C. Install resilient channels horizontally at 24" on center and screw attach to each support. Provide channel at top and bottom of wall and around all openings.

END OF SECTION 092216

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following:
   1. Interior gypsum board walls.

B. Related Sections:
   1. Interior Painting: Section 099123

1.03 SUBMITTALS

A. Submit copies of manufacturer's product data and specifications with each material component and accessory plainly identified in accordance with Division 1.

1.04 QUALITY ASSURANCE

A. Drywall manufactured in China will not be allowed.

B. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

C. Gypsum board partitions and walls and shaftwall systems shall be identified in the product data submittal as complying with a fire-rated and listed wall assembly system as classified by Underwriters Laboratories, Inc. (UL) or other accredited independent testing laboratory for required fire-rated construction where indicated on drawings. Retain paragraph below where gypsum board is part of STC rated assemblies. Indicate design designations of specific assemblies on Drawings.

D. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

1.05 REFERENCE STANDARDS

A. Comply with Gypsum Association Documents GA-216 "Recommended Specifications for Application and Finishing of Gypsum Board" and GA-214 “Levels of Gypsum Board Finish”, latest editions.

B. Comply with ASTM Standards referenced within the text of this specification.

1.06 DELIVERY, STORAGE AND HANDLING

A. Store materials in a clean, dry area until ready for use. Store gypsum panels in horizontal (flat) position.

1.07 PROJECT CONDITIONS

A. During gypsum panel finishing, maintain temperatures within the building within the range of 55 degrees to 70 degrees F. Provide adequate ventilation to carry off excess moisture.

1.08 SEQUENCING

A. Where partitions stop against bottom of ceiling grid system, install grid system and floor covering prior to stud erection.

PART 2 - PRODUCTS

2.01 GYPSUM BOARD, GENERAL

A. General: Complying with ASTM C 36/C 36M or ASTM C 1396/C 1396M, as applicable to type of gypsum board indicated and whichever is more stringent.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. James Hardie Gypsum
      b. Georgia-Pacific Corporation
      c. Gold Bond - National Gypsum Company
      d. United States Gypsum Company
      e. Domtar Gypsum, Inc.
      f. Centex American / Eagle Gypsum Co.
      g. Pabco Gypsum Co.
      h. American Gypsum Co.
      i. Approved substitute

B. Type X:
   1. Thickness: 5/8 inch (15.9 mm).
   2. Width: 48 inches wide.
   3. Long Edges: Tapered.

2.02 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.
   1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet.
   2. Shapes:
      a. Cornerbead.
      b. LC-Bead: J-shaped; exposed long flange receives joint compound.
      c. Expansion (control) joint.

B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.
   1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Fry Reglet Corp.
      b. Gordon, Inc.
      c. Pittcon Industries.
   2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221 (ASTM B 221M), Alloy 6063-T5.
   3. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified.

2.03 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:
   1. Interior Gypsum Wallboard: Paper.
   2. Exterior Gypsum Soffit Board: Paper.
   3. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
   4. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

2.04 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
   1. Use adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
   1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
   2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

D. Thermal Insulation: As specified in Division 07 Section "Thermal Insulation."

PART 3 – EXECUTION

3.01 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C 840.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations, and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

3.02 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.

C. Interior Trim: Install in the following locations:
   1. Cornerbead: Use at outside corners.
   2. LC-Bead: Use at exposed panel edges.

D. Aluminum Trim: Install in locations indicated on Drawings.

3.03 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints, rounded or beveled edges, and damaged surface areas.

C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.

D. Gypsum Finish Level Definitions. Level 0: No taping, finishing, or accessories required.

1. Level 1: All joints and interior angles shall have tape set in joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable.
2. Level 2: All joints and interior angles shall have tape embedded in joint compound and wiped with a joint knife leaving a thin coating of joint compound over all joints and interior angles. Fastener heads and accessories shall be covered with a coat of joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable. Joint compound applied over the body of the tape at the time of tape embedment shall be considered a separate coat of joint compound and shall satisfy the conditions of this level.
3. Level 3: All joints and interior angles shall have tape embedded in joint compound and one additional coat of joint compound applied over all joints and interior angles. Fastener heads and accessories shall be covered with two separate coats of joint compound. All joint compound shall be smooth and free of tool marks and ridges. Note: It is recommended that the prepared surface be coated with a drywall primer prior to the application of final finishes. See painting/wallcovering specification in this regard.
4. Level 4: All joints and interior angles shall have tape embedded in joint compound and two separate coats of joint compound applied over all flat joints and one separate coat of joint compound applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. All joint compound shall be smooth and free of tool marks and ridges. Note: It is recommended that the prepared surface be coated with a drywall primer prior to the application of final finishes. See painting specification in this regard.
5. Level 5: All joints and interior angles shall have tape embedded in joint compound and two separate coats of joint compound applied over all flat joints and one separate coat of joint compound applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. A thin skim coat (Ref: Terminology, Section II, page 2) of joint compound or a material manufactured especially for this purpose, shall be applied to the entire surface. The surface shall be smooth and free of tool marks and ridges. Note: It is recommended that the prepared surface be coated with a drywall primer prior to the application of finish paint. See painting specification in this regard.

E. Gypsum Finish Locations: Finish panels to levels indicated below:
   1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
   2. Level 2: Panels that are substrate for tile.
   3. Level 3: Not used.
   4. Level 4: Typical unless otherwise indicated.
   5. Level 5: Not used.

F. Finishing Cementitious Backer Units:
   1. On all wall and ceiling joints and corners, fill gaps with mortar and finish with a 2” fiberglass tape over which a thin coat of mortar is then applied.

3.04 PROTECTION

A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

B. Remove and replace panels that are wet, moisture damaged, and mold damaged.
   1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
   2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

SECTION 095113 - ACOUSTICAL TILE CEILINGS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes:
   1. Acoustical tiles and concealed suspension systems for ceilings.

1.03 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Source Limitations:
   1. Acoustical Ceiling Panel: Obtain each type through one source from a single manufacturer that matches existing.
   2. Suspension System: Obtain each type through one source from a single manufacturer, that matches existing

1.04 QUALITY ASSURANCE

A. Acoustical Testing Agency Qualifications: An independent testing laboratory, or an NVLAP-accredited laboratory.

B. Fire-Test-Response Characteristics:
   1. Fire-Resistance Characteristics: Where indicated, provide acoustical tile ceilings identical to those of assemblies tested for fire resistance per ASTM E 119 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
      a. Identify materials with appropriate markings of applicable testing and inspecting agency.
   2. Surface-Burning Characteristics: Acoustical tiles complying with ASTM E 1264 for Class A materials, when tested per ASTM E 84.
      a. Smoke-Developed Index: 450 or less.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature, extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and stabilized moisture content.

C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.06 PROJECT CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

   1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

1.07 COORDINATION

A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system and partition assemblies.

PART 2 – PRODUCTS

2.01 ACOUSTICAL TILE CEILINGS, GENERAL

A. Acoustical Tile Standard: Comply with ASTM E 1264.

B. Acceptable Manufacturers - Lay-in Ceiling Panels:
   1. Armstrong World Industries
   2. Certainteed
   3. United States Gypsum Company
   4. approved substitute

C. Metal Suspension System Standard: Comply with ASTM C 635.

D. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
   1. Anchors in Concrete: Bonded anchors fabricated from corrosion-resistant materials, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing per ASTM E 488 or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.
   2. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing per ASTM E 1190, conducted by a qualified testing and inspecting agency.

E. Wire Hangers, Braces, and Ties: Zinc-coated carbon-steel wire; ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
   1. Size: Select wire diameter so its stress at 3 times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106-inch- (2.69-mm-) diameter wire.

F. Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension system runners.

2.02 ACOUSTICAL TILES FOR ACOUSTICAL TILE CEILING

A. Product installed under this Section to match existing product installed on site.

B. Classification: Provide tiles complying with ASTM E 1264 for type and form as follows:
   1. Type and Form: Type III, mineral base with painted finish; Form 2, water felted.

C. LR: Not less than 0.84.

D. NRC: Not less than 0.80, Type E-400 mounting per ASTM E 795.

2.03 METAL SUSPENSION SYSTEM FOR ACOUSTICAL TILE CEILING

A. Direct-Hung Suspension System: Intermediate-duty structural classification.

B. Access: Upward or Downward, with each access unit identified by manufacturer's standard unobtrusive markers.

2.04 METAL EDGE MOLDINGS AND TRIM

A. Acceptable Manufacturers – Suspended Ceiling Systems: (SCS)
1. Armstrong World Industries
2. Chicago Metallic Corporation
3. United States Gypsum Company
4. Certainteed
5. approved substitute

B. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension system runners.
1. Provide manufacturer's standard edge moldings that fit acoustical tile edge details and suspension systems indicated and that match width and configuration of exposed runners, unless otherwise indicated.

C. Extruded-Aluminum Edge Moldings and Trim: Where indicated, provide manufacturer's extruded aluminum edge moldings and trim of profile indicated, including splice plates, corner pieces, and attachment and other clips, complying with seismic design requirements and the following:
1. Aluminum Alloy: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than the strength and durability properties of aluminum extrusions complying with ASTM B 221 for Alloy and Temper 6063-T5.
2. Profile / Dimension: 10” nominal channel profile.
3. Finish designations prefixed by AA comply with system established by the Aluminum Association for designating aluminum finishes.
4. Baked-Enamel Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; organic coating: as specified below). Apply baked enamel complying with paint manufacturer's written instructions for cleaning, conversion coating, and painting.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and
anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

3.03 INSTALLATION

A. Comply with ASTM C 636 and seismic design requirements indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

B. Measure each ceiling area and establish layout of acoustical tiles to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width tiles at borders.

C. Suspend ceiling hangers from building's structural members, plumb and free from contact with insulation or other objects within ceiling plenum. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, counter splaying, or other equally effective means. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers, use trapezes or equivalent devices. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
   1. Do not support ceilings directly from permanent metal forms or floor deck; anchor into concrete slabs.
   2. Do not attach hangers to steel deck tabs or to steel roof deck.

3.04 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer’s written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

B. Install edge moldings and trim of type indicated at perimeter of acoustical tile ceiling area and where necessary to conceal edges of acoustical tiles. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3.2 mm in 3.6 m). Miter corners accurately and connect securely.

C. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

D. Install acoustical tiles in coordination with suspension system and exposed moldings and trim. Place splines or suspension system flanges into kerfed edges so tile-to-tile joints are closed by double lap of material.

E. Repairs:
   1. Where deteriorated acoustical tiles are identified, remove tiles. Clean, repair and replace as necessary.
      a. Repair and installed framing to match existing where deteriorated framing is identified.

END OF SECTION 095113

SECTION 096519 - RESILIENT TILE FLOORING & BASE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:
   1. Luxury Vinyl Tile (LVT)
   2. Vinyl Base
   3. Vinyl Edging

B. Related Sections:
   1. Gypsum Board: Section 092900
   2. Tile Carpeting: 096813
   3. Interior Painting: Section 099123

1.03 SUBMITTALS

A. Product Data: For each type of product indicated.

1.04 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
   1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

B. Provide all resilient flooring and accessories from a single source.

1.05 PROJECT CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer in spaces to receive floor tile.

B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer.

C. Close spaces to traffic during floor tile installation.

D. Close spaces to traffic for 48 hours after floor tile installation.

E. Install floor tile after other finishing operations, including painting, have been completed.

1.06 WARRANTY

A. Resilient base installer shall provide a written statement, in accordance with Division 1, that the installation is warranted for one (1) year and that he will, upon demand, repair or replace any resilient base that does not adhere properly and will correct any condition due to faulty installation during the warranty period. The warranty period shall commence at the Date of Substantial Completion.

PART 2 - PRODUCTS

2.01 LUXURY VINYL TILE

A. Acceptable Manufacturers – Luxury Vinyl Tile (LVT):
   1. Armstrong Diamond 10 - Terra

B. Tile Standard: ASTM F 1066, Class 2, through-pattern tile.

C. Wearing Surface: Smooth.

D. Thickness: 1/8” (0.125 inch, 3.2 mm).

2.02 VINYL BASE

A. 1/8" thick vinyl base, 4" high. Provide base with top and toe cove at resilient flooring; provide top cove straight base at carpeting. Factory-formed external and internal corners are required. Use 4’ straight goods.

B. Sizes, Colors and Patterns: As selected by Architect from full range of industry colors.
   1. Pattern and color must extend the full thickness of product.

2.03 VINYL EDGING

A. 1/4" thick Vinyl wheeled traffic transition, CTA-XX-HT 2 1/2” long transition from the carpet tile to the other surfaces Use continuous rolled-goods wherever possible.

B. Sizes, Colors and Patterns: As selected by Architect from full range of industry colors.
   1. Pattern and color must extend the full thickness of product.

2.04 INSTALLATION MATERIALS

A. Adhesives: Water-resistant type recommended by manufacturer to suit base and substrate conditions indicated, to achieve specified warranty requirements.
   1. Adhesive for vinyl edging and base shall be a type not affected by heat. Clear spread adhesives are not permitted.

PART 3 - EXECUTION

3.01 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

C. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.02 GENERAL INSTALLATION:

A. Vinyl base shall be tightly cemented to wall with butt joints tight. Install base in toe space of cabinets.

B. Vinyl transition strips shall be tightly cemented to the floor with butt joints tight. Do not cut the base over top of the transition strip.

C. Use a ‘V’ notched trowels. Caulk gun adhesive installation is prohibited.

D. Installer shall provide a moisture and PH test, one teach per each 1,000 square feet of flooring. Record results and locations and provide a written report prior to the start of installation.

E. Provide ventilation before, during, and after installation to provide a relative humidity of 40%.

F. Minimum linear dimension of any section of cove base: 2’-0”

G. At exposed ends of cove base, cut bottom of exposed toe back at 45 degrees.

3.03 CLEANING AND PROTECTION

A. Upon completion, remove loose, cracked, chipped, stained, or otherwise defective base and replace in a satisfactory manner. Clean surfaces using only cleaners approved by the flooring product manufacturer. Remove mastic cement from adjoining work with particular care to not damage such work.

END OF SECTION 096519

SECTION 096813 - TILE CARPETING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section includes:
   1. This Section includes modular carpet tile and accessories.

B. Related Sections:
   1. Resilient Tile Flooring & Base: Section 096519

1.03 SUBMITTALS

A. Product Data: For each product indicated.

B. Samples: Submit full color range of 12” by 12” size samples of each carpet type specified for Architect’s selection.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is certified by the Floor Covering Installation Board or who can demonstrate compliance with its certification program requirements.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Comply with CRI 104, Section 5, "Storage and Handling."

1.06 PROJECT CONDITIONS

A. Comply with CRI 104, Section 7.2, "Site Conditions; Temperature and Humidity" and Section 7.12, "Ventilation."

B. Environmental Limitations: Do not install carpet tiles until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.

D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.07 WARRANTY

A. Special Warranty for Carpet Tiles: Manufacturer's standard form in which manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, more than 10 percent loss of face fiber, edge raveling, snags, runs, loss of tuft bind strength, dimensional stability, excess static discharge, and delamination.
   1. Warranty Period: Five (5) years from date of Substantial Completion.

PART 2 – PRODUCTS

2.01 CARPET

A. Approved Manufacturers:
   1. Bentley Mills
      Tagline 24x24
      Color Down to Earth

2.02 CARPET TILE

A. Products conforming with the following characteristics:
   1. Fiber Content: 100 percent nylon 6, 6; 100 percent nylon 6; 100 percent polypropylene.
   2. Primary Backing/Backcoating: Manufacturer's standard composite materials.
   3. Secondary Backing: Manufacturer's standard material.
   4. Size: 24”x24”
   5. Applied Soil-Resistance Treatment: Manufacturer's standard material.
   6. Antimicrobial Treatment: Manufacturer's standard material.

B. Performance Characteristics: As follows:
   1. Critical Radiant Flux Classification: Not less than 0.45 W/sq. cm.
   2. Dry Breaking Strength: Not less than 100 lbf (445 N) per ASTM D 2646.
   3. Tuft Bind: Not less than 5 lbf (22 N).
   4. Delamination: Not less than 4 lbf/in. (18 N/mm) per ASTM D 3936.
   5. Dimensional Tolerance: Within 1/32 inch (0.8 mm) of specified size dimensions, as determined by physical measurement.
   6. Dimensional Stability: 0.2 percent or less per ISO 2551 (Aachen Test).
   7. Colorfastness to Crocking: Not less than 4, wet and dry, per AATCC 165.
   8. Colorfastness to Light: Not less than 4 after 60 AFU (AATCC fading units) per AATCC 16, Option E.
   9. Antimicrobial Activity: Not less than 2-mm halo of inhibition for gram-positive bacteria; not less than 1-mm halo of inhibition for gram-negative bacteria; no fungal growth; per AATCC 174.
   10. Electrostatic Propensity: Less than 3.5 kV per AATCC 134.

2.02 PRIMER AND SEALING

A. Floor primer recommended by carpet manufacturer capable of withstanding five (5) ponds of moisture emanating from concrete slab per thousand square feet area during a 24- hour period. Provide manufacturer’s recommended seam treatment for chemically welded seams.

2.03 CARPET BASE

A. Provide carpet 4” base per manufacturer to match carpet tile.

2.04 LATEX UNDERLAYMENT COMPOUND

A. As approved by carpet manufacturer, compatible with adhesive used for installation of carpet.

2.05 FLOOR FILL

A. Provide “Ardex K15” by Ardex Engineered Cements, Aliquippa, PA or “Level Right” by Maxxon Corp., Hamel, Minnesota, or approved equal.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Verification of Conditions: Examine substrate for excessive moisture content and unevenness which would prevent execution and quality of carpet installation as specified. Submit copies of moisture test results conducted on concrete floor slabs to Architect. Do not proceed with installation of carpet until defects have been corrected.

3.02 PREPARATION

B. Level the uneven floor joints or other irregularities in substrate by filling with latex underlayment compound. Sand leveled areas to provide a completely level surface. Any required grinding or chipping of concrete shall be at the expense of the Contractor. Remove rough spots and foreign matter which may be evident through the carpet.

C. Thoroughly clean and damp mop concrete floor slabs and allow to dry before installing the carpet

3.03 INSTALLATION

A. Lay carpet on floors with run of pile in same direction as anticipated traffic.

B. Center seams under doors; do not seam in traffic direction at doorways.

C. Extend carpet under open-bottomed and raised-bottom obstructions and under removable flanges of obstructions. Extend carpet into closets and alcoves of rooms indicated to be carpeted, unless another floor finish is indicated for such spaces. Extend carpet under all movable furniture and equipment, unless otherwise directed.

D. Install carpet edge guard at every location where edge of carpet is exposed to traffic, except where another device, such as an expansion joint cover system or threshold, is indicated with an integral carpet binder bar.

E. Provide cut-outs where required and bind cut edges properly where not concealed by edge guards or overlapping flanges.

F. Carpet materials in any contiguous area shall be from a single dye lot. Visible differences in color or texture shall be grounds for rejection.

G. Provide Manufacturer's Field Inspection Services during final inspection and as otherwise requested by the Owner.

H. General: Comply with CRI 104, Section 14, "Carpet Modules," and with carpet tile manufacturer's written installation instructions.

I. Installation Method: As recommended in writing by carpet tile manufacturer.

J. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

K. Install pattern parallel to walls and borders.

3.04 CLEANING

After installation is complete, clean up dirt and debris, remove spots, and clean carpet with cleaning agents recommended by the manufacturer. Remove loose threads with sharp scissors. Clean carpet with a vacuum cleaner.
Remove rubbish, wrapping paper and salvages from the job site. Leave excess pieces of usable carpet with the Owner for future use.

3.05 PROTECTION

Following cleaning of carpet, completely cover carpet with heavy protective paper or polyethylene sheeting. Leave protective covering in place until work area is completed and permission for removal is granted by Architect.

END OF SECTION 096813

SECTION 099123 - INTERIOR PAINTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes surface preparation and the application of paint systems on the following interior substrates:
   1. Hollow metal frames & doors.
   2. Gypsum board.

B. Work Not Requiring Painting or Finishing: In addition to material obviously not requiring paint such as glass, flooring, etc., the following surfaces shall not be painted:
   1. Surfaces indicated by the finish schedule to remain unfinished
   2. Factory finished surfaces except those indicated in Article 3.07

1.03 DEFINITIONS

A. MPI: Master Painters Institute.

1.04 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples: For each finish and for each color and texture required.

C. Product List: Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.

1.05 QUALITY ASSURANCE

A. MPI Standards:
   1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."

B. For renovation areas, consult "MPI Maintenance Repainting Manual" and revise subparagraph below and paint systems specified in Part 3.

1.06 PROJECT CONDITIONS

A. Existing Conditions: Spaces must be clean before interior painting is started. Do not paint in rooms or spaces where rubbish has accumulated or while rubbish is being removed. Painting shall not be allowed in dusty rooms. Do not remove rubbish while finish is fresh. Surfaces to which finish is to be applied shall be dry and clean.

1.07 EXTRA MATERIALS

A. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.
   1. Quantity: Furnish an additional 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.
B. Containers shall be clearly labeled describing contents, color, and formula.
C. Identify using the same designation as found on the finish schedule in the operations and maintenance manual.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Products not specified by name shall be "professional best grade" products of acceptable manufacturers. Provide primers and undercoat paint produced by the same manufacturer of the finish coats.

B. Acceptable Manufacturers: The following manufacturers will be acceptable for use on the work:
   1. Sherwin-Williams

2.02 PAINT, GENERAL

A. Material Compatibility:
   1. Provide materials for use within each paint 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.
   2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

B. VOC Content of Field-Applied Interior Paints and Coatings: Provide products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24); these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:
   1. Flat Paints, Coatings, and Primers: VOC content of not more than 50 g/L.
   2. Nonflat Paints, Coatings, and Primers: VOC content of not more than 150 g/L.
   3. Floor Coatings: VOC not more than 100 g/L.
   4. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.
   5. Floor Coatings: VOC not more than 100 g/L.
   6. Shellacs, Clear: VOC not more than 730 g/L.
   7. Shellacs, Pigmented: VOC not more than 550 g/L.
   8 Primers, Sealers, and Undercoaters: VOC content of not more than 200 g/L.

C. Chemical Components of Field-Applied Interior Paints and Coatings: Provide topcoat paints and anticorrosive and anti-rust paints applied to ferrous metals that comply with the following chemical restrictions; these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:
   1. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
   2. Restricted Components: Paints and coatings shall not contain any of the following:
      a. Acrolein.
      b. Acrylonitrile.
      c. Antimony.
      d. Benzene.
      e. Butyl benzyl phthalate.
      f. Cadmium.
      g. Di (2-ethylhexyl) phthalate.
      h. Di-n-butyl phthalate.
      i. Di-n-octyl phthalate.
      j. 1,2-dichlorobenzene.
      k. Diethyl phthalate.
      l. Dimethyl phthalate.
      m. Ethylbenzene.
      n. Formaldehyde.
      o. Hexavalent chromium.
      p. Isophorone.

q. Lead.
r. Mercury.
s. Methyl ethyl ketone.
t. Methyl isobutyl ketone.
u. Methylene chloride.
v. Naphthalene.
w. Toluene (methylbenzene).
x. 1,1,1-trichloroethane.
y. Vinyl chloride.

D. Colors: As selected by Architect from manufacturer's full range.

2.03 PRIMERS/SEALERS
A. Interior Alkyd Primer/Sealer: MPI #45.
B. Interior Alkyd Primer/Sealer: MPI #45.

2.04 METAL PRIMERS
A. Alkyd Anticorrosive Metal Primer: MPI #79.
B. Quick-Drying Alkyd Metal Primer: MPI #76.
C. Waterborne Galvanized-Metal Primer: MPI #134.

2.05 LATEX PAINTS
A. Interior Latex (Eggshell): MPI #52 (Gloss Level 3).
B. Interior Latex (Satin): MPI #43 (Gloss Level 4).
C. Interior Latex (Semigloss): MPI #54 (Gloss Level 5).

PART 3 - EXECUTION

3.01 EXAMINATION
A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
1. Gypsum Board: 12 percent.

C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.02 PREPARATION
A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

B. Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

C. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
   1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.

D. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.

E. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.

3.03 APPLICATION

A. Apply paints according to manufacturer's written instructions.
   1. Use applicators and techniques suited for paint and substrate indicated.
   2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
   3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Mechanical and Electrical Work: Paint items exposed in equipment rooms and occupied spaces including, but not limited to, the following:
   1. Mechanical Work:
      a. Uninsulated metal piping.
      b. Uninsulated plastic piping.
      c. Pipe hangers and supports.
      d. Tanks that do not have factory-applied final finishes.
      e. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
      f. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
      g. Mechanical equipment that is indicated to have a factory-primed finish for field painting.
   2. Electrical Work:
      a. Switchgear.
      b. Panelboards.
      c. Electrical equipment that is indicated to have a factory-primed finish for field painting.

3.04 REPAINTING OF EXISTING PAINTED SURFACES

A. Remove tape, staples, and loose paint.

B. Fill nail holes, staple holes, holes of any size, cracks, and voids.

C. Fill, sand and finish to provide uniform substrate and to match existing surfaces.

D. Texture or skim coat if necessary.

3.05 FIELD QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when paints are being applied:
   1. Owner will engage the services of a qualified testing agency to sample paint materials being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
   2. Testing agency will perform tests for compliance with product requirements.
   3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying-paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

3.06 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.07 INTERIOR PAINTING SCHEDULE

A. Ferrous, Zinc Coated or Factory-Primed Metals – Painted:
   1. Prime Coat: Suitable latex primer (or factory-prime coat), DTM Acrylic Primer / Finish
   2. Intermediate Coat: Latex enamel undercoat, Pro Classic Waterborne Acrylic
   3. Topcoat: Latex enamel, semi-gloss, Pro Classic Waterborne Acrylic.

B. Gypsum Board Substrates - Painted:
   1. Prime Coat: Suitable latex primer, Prep Rite 200
   2. Intermediate Coat: Latex enamel undercoat, Pro Mar 200
   3. Topcoat: Latex enamel, walls semi-gloss, ceiling eggshell, Pro Mar 200

END OF SECTION 099123

SECTION 099300 - STAINING & TRANSPARENT FINSIHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. Related Sections:
   1. Section 092900 Gypsum Board

1.2 SUMMARY

A. Section includes surface preparation and application of wood finishes on the following substrates:
   1. Interior Substrates:
      a. Wood Base
      b. Chair Rail

1.3 DEFINITIONS

A. Gloss Level 1: (A traditional matte finish-flat). Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

B. Gloss Level 4: (A satin-like finish). 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

C. Gloss Level 5: (A traditional semi-gloss). 35 to 70 units at 60 degrees, according to ASTM D 523.

D. Gloss Level 6: (A traditional gloss). 70 to 85 units at 60 degrees, according to ASTM D 523.

E. Gloss Level 7: (A high gloss). More than 85 units at 60 degrees, according to ASTM D 523.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include preparation requirements and application instructions.

B. Samples for Initial Selection: For each type of product indicated.

C. Samples for Verification: For each type of finish system and in each color and gloss of finish indicated.
   1. Submit Samples on representative samples of actual wood substrates, 8 inches square or 8 inches long.
   2. Label each Sample for location and application area.

D. Product List: For each product indicated, include the following:
   1. Cross-reference to finish system and locations of application areas. Use same designations indicated on Drawings and in schedules.
   2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the product proposed for use highlighted.
   3. VOC content.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Stains and Transparent Finishes: 5 percent, but not less than 1 gallon of each material and color applied.

1.6 QUALITY ASSURANCE

A. Mockups: Apply mockups of each finish system indicated and each color selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Architect will select one surface to represent surfaces and conditions for application of each type of finish system and substrate.
      a. Vertical and Horizontal Surfaces: Provide samples as directed by Architect.
      b. Other Items: Architect will designate items or areas required.
   2. Final approval of stain color selections will be based on mockups.
      a. If preliminary stain color selections are not approved, apply additional mockups of additional stain colors selected by Architect at no added cost to Owner.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
   1. Maintain containers in clean condition, free of foreign materials and residue.
   2. Remove rags and waste from storage areas daily.

1.8 FIELD CONDITIONS

A. Apply finishes only when temperature of surfaces to be finished and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply finishes when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Benjamin Moore & Co.
   2. Devoe.
   3. Minwax.
   4. Sherwin-Williams Company.

B. Products: Subject to compliance with requirements, provide product listed in other Part 2 articles for the category indicated.

2.2 MATERIALS, GENERAL

A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."

B. Material Compatibility:
   1. Provide materials for use within each finish 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.
   2. For each coat in a finish system, provide products recommended in writing by manufacturers of topcoat for use in finish system and on substrate indicated.

C. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction[and, for interior stains and finishes applied at project site, the following VOC limits, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24)].
   1. Clear Wood Finishes, Varnishes: VOC not more than 350 g/L.
   2. Shellacs, Clear: VOC not more than 730 g/L.
   3. Stains: VOC not more than 250 g/L.

4. Primers, Sealers, and Undercoaters: 200 g/L.

D. Low-Emitting Materials: Interior stains and finishes shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

E. Stain Colors: As selected by Architect to match existing building standard.

2.3 WOOD FILLERS

A. Wood Filler Paste: MPI #91.

2.4 PRIMERS AND SEALERS

A. Alkyd, Sanding Sealer, Clear: MPI #102.

B. Shellac: MPI #88.

2.5 STAINS

A. Stain, Semi-Transparent, for Interior Wood: MPI #90.

2.6 POLYURETHANE VARNISHES

A. Varnish, Interior, Polyurethane, Oil-Modified, Semi-gloss (Gloss Level 5): MPI #57.
   1. Sheen: Match existing building standard if other than semi-gloss as approved by DPS Project Manager and Architect.

2.7 SOURCE QUALITY CONTROL

A. Testing of Materials: Owner reserves the right to invoke the following procedure:
   1. Owner will engage the services of a qualified testing agency to sample wood finishing materials. Contractor will be notified in advance and may be present when samples are taken. If materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
   2. Testing agency will perform tests for compliance with product requirements.
   3. Owner may direct Contractor to stop applying wood finishes if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying materials from Project site, pay for testing, and refinish surfaces finished with rejected materials. Contractor will be required to remove rejected materials from previously finished surfaces before refinishing with complying materials if the two finishes are incompatible or produce results that, in the opinion of the Architect, are aesthetically unacceptable.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Interior Wood Substrates: 10 percent, when measured with an electronic moisture meter.

C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

D. Proceed with finish application only after unsatisfactory conditions have been corrected.
   1. Beginning finish application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable.

C. Clean and prepare surfaces to be finished according to manufacturer's written instructions for each particular substrate condition and as specified.
   1. Remove dust, dirt, oil, and grease by washing with a detergent solution; rinse thoroughly with clean water and allow to dry. Remove grade stamps and pencil marks by sanding lightly. Remove loose wood fibers by brushing.
   2. Remove mildew by scrubbing with a commercial wash formulated for mildew removal and as recommended by stain manufacturer.

D. Interior Wood Substrates:
   1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
   2. Apply wood filler paste to open-grain woods, as defined in "MPI Architectural Painting Specification Manual," to produce smooth, glasslike finish.
   3. Sand surfaces that will be exposed to view and dust off.
   4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

3.3 APPLICATION

A. Apply finishes according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
   1. Use applicators and techniques suited for finish and substrate indicated.
   2. Finish surfaces behind movable equipment and furniture same as similar exposed surfaces.
   3. Do not apply finishes over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

B. Apply finishes to produce surface films without cloudiness, holidays, lap marks, brush marks, runs, ropiness, or other surface imperfections.

3.4 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing finish application, clean spattered surfaces. Remove spattered materials by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from finish application. Correct damage by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced finished wood surfaces.

3.5 INTERIOR WOOD-FINISH-SYSTEM SCHEDULE

A. Wood substrates, nontraffic surfaces, including wood trim, architectural woodwork, wood-based panel products, exposed existing beams and other items as indicated in summary at the beginning of this section.
   1. Polyurethane Varnish over Stain System:
      a. Stain Coat: Stain, semi-transparent, for interior wood, MPI #90.
      b. First Intermediate Coat: Polyurethane varnish matching topcoat.
      c. Second Intermediate Coat: Polyurethane varnish matching topcoat.

d. Topcoat: Varnish, interior, polyurethane, oil-modified, semi-gloss (Gloss Level 5), MPI #57.
    1) Sheen: Match existing building standard if other than semi-gloss as approved by Project Manager and Architect.

END OF SECTION 099300

SECTION 101400 - SIGNAGE

PART 1 - GENERAL

1.01 CONDITIONS AND REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following:
   1. Room signs.
   2. Emergency evacuation maps.
   3. All new interior signage to match existing interior signage.

1.03 ACCESSIBLE REQUIREMENTS

A. Comply with the following:
   1. International Building Code Adopted by Douglas County Building Department
   2. American with Disabilities Act Accessibility Guidelines (ADAAG) Sections 4.1.2 (7) and Section 4.30.

1.04 DEFINITIONS

A. ADA-ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's
   "Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines."

1.05 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show fabrication and installation details for signs.
   1. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
   2. Provide message list, typestyles, and graphic elements, including tactile characters and Braille, and layout for each sign.
   3. Wiring Diagrams: Power, signal, and control wiring.

C. Samples: For each sign type and for each color and texture required.

1.06 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable provisions in ICC/ANSI A117.1.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Source Limitations for Signs: Obtain each sign type indicated from one source from a single manufacturer.

1.07 COORDINATION

A. Coordinate placement of blocking as required to attach signs

PART 2 – PRODUCTS

2.01 MATERIALS

A. Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet), Type UVA (UV absorbing).

2.02 SIGNAGE APPLICATIONS

A. Room and Door Signs: Provide a sign for every doorway, whether it has a door or not, not including corridors, lobbies, and similar open areas.
   1. Sign Type: Match Existing
   3. Character Height: Match Existing
   4. Sign Height: Match Existing

2.03 MANUFACTURER

A. Forum Engraving & Sign Company

2.04 ACCESSORIES

A. Anchors and Inserts: Match Existing

2.04 FABRICATION

A. General: Match Existing

PART 3 - EXECUTION

3.01 INSTALLATION

A. Locate signs and accessories where indicated, using mounting methods of types described and complying with manufacturer's written instructions.
   1. Install signs level, plumb, and at heights indicated, with sign surfaces free of distortion and other defects in appearance.
   2. Interior Wall Signs: Install signs on walls adjacent to latch side of door where applicable. Where not indicated or possible, such as double doors, install signs on nearest adjacent walls. Locate to allow approach within 3 inches (75 mm) of sign without encountering protruding objects or standing within swing of door.

B. Wall-Mounted Signs: Comply with sign manufacturer's written instructions except where more stringent requirements apply.
   1. Mechanical Fasteners: Use non-removable mechanical fasteners placed through predrilled holes. Attach signs with fasteners and anchors suitable for secure attachment to substrate as recommended in writing by sign manufacturer.
   2. Signs Mounted on Glass: Provide matching opaque plate on opposite side of glass to conceal mounting materials.

3.02 CLEANING AND PROTECTION

A. After installation, clean soiled sign surfaces according to manufacturer's written instructions. Protect signs from damage until acceptance by Owner.

END OF SECTION 101400

SECTION 102600 - CORNER GUARDS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:
   1. Vinyl Corner Guards.

B. Related Sections:
   1. Drywall Corners: Section 092900 Gypsum Board

1.03 SUBMITTALS

A. Product Data: Submit in accordance with Division 1.

B. Samples: For each type of unit and for each color and texture required.

1.04 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: Provide impact-resistant, plastic wall-protection units with surface-burning characteristics as determined by testing identical products per ASTM E 84, NFPA 255, or UL 723 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

PART 2 - PRODUCTS

2.01 CORNER GUARDS

A. Acceptable Manufacturers:
   1. Match Existing

B. Description:
   1. Material: Vinyl.
   2. Size: Match Existing
   3. Configuration: 90 degree angle.
   4. Mounting: Tape
   5. Edges: beveled

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install at all exterior corners of main traffic paths over wall corners using screws applied in accordance with manufacturer's instructions. Butt bottom edge of corner guard to top of base.

B. Complete finishing operations, including painting, before installing impact-resistant wall-protection system components.

C. Install impact-resistant wall-protection units level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.
   1. Provide splices, mounting hardware, anchors, and other accessories required for a complete installation.

END OF SECTION 102600

SECTION 230100
BASIC MECHANICAL REQUIREMENTS

PART 1 GENERAL

1.01 GENERAL CONDITIONS

A. The General Conditions of the Contract and Supplementary Conditions of the General Contract apply to work under this Division.

1.02 QUALITY ASSURANCE

A. The mechanical design for this project is based on specific manufacturers and equipment as scheduled on the drawings and listed in these Division 23 Specifications with specific model number identifiers. Acceptable substitute manufacturers of equipment are listed in these specifications. If any acceptable substitute manufacturer's equipment is used, the cost of any change in design or construction required by their use shall be borne by the contractor. Contractor shall document and submit all changes to design plans and schedules as a result of the use of substituted equipment.

B. If manufacturer's material or equipment is listed in Schedules or on Drawings, they are types to be provided for establishment of size, capacity, grade, and quality. If other acceptable manufacturers are used, cost of any change in construction required by their use shall be borne by Contractor.

C. Equipment shall conform to State and/or local Energy Conservation Standards.

D. Execute and test all work per Underwriters, state and local codes, rules, and regulations applicable to trade affected. Included are recommendations of NFPA, SMACNA, OSHA, and ASHRAE. References to standards are latest revision of standard specified.

E. Comply with rules and regulations of local utility companies. Include cost of valves, valve boxes, meter boxes, meters, accessory equipment required for project.

1.03 INTENT AND INTERPRETATIONS

A. It is the intent of these Drawings and Specifications to result in a complete mechanical installation in complete accordance with all applicable codes and ordinances.

B. Drawings are diagrammatic in character and do not necessarily indicate every required pipe, offset, transition, etc. Items not specifically mentioned in the Specification or noted on the Drawings, but which are obviously necessary to make a complete working installation, shall be included.

C. Drawings and specifications are complementary. Whatever is called for in either is binding as though called for in both. The more stringent requirements shall govern.

D. Drawings shall not be scaled for rough-in measurements or used as shop drawings. Where drawings are required for these purposes or have to be made from field measurements, take the necessary measurements and prepare the drawings.

E. Symbols used on the Drawings are defined in the Legend on the Drawings. All symbols indicated on the Legend may not necessarily be required for the project.

F. “Provide” shall mean “furnish and install.” “Accepted” or “acceptable” denotes the work or equipment item is in conformance with the design concept of the project and, in general, complies with the pertinent information given in the Contract Documents.

G. Prior to ordering equipment, determine that equipment will adequately pass through building openings and passageways providing unobstructed access to final equipment location. Equipment shall be manufactured and shipped in sections for assembly in final equipment location when inadequate building openings and passageways limit access. Shop drawings and submittals shall indicate sectionalized manufacturing of equipment.

H. Before any work is installed, determine equipment will properly fit the space, required clearances can be maintained and equipment can be located without interferences between

systems, with structural elements, or with the work of other trades.

I. If conflicts are discovered in Contract Documents as work progresses, submit a set of drawings marked with red pencil showing recommended modifications to the Architect for approval prior to installation.

J. The Drawings indicate the general arrangement of mechanical systems. However, rearrangement will not be permitted without specific approval prior to installation.

1.04 JOB CONDITIONS

A. Location, size, and type of equipment and material shown as existing are taken from existing drawings and limited field survey. Verify exact conditions in field prior to start of construction.

B. Before submitting bid, examine premises and become familiar with all existing conditions which may affect cost. No allowance will subsequently be made for not following this procedure.

C. Owner supplied existing equipment will be installed. Become familiar with existing rough-in requirements prior to installation. Report any difficulties or discrepancies to Architect prior to start of work.

D. Not all piping and ductwork offsets, transitions, and multiple connections required to install the new work into the available space are shown on the drawings. Field measure for exact requirements and install accordingly.

E. Where locations of devices and equipment are not specifically mentioned in the Specifications or indicated on the Drawings, verify locations with Architect or Owner prior to rough-in.

F. Provide carpentry, masonry, concrete and metal work required for work of this Division where not specifically called for under other Sections.

1.05 PERMITS AND FEES

A. Arrange and pay for all inspections, permits, licenses, certificates, and fees required in connection with work.

1.06 SUBMITTALS AND SHOP DRAWINGS

A. Conform to requirements of Division 01 and following paragraphs.

B. Submittals and shop drawings shall identify specific equipment with numbers or letters identical to those listed or scheduled on the Drawings or Specifications.

1.07 SUBSTITUTIONS

A. Equipment scheduled on drawings and specifically called for in these specifications was used as the basis of the mechanical systems design; modifications to the systems design to accommodate a substituted piece of equipment shall be the responsibility of the installing Contractor.

B. Coordinate all substituted equipment requirements with other trades prior to ordering equipment.

1.08 RECORD DOCUMENTS

A. Keep in custody during entire period of construction, a current set of documents indication changes that have been made to the Contract Documents. Changes to be noted on the documents shall include but shall not be limited to piping or ductwork installed more than 2'-0" from where shown on Drawings, changes in pipe and duct size, location of valves and cleanouts. Incorporate Addenda, accepted Alternates, Change Orders, and other Document revisions which occurred after the award of the General Contract or the start of construction activities into the Record Documents. Notations and changes shall be done in a neat and legible manner in accordance with Architect's instructions. Changes shall be noted in red, deletions in green, and notes in blue.

B. Upon completion of work, submit the complete set of Record Documents to the Architect. The Contract Documents set the standard for content and methods of presentation for the changes

shown.

C. The Contract shall not be considered completed until these Record Documents have been reviewed and accepted by the Architect.

1.09 DELIVERY, STORAGE, HANDLING

A. Provide delivery and safe storage of materials and equipment. Make provisions for introduction into building of equipment too large to pass through finished openings. Provide for hoisting of equipment.

1.10 PROTECTION OF EQUIPMENT

A. Protect materials and equipment from physical damage, construction dirt, and the elements from time of shipment to time installation is accepted by Owner.

B. Protect work against theft, injury, or damage from all causes.

1.11 GUARANTEE

A. Guarantee materials, workmanship and operation of equipment installed for period of one (1) year from date of acceptance of entire Work. Repair or replace any part of work which shows defect during that time.

B. Be responsible for damage to property of Owner or to work of other contractors during construction and guarantee period.

C. Furnish equipment warranties to Owner.

PART 2 PRODUCTS

2.01 NOT USED

PART 3 EXECUTION

3.01 EQUIPMENT WIRING AND CONNECTIONS

A. Voltage characteristics shall be as in Electrical Division of Specifications and on Electrical Drawings.

3.02 INSPECTIONS

A. Do not cover up or enclose work until inspected, tested, and approved. Any work enclosed or covered up before such approval shall be uncovered, tested, and approved.

3.03 SUPERVISION

A. Supervise work to proceed in proper sequence without delay to other contractors. Keep supervisor on premises at all times to ensure intent of Drawings and Specifications is being followed.

3.04 INSTALLATION

A. Workmanship shall be first quality. Appearance of work shall be of equal importance to its mechanical operation. Lack of quality workmanship shall be reason for rejection of system in part or in whole.

B. Complete installation shall function smoothly and noiselessly.

C. Install equipment and materials per manufacturers' recommendations and local codes or regulations.

3.05 TESTING

A. All tests specified herein and/or called for by authorities having jurisdiction shall be witnessed by Architect or Owner. Reference other Division 23 Sections for additional requirements specific to those sections.

3.06 COMPLETION

A. After tests and adjustments have been made and systems pronounced satisfactory for permanent operation, refinish damaged finish and leave everything in proper working order and

appearance.

B. On completion of work, remove tools, scaffolding, debris, etc., from grounds and leave premises clean.

3.07 PROJECT CLOSE-OUT

A. Upon written notice from the Contractor certifying the work is complete and ready for inspection, Engineer will prepare punchlist of items determined to be incomplete or otherwise not in compliance with intent of Contract Documents.

B. When required, subsequent visit to review completion of punchlist work will be made after receipt of written statement from Contractor indicating punchlist work is complete. Include copies of intermediate observation reports and final punchlists with individual items initialed by Contractor to attest that individual work items are completed.

C. Contractor shall pay Engineer's costs at the billing rates in effect at the time the services are performed for subsequent punch list visits required due to lack of completion of initial punch list.

3.08 OPERATION AND MAINTENANCE MANUALS

A. Prior to completion of project, submit three (3) sets of maintenance manuals covering operation and maintenance of mechanical equipment with moving or movable parts. Instructions shall be in pamphlet or typewritten form in three ring binders. Instructions for each unit shall be indicated by separate tab.

1. Maintenance manuals submitted in electronic form shall be provided in separate Portable Document Format (pdf) folders for each system or item of equipment installed.

B. Include name, address, telephone number of party to be contacted for 24-hour service for each item of equipment.

C. Include starting, stopping, lubrication, preventative maintenance schedule, and adjustment information for each piece of equipment.

D. Include guarantees and warranties of all equipment.

END OF SECTION

SECTION 230500
BASIC MECHANICAL MATERIALS AND METHODS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes the following:
   1. HVAC demolition.
   2. Equipment installation requirements common to equipment sections.

1.03 QUALITY ASSURANCE

A. Electrical Characteristics for HVAC Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

PART 2 PRODUCTS

2.01 NOT USED

PART 3 EXECUTION

4.01 HVAC DEMOLITION

A. Disconnect, demolish, and remove HVAC systems, equipment, and components indicated to be removed.
   1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
   2. Equipment to Be Removed: Disconnect and cap services and remove equipment.

4.02 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.

B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.

C. Install HVAC equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

END OF SECTION

SECTION 230593
TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pre-Construction measurement and recording of existing air systems

B. Testing, adjustment, and balancing of air systems.

1.02 REFERENCE STANDARDS

A. ASHRAE Std 111 - Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems; 2008, with Errata (2019).

B. SMACNA (TAB) - HVAC Systems Testing, Adjusting and Balancing; 2002.

1.03 SUBMITTALS

A. Pre-Construction TAB Report: Provide pre-construction measurements of existing air systems as outlined below. Submit written report and retain for reference during post constuction activities.
   1. Submit under provisions of Division 01.
   2. Pre-construction TAB shall include measurement of all air systems within the project scope of work.
   3. Air Terminal Units:
      a. Maximum airflow
      b. Minimum airflow
      c. Air device flow rates associated with terminal unit.

B. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
   1. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for and for inclusion in operating and maintenance manuals.
   2. Provide reports in electronics (PDF) format, complete with index page and indesing bookmarks with air outlets and equipment identified to correspond with data sheets, and indicating thermostat locations.
   3. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
   4. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
   5. Units of Measure: Report data in I-P (inch-pound) units only.

1.04 PROJECT CONDITIONS

A. Partial Owner Occupancy: Owner will occupancy partial areas of the site and existing building during TAB period. Cooperate with Owner during TAB operatioins to minimize conflicts with Owner's operations.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

A. Perform total system balance in accordance with one of the following:
   1. ASHRAE Std 111, Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems.
   2. NEBB Procedural Standards for Testing Adjusting Balancing of Environmental Systems.
   3. SMACNA (TAB).

B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.

C. TAB Agency Qualifications:
   1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.
   2. Having minimum of three years documented experience.
   3. Certified by one of the following:
      a. NEBB, National Environmental Balancing Bureau: www.nebb.org/#sle.
      b. TABB, The Testing, Adjusting, and Balancing Bureau of National Energy Management Institute: www.tabbcertified.org/#sle.

D. TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.

3.02 EXAMINATION

A. Examine approved submittal data of HVAC systems and equipment.

B. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
   1. Systems are started and operating in a safe and normal condition.
   2. Temperature control systems are installed complete and operable.

C. Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.

D. Beginning of work means acceptance of existing conditions.

3.03 PREPARATION

A. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to to facilitate spot checks during testing.

B. Provide additional balancing devices as required.

3.04 ADJUSTMENT TOLERANCES

A. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.

3.05 RECORDING AND ADJUSTING

A. Ensure recorded data represents actual measured or observed conditions.

B. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.

C. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.

D. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

3.06 AIR SYSTEM PROCEDURE

A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities at site altitude.

B. Measure air quantities at air inlets and outlets.

C. Use volume control devices to regulate air quantities only to extend that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.

D. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.

E. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.

F. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.

3.07 INSPECTIONS

A. Final Inspection:
   1. After initial inspection is complete and evidence by random checks verifies that testing and balancing are complete and accurately documented in the final report, request that a final inspection be made by Owner.
   2. TAB firm test and balance engineer shall conduct the inspection in the presence of Owner.
   3. Owner shall randomly select measurements documented in the final report to be rechecked. The rechecking shall be limited to either 10 percent of the total measurements recorded, or the extent of measurements that can be accomplished in a normal 8-hour business day.
   4. If the rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."
   5. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.
   6. TAB firm shall recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes and resubmit the final report.
   7. Request a second final inspection. If the second final inspection also fails, Owner shall contract the services of another TAB firm to complete the testing and balancing in accordance with the Contract Documents and deduct the cost of the services from the final payment.

3.08 ADDITIONAL TESTS

A. Within 90 days of completing TAB, perform additional testing and balancing to verify that balanced conditions are being maintained throughout and to correct unusual conditions.

B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional testing, inspecting, and adjusting during near-peak summer and winter conditions.

3.09 SCOPE

A. Test, adjust, and balance the following:
   1. Air Inlets and Outlets.

3.10 MINIMUM DATA TO BE REPORTED

A. Air Distribution Tests:
   1. Air terminal number.
   2. Room number/location.
   3. Terminal type.
   4. Terminal size.
   5. Area factor.
   6. Design velocity.
   7. Design air flow.
   8. Test (final) air flow.
   9. Percent of design air flow.

END OF SECTION

SECTION 230713
DUCT INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Duct insulation.

1.02 RELATED REQUIREMENTS

A. Division 07 for firestopping.

B. Section 233100 - HVAC Ducts and Casings: Glass fiber ducts.

1.03 REFERENCE STANDARDS

A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2021.

B. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2013 (Reapproved 2019).

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.

D. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2023.

1.04 SUBMITTALS

A. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.

B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.06 FIELD CONDITIONS

A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.

B. Maintain temperature during and after installation for minimum period of 24 hours.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84.

2.02 GLASS FIBER, FLEXIBLE

A. Manufacturer:
   1. CertainTeed Corporation: www.certainteed.com/#sle.
   2. Johns Manville: www.jm.com/#sle.
   3. Knauf Insulation: www.knaufinsulation.com/#sle.
   4. Owens Corning Corporation: www.ocbuildingspec.com/#sle.

B. Insulation: ASTM C553; flexible, noncombustible blanket.
   1. K value: 0.27 at 75 degrees F, when tested in accordance with ASTM C518.
   2. Maximum Service Temperature: 250 degrees F.
   3. Maximum Water Vapor Absorption: 5.0 percent by weight.

C. Vapor Barrier Jacket:

1. Kraft paper with glass fiber yarn and bonded to aluminized film.
2. Moisture Vapor Permeability: 0.02 perm inch, when tested in accordance with ASTM E96/E96M.
3. Secure with pressure-sensitive tape.

D. Vapor Barrier Tape:
1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure-sensitive rubber-based adhesive.

E. Indoor Vapor Barrier Mastic:
1. Vinyl emulsion type acrylic or mastic, compatible with insulation, black color.

PART 3 EXECUTION

3.01 EXAMINATION

A. Test ductwork for design pressure prior to applying insulation materials.

B. Verify that surfaces are clean, foreign material removed, and dry.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Insulated Ducts Conveying Air Below Ambient Temperature:
1. Provide insulation with vapor barrier jackets.
2. Finish with tape and vapor barrier jacket.
3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
4. Insulate entire system, including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.

C. Insulated Ducts Conveying Air Above Ambient Temperature:
1. Provide with or without standard vapor barrier jacket.
2. Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.

3.03 SCHEDULES

A. Refer to insulation schedule on drawings

END OF SECTION

SECTION 233100
HVAC DUCTS AND CASINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal ducts.

B. Flexible ducts.

1.02 RELATED REQUIREMENTS

A. Section 230713 - Duct Insulation: External insulation and duct liner.

B. Section 233319 - Duct Silencers.

1.03 REFERENCE STANDARDS

A. ASHRAE (FUND) - ASHRAE Handbook - Fundamentals; Most Recent Edition Cited by Referring Code or Reference Standard.

B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.

D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.

E. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2024.

F. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2020.

G. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Division 01 for submittal procedures.

B. Product Data: Provide data for duct materials, duct liner, and duct connections.

C. Project Record Documents: Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.

1.05 FIELD CONDITIONS

A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.

B. Maintain temperatures within acceptable range during and after installation of duct sealants.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Provide UL Class 1 ductwork, fittings, hangers, supports, and appurtenances in accordance with NFPA 90A and SMACNA (DCS) guidelines unless stated otherwise.

B. Provide metal duct unless otherwise indicated. Fibrous glass duct can be substituted at the 's option.

C. Acoustical Treatment: Provide sound-absorbing liners and sectional silencers for metal-based ducts in compliance with Section 233319.

D. Duct Shape and Material in accordance with Allowed Static Pressure Range:

E. Duct Sealing and Leakage in accordance with Static Pressure Class:
   1. Duct Pressure Class and Material for Common Mechanical Ventilation Applications:
      a. Return and Relief Air: 1 in-wc pressure class, galvanized steel.
      b. General Exhaust Air: 1 in-wc pressure class, galvanized steel.

F. Duct Fabrication Requirements:
   1. Duct and Fitting Fabrication and Support: SMACNA (DCS) including specifics for continuously welded round and oval duct fittings.
   2. No variation of duct configuration or size permitted except by written permission. Size round duct installed in place of rectangular ducts in accordance with ASHRAE (FUND) Handbook - Fundamentals.
   3. Use reinforced and sealed sheet-metal materials at recommended gauges for indicated operating pressures or pressure class.
   4. Construct tees, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows must be used, provide airfoil turning vanes of perforated metal with glass fiber insulation.

2.02 METAL DUCTS

A. Material Requirements:
   1. Galvanized Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G90/Z275 coating.

B. Round Metal Ducts:
   1. Round Single Wall Duct: Round lock seam duct with galvanized steel outer wall.
   2. Round Connection System: Interlocking duct connection system in accordance with SMACNA (DCS).

C. Connectors, Fittings, Sealants, and Miscellaneous:
   1. Fittings: Manufacture with solid inner wall of perforated galvanized steel.
   2. Transverse Duct Connection System: SMACNA "E" rated rigid class connection, interlocking angle and duct edge connection system with sealant, gasket, cleats, and corner clips in accordance with SMACNA (DCS).
   3. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.
      a. Type: Heavy mastic or liquid used alone or with tape, suitable for joint configuration and compatible with substrates, and recommended by manufacturer for pressure class of ducts.
      b. Surface Burning Characteristics: Flame spread index of zero and smoke developed index of zero, when tested in accordance with ASTM E84.
   4. Hanger Rod: ASTM A36/A36M; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.
   5. Hanger Fasteners: Attach hangers to structure using appropriate fasteners as follows:

2.03 FLEXIBLE DUCTS

A. Flexible Ducts: UL 181, Class 1, polyethylene film, mechanically fastened and rolled using galvanized steel to form spiral helix.
   1. Pressure Rating: 10 in-wc positive and 5 in-wc negative.
   2. Maximum Velocity: 5500 fpm.
   3. Temperature Range: Minus 20 degrees F to 250 degrees F.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install, support, and seal ducts in accordance with SMACNA (DCS).

B. During construction, provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering the ductwork system.

C. Flexible Ducts: Connect to metal ducts with liquid adhesive plus tape.

D. Duct sizes indicated are precise inside dimensions. For lined ducts, maintain sizes inside lining.

E. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

F. Duct Insulation: Provide duct insulation. See Section 230713.

END OF SECTION

SECTION 260010 – COMMON WORK RESULTS FOR ELECTRICAL

PART 1 GENERAL

1.01 REFERENCES

A. In addition to references found in standard Section 01060, electrical installation shall meet, as a minimum, the most recent applicable versions or regulatory requirements of the following:

1. Federal and state regulations
2.
3. OSHA
4. ANSI/NFPA 70 (National Electric Code) as adopted by the AHJ
5. NEMA
6. IEEE
7. ANSI
8. ANSI/IEEE C2 – National Electrical Safety Code (NESC)
9. NFPA 101 – Life Safety Code
10. NECA – Standard of Installation

1.02 OPERATION AND MAINTENANCE INFORMATION

1. Include the following information, in addition to operation and maintenance information required by Division 1 standards and other Division 26 standards.
2. Include a complete list of product data and shop drawings, acceptance tests, warranties, certificates, sub-contractor and supplier information (i.e. name, address, and phone no.).
3. Include schematic diagrams and point-to-point wiring diagrams for the following systems.
   a) Fire detection/alarm systems
   b) Communication system (rough-in)
   c) Lighting/dimming control systems
   d) Stage lighting systems
   e) Motor control systems
   f) Electrical systems control
   g) Medium voltage equipment
   h) Sound systems
   i) Kitchen hood fire control panel
   j) Clock systems
   k) Security systems (rough-in)

PART 2 PRODUCTS

2.01 EQUIPMENT

A. Electrical equipment shall bear the U.L. label for the use intended.

PART 3 EXECUTION

3.01 FIELD QUALITY CONTROL

A. Independent testing agent to conduct operating and acceptance tests on new electrical systems:

1. Service entrance feeders, panelboards and distribution panelboards.
2. Switchgear.
3. Panelboards.
4. Main grounding system including all grounding electrode conductors.

B. Factory trained and certified technician to conduct operating and acceptance testing for the following as applicable:
   1. Engine generators and transfer switches.
   2. Lighting control systems and dimming systems.
   3. Fire alarm and detection systems.
   4. Area of rescue assistance two way communication system.
   5. Clock system.

C. The testing agent shall prepare written reports of values of all test readings and procedures. Reports shall include all breaker settings and modifications to one-line and three-line drawings.

D. The testing agent shall furnish all equipment, instruments and personnel required to conduct tests.

E. Test will be defined in the individual section describing the equipment or system.

3.02 INSTALLATION

A. Permanent power shall not be turned on until all breaker settings are received and set, the correct CTs and PTs are installed, metering is installed correctly and wired correctly, grounding system is correctly installed, ground fault levels are properly set and all the above is verified by an independent testing agency, the A/E and the Owner Project Manager.

3.03 CLEANING

A. Clean electrical equipment, such as switches, panelboards, luminaires, etc., of construction dirt, dust, paint smears, etc., and touch-up or repaint all scars, blemishes, rust spots, etc., to original state of finish.

B. Vacuum interior of all switches, switchboards, panelboards, luminaires, junction boxes, outlet boxes, control panels, and other electrical enclosures.

3.04 DEMONSTRATION

A. Contractor shall provide training for Owner maintenance personnel for systems and equipment as required by the Division 26 Sections.

B. The system manufacturer shall include factory training seminars for Owner maintenance personnel. Training seminars shall address operation, testing and maintenance of the system.

C. System manufacturers shall provide certificates of training to attending Owner personnel.

END OF SECTION 260100

SECTION 260519 LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.03 REFERENCES

A. Specify Underwriters Laboratories (UL) listed equipment, assemblies and materials.
B. Where appropriate, refer to current NEMA Standards for material ratings.
C. National Electrical Code (NEC) (current edition).
D. Local Authority Having Jurisdiction.

PART 2 PRODUCTS

2.01 BUILDING WIRE

A. Insulated Wire:
   1. Types THHN, THWN, XHHW; rating 600V, 90°C or higher.
   2. Insulation types specified shall conform to NEC requirements for temperature, moisture, and mechanical environmental conditions.

B. Conductor Material:
   1. Conductors #10 AWG and larger, stranded copper.
   2. Conductors #12 AWG solid copper, or stranded copper.
   3. Conductors smaller than #12 AWG, solid copper.

C. Control Wire: Stranded copper with 600V insulation, 90°C or higher.

D. Minimum Size:
   1. Minimum wire size of #12 AWG for power and lighting circuits.
   2. Minimum wire size #14 AWG for control and signal circuits.

.2.02 REMOTE CONTROL AND SIGNAL CABLE

A. Class 1, 2, or 3:
   1. Shall comply with NEC Article 725
   2. Class 1: Copper conductor, 600V insulation, rated 75°C or higher.
   3. Class 2 & 3: Listing and marking per NEC Article 725.
   4. All control and signal cables shall be installed in conduit except for security wiring. See relevant section for Security system wiring.

2.03 MODULAR WIRING SYSTEMS

A. Modular wiring systems are not allowed.

2.04 METAL CLAD CABLE

A. Type AC not allowed.
B. Type MC Cable allowed in very limited locations.

2.05 TERMINATION

A. Splices and taps are to carry full ampacity of conductors without perceptible temperature rise. Temperature rating shall match cable temperature rating.

PART 3 EXECUTION

3.01 INSTALLATION

A. Device removal in a multi-wire branch circuit: where a circuit extends through a receptacle, all conductors shall be pigtailed so downstream load does not go through receptacles.

B. Wire Sizing:
1. For 20 ampere 120V circuits longer than 75', use #10 AWG conductors.
2. For 20 ampere 277V circuits longer than 150', use #10 AWG conductors.
3. For circuit amperes other than 20 ampere and for distances greater than listed above, calculate voltage drop and size conductors for maximum three (3) percent voltage drop.

C. Wire Color Coding:
1. Color code wires for building voltage classes as follows:
a) 120/208V-3Ø:
i) ØA – Black
ii) ØB – Red
iii) ØC – Blue
iv) Neutral – White
v) Ground – Green

b) 277/480V-3Ø:
i) ØA – Brown
ii) ØB – Orange
iii) ØC – Yellow
iv) Neutral – Gray
v) Ground – Green.

D. Parallel Conductors: Specify that parallel conductor feeders be installed so that all runs are of identical equal length.

E. Wire Pulling:
1. All conductors to be pulled into conduit at the same time.
2. Pulling lubricant shall be UL-listed for use.
3. Length of conductors at receptacles, junction, and switches: at least 6" of free conductor shall be left at each outlet, junction and switch for splices or connection of fixtures or devices. Comply with NEC Article 300.
4. Install box connectors and bushings at points where wiring enters conduit, raceways, equipment or panels.
5. All wires within multi-conductor wiring shall remain within the jacket except at splice points and terminations.
6. No uncovered (out of jacket) conductor shall be exposed or run through conduit or raceways.

G. Wiring Connections and Terminations:
1. All conductors shall be spliced only in accessible junction boxes or wireways.
2. Prior to conductor termination in lugs or connectors, thoroughly clean wires.
3. A grounding conductor(s) shall be provided in all branch circuit raceways. Conduit shall not be used as a grounding conductor.
4. For all new work, conduit shall not be used as a grounding conductor.

F. Metal Clad Cable:

1. New Construction permitted use includes:
a. Lighting fixture whip connections of 6 feet or less.

b. Branch circuits from accessible ceiling down wall to devices (not for entire run of branch circuit).
c. Branch circuits within metal stud partition walls.

2. Remodel construction permitted use include:
   a. Lighting fixture whip connections of 6 feet or less.
   b. Where concealed in existing walls, or existing hard lid spaces where “fished” to point of connection.
3. Uses not permitted:
   a. In any exposed or outdoor locations.
   b. Accessible ceilings other than use stated above.

3.02 FIELD QUALITY CONTROL

A. Independent testing agent to conduct operating and acceptance testing for service and distribution feeders.

B. Prior to energizing, all feeders from transformers, switchboards, and building service cables, are to be tested with a 500-volt insulation megohm meter to determine insulation resistance levels to assure requirements are fulfilled. All field test data is to be recorded and submitted to the DPS Project Manager. Test is to include meggering for one minute between conductors and between each conductor and ground. Cables are to be megered after installation with cables disconnected at both ends. The value must not be less than as follows:

Conductor Size (AWG or MCM	Resistance (MegaOhms-1000 ft)
#16 AWG to #8 AWG	200
#6 AWG to #2/0 AWG	100
#3/0 AWG to 500 MCM	50

3.03 REMODEL PROJECTS

A. Aluminum Wire and Cable:
   1. Aluminum wire/cable not allowed.

   2. Replace existing aluminum wires/cables with copper wires/cables. (Where funding is not available for the replacement, the aluminum wires/cables shall be documented to DPS Project Manager for future action).

END OF SECTION 260519

SECTION 2600526 – GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

None.

PART 2 PRODUCTS

2.01 MATERIALS

A. Ground Rods: copper-encased steel, 3/4” diameter, minimum length 10’.

B. Grounding Conductors, Bonding Jumpers and Wires: copper.

C. Ground Bushings: OZ type BLO or equal.

D. Cold water pipe clamps and associated hardware shall be bronze.

PART 3 EXECUTION

3.01 INSTALLATION

A. Provide a separate insulated equipment grounding conductor in all feeder circuits. Terminate each end on a grounding lug, bus or bushing.

B. Provide connections of grounding electrode conductors to metal water pipe, structural steel, Connections are to be made to flanged piping at the street side of the flange of water pipe. Require bonding jumper around water meter. Make readily accessible connections.

C. Concrete-Encased Grounding Electrode (Ufer Ground): Fabricate according to NFPA 70; use a minimum of 20 feet of bare copper conductor not smaller than No. 4 AWG, or as noted on drawings.

1. If concrete foundation is less than 20 feet long, coil excess conductor within base of foundation.
2. Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts. Extend grounding conductor below grade and connect to building's grounding grid or to grounding electrode external to concrete.

D. For isolated grounding systems, specify an insulated full-size grounding conductor terminated at the nearest grounding electrode in compliance with NEC.

E. Continuous conduit system may not be used for grounding path.

F. The main service ground shall be terminated on a ¼” x 4” x 2’-0” section of copper bus on stand-off supports, located in main electrical equipment room, adjacent to main switch gear.

1. Ground terminations to this bus shall be by means of exothermic welding, in accordance with IEEE-80, Chapter 9, “Selection of Conductors and Joints”.

G. Permanent power shall not be energized until all breaker settings are received and set, correct CT’s and PT’s installed, metering set and installed, grounding system installed, ground fault protection levels set. All breakers settings, including protective ground fault devices, shall be tested by and independent testing agency. All settings to be reviewed and approved by engineer and DPS project manager.

3.02 FIELD QUALITY CONTROL

A. Perform field testing of ground resistance from service neutral connection to ground reference point. Maximum permitted resistance 0.5 ohms.

B. For ground rods, perform fall of potential test with results not greater than five (5) ohms. Contractor shall add length to ground rods or add more ground rods and connections to meet requirement of five (5) ohms or less.

C. Require tests to be performed in the presence of an owner's representative.

D. Provide written test results of all field tests to the Project Manager.

END OF SECTION 260526

SECTION 260529 – HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

None.

PART 2 PRODUCTS

2.01 MATERIALS

A. Support Channels:

1. Galvanized or painted steel for non-corrosive environment.

B. Hardware:

1. Corrosion resistant.

PART 3 EXECUTION

3.01 INSTALLATION

A. Anchors:

1. Fasten hanger rods, conduit clamps, outlet and junction boxes to building structure using precast insert system, preset inserts or beam clamps.
2. In precast structures, use precast inserts wherever possible.
3. In hollow masonry, plaster, or gypsum board partitions and walls, use toggle bolts or hollow wall fasteners.
4. In solid masonry walls, use expansion anchors or preset inserts with removable screws or bolts.
5. In cast-in-place concrete, use expansion anchors, preset inserts or self-drilling masonry anchors with removable screws or bolts.
6. In sheet metal studs, use sheet metal screws.
7. Attachment of electrical supports to piping, ductwork, mechanical equipment or conduit is not allowed.
8. Drilling of structural steel members is prohibited.
9. Plastic, fiber, or powder activated anchors are prohibited in any type of construction.
10. Attachment to ceiling suspension wires is prohibited.
11. Use of tie wire as a means of support is prohibited. Wires being utilized for the support of the ceiling system shall not be utilized. Independent support wires installed for the purpose of supporting conduit and boxes shall be permitted. Independent support wires will also be permitted for use as a fixture support where applicable.
12. Concrete anchors shall not be used to suspend heavy electrical loads such as panelboards or conduits 4” and larger.
13. Anchors shall be sized to support conduits when full fitted to maximum capacity with cables.
14. One-time expansion anchors are not allowed.

B. Supports:

1. Provide supports fabricated from structural steel, steel channel or unistrut, rigidly bolted or welded to present a neat appearance.
2. Install free-standing electrical equipment on 4” concrete housekeeping pads.
3. All surface mounted cabinets, enclosures and panelboards be supported with a minimum of four anchors. On exterior concrete walls below grade and all other areas subject to moisture, provide 1” steel channel stand-offs for cabinets and raceways.
4. Use bridge studs at top and bottom with channels to support cabinets and enclosures

which are flush mounted in hollow walls.
5. Provide suitable vibration insulation pads for vibrating equipment such as transformers.
6. No suspended conduit or box supports shall be less than ¼" diameter steel rod. Rod used as pedestal support is not acceptable.

C. Conduit straps and hangers:

1. Heavy-duty malleable iron or steel.

a Above grade locations subject to moisture or corrosion including crawl spaces shall use corrosion resisting steel.

b. Perforated pipe straps, wire hangars, or spring set fasteners with hangers are not permitted

c. Support conduits above suspended ceilings from building structure by suitable hangers. Supporting conduits from ceiling suspension wires is not permitted.

D. Conduit racks:

1. For electrical conduit use only.

a. Multi-use suspension systems for plumbing and other piping along with electrical conduits may be used if designed for that purpose. Maintain 6" clearance between electrical conduits and all other piping.

E. Conduit anchors:

1. Plastic or fiber expansion and powder-activated anchors are not permitted. Anchors must be mounted using removable bolts or screws.

F. Suspension and anchorage

1. Use of powder actuated fasteners and toggle bolts is prohibited.

2. Steel roof and floor decking, suspended ceilings, and hollow assemblies shall not be used for the attachment of anchorages or supports for suspended equipment, conduit pipes, or other electrical system components.

a) Exception: Attachment, anchorages, or supports specifically approved by a Structural Engineer.

3. Equipment shall be anchored with anchors extending through the housekeeping pad or curb into the floor, except where the housekeeping pad is an extension of an inertia block separated from the floor structure.
4. Retaining clips/clamps shall be used in locations where vibration may be a

concern.

5. Drilling, cutting or burning of, or welding to, structural members for attachment of hangers and supports is subject to prior approval by the A/E.
6. Wall assemblies are not an acceptable replacement for hangers.
7. Signs shall be secured to a fixed device or the building wall with corrosion-resistant chains or fasteners.

END OF SECTION 260529

SECTION 260553 – IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

None.

2 PRODUCTS

2.01 MATERIALS

A. Nameplates:
1. Engraved three-layer laminated plastic, black letters on white background.
2. Life safety and emergency shall be white letters on red background.
3. UPS shall be yellow letters on white background.
4. Grounds shall be green letters on white background.
5. Thickness 1/16” for units up to 20 square inches or 8 inches in length; 1/8” thick for larger nameplates.
6. Fasteners: Minimum 2 self-tapping stainless steel screws.

B. Electronic Labels:
1. Manufacturers
a) Kroy
b) Brother

C. Wire and Cable Markers:
1. For cables smaller than #2/0, standard vinyl-cloth self-adhesive cable/conductor markers of wraparound type, either pre-numbered plastic coated type, or write-on type with clear plastic self-adhesive cover flap are to be used.
2. For cables #2/0 and larger, heat shrink sleeve to be used for phase color coding.

D. Embossed labels are prohibited.

PART 3 EXECUTION

3.01 INSTALLATION

A. Nameplates and Labels:
1. Degrease and clean surfaces to receive nameplates and labels.
2. Install nameplates parallel to equipment lines.
3. Secure nameplates to equipment using minimum two screws or rivets. Locate nameplates on outside face of panelboard doors in finished locations.
4. Electronic labels will be permitted only for identification of individual wall switches (in unfinished areas), and on outside face of receptacles and wall switch plates.

B. Wire Identification:
1. Provide wire markers on each conductor at points of termination in panelboards, outlet and junction boxes, at load connections, and internally to cabinets and enclosures with electrical components. Identify with branch circuit or feeder number for power and lighting circuits, and with control circuit number for control wiring.

C. Junction and Pull Box Identification:
1. On the cover of each junction box and pull box: the circuit number(s) of the enclosed

conductors are to be legibly written with a black permanent ink broad tip marking pen and the system identification.

2. Paint covers for emergency and fire alarm system red.

3.02 NAMEPLATE ENGRAVING SCHEDULE

A. For engraving, identification shall be the name of the device, panelboard, etc. The “voltage, load serve” line also shall include the name of the feeding panel, switchboard, etc.

B. Switchboards and Motor Control Centers:

1. Identification: ½”-high lettering.
2. Voltage, loads served: ¼”-high lettering.

C. Panelboards, Cabinets, and Enclosures:

1. Identification: ½”-high lettering.
2. Voltage: ¼”-high lettering.

D. Transformers:

1. Identification: ½”-high lettering.
2. Voltage, source: ¼”-high lettering.

E. Switches and Receptacles:

1. Identification: electronic tape or neatly-written permanent ink on inside faceplate in finished areas.

F. Interior Cabinet and Enclosure Electrical Components:

1. Identification: ½”-high lettering.
2. Voltage, source: ¼”-high lettering.

G. Disconnects, Starters, and Control Stations:

1. Identification: 3/16”-high lettering.
2. Voltage, source: 3/16”-high lettering.

3.03 PULL AND JUNCTION BOX COLOR-CODING

A. For ease of identification during maintenance and remodeling, junction box covers shall be color-coded according to the following schedule:

1. Fire alarm: red
2. Emergency circuitry: yellow
3. Telephone: green
4. Television: violet
5. Computer data: blue
6. 277/480V system: orange

END OF SECTION 260553

SECTION 260800 ELECTRICAL COMMISSIONING

PART 1 GENERAL

1.01 SUBMITTALS

A. Provide submittal documentation, relative to commissioning, to the CA as requested by the CA.

B. Schedule of equipment and system start-up to Engineer, Owner and CA.

C. Results of Vendor's shop and field tests.

D. Qualifications of the independent testing agency (if used) (reference paragraph 3.03 herein).

E. Required documentation as required by Code, the AHJ, and listed within the Contract Documents and herein.

F. Equipment and instrumentation calibration certification or documentation for all test instruments.

G. Documentation that the vendor's storage and handling requirements were met for all equipment and materials.

H. Equipment Vendor's Recommendations for:

1. Alignment Tolerances.
2. Allowable Vibration Levels.
3. Lubrication Requirements.
4. Cleaning Procedures.

I. Observed Installation Data:

1. Alignment Readings.
2. Operating Vibration Levels.
3. Test and Inspection Reports.

J. At completion of Work, Contractor shall submit to Owner certification that equipment has been tested and commissioned and is in operating condition in accordance with contract documents.

K. Final Reports: Refer to Section 01 45 45 for final report requirements.

1.02 QUALITY ASSURANCE

A. Testing of the electrical equipment and systems shall comply with "Acceptance Testing Specifications for Electric Power Distribution Equipment and Systems" by the International Electrical Testing Association, Inc.

B. Contractor shall perform specified services with qualified personnel, or employ and pay for qualified organization to perform specified services. The personnel performing the testing shall be certified by a national organization, with a minimum of five years experience inspecting, testing, and calibrating electrical equipment, systems and devices. Information on the certified personnel shall be submitted to the engineer for

approval prior to the start of work.

C. Contractor shall provide calibrated instruments required for commissioning and testing operations.
    1. Make personnel and instruments available to Engineer to facilitate spot checks during testing.
    2. Retain possession of instruments; remove from Site at completion of services.
D. Furnish material, tools, and labor required to perform start-up of each respective item of equipment, instrument and system.
E. Coordinate the startup of equipment and systems with existing operations or facility equipment so that it does not affect owner's operations.
F. Provide equipment vendor's authorized service representative to inspect and approve installation where required in individual specification sections.
G. Comply strictly with specified vendor's, engineer's, and CA's procedures in starting up and commissioning specified systems.

1.03 COORDINATION

A. Coordinate startup, testing and commissioning services to ensure rapid completion of services.
B. Promptly report to engineer and CA any deficiencies noted during performance of commissioning and testing services.

1.04 JOB CONDITIONS

A. Prior to start of testing and commissioning, verify that required "job conditions" are met:
    1. Systems installation is complete and in full operation.
    2. Ambient conditions are within reasonable range relative to design conditions.
    3. Special equipment such as computers, laboratory equipment, and electronic equipment are in full operation.
B. Verify that requirements for preparation for testing and commissioning have been met for elements of each of systems that require testing.

PART 2 PRODUCTS No Requirements

PART 3 EXECUTION

3.01 EQUIPMENT CLEANING

A. When no longer required, contractor shall thoroughly clean equipment of temporary protective coatings and foreign materials.
B. Contractor shall perform cleaning procedures recommended by equipment vendor and as outlined in specification sections.

3.02 INSPECTION

A. Contractor shall inspect equipment installations and verify, in writing, status of work meets requirements for starting equipment including, but not limited to, the following:

1. Compare equipment nameplate information, including breaker sizes, etc. with latest drawings and documents and report discrepancies to engineer.
2. Check for proper mounting, anchorage, required clearances, physical damage and alignment.
3. Lubrication type, quantity, and date installed.
4. Torque test cable mechanical connections to vendors recommended torque values with a calibrated torque wrench. In absence of vendor data, refer to UL 486 for torque values.
5. Proper drive rotation before connecting coupling, belts, or chains.
6. Exercise all active components.
7. Ensure that all shipping brackets and appurtenances have been removed.
8. Ensure that all resilient mounts are free.
9. Check out of wiring and control systems for proper terminations and continuity.
10. Verify proper equipment grounding.
11. Verify proper motor and electric device voltage ratings.
12. Control systems operational.
13. Auxiliary services connected, i.e., alarm and trip circuits, and safety devices.
14. Instrumentation calibrated (other than control systems covered under Division 25).
15. Verify wiring terminations are complete and breaker/fuse size matches the requirements shown on the drawings.
16. The contractor shall ensure that the electrical contractor installs all rough in boxes and associated conduit and boxes as shown on the drawings by marking on a set of drawings.
17. Ensure that all conductors and boxes and cabinets, devices, etc. are labeled per the project spec's.

B. Engineer, owner, and CA reserves right to witness all contractor's inspections. Contractor shall invite engineer and owner for all testing sessions. The CA will witness these inspections as called for in the commissioning plan.

3.03 ELECTRICAL SYSTEM COMMISSIONING

A. General:

1. Check installation of equipment to confirm it is complete, including panels, doors, internal partitions, coatings, cover plates, etc.
2. Review factory test results for electrical equipment.
3. Perform the testing and startup required by the equipment vendor.

B. The Contractor shall hire an independent testing agent or utilize the equipment vendor to

conduct operating and acceptance tests on new electrical system components and all existing devices which are impacted by the project. The following shall be tested: all service entrance equipment and main distribution equipment (not including panelboards or other items fed from it); generators and transfer switches, fire detection and alarm systems, UPS systems greater than 45kVA, and theater lighting and sound systems.

1. The testing agent shall prepare written reports of values of all test readings and procedures. Reports shall include all breaker settings and modifications to one-line and three-line drawings.
2. The testing agent shall furnish all equipment, instruments and personnel required to conduct tests.
3. Test will be defined in the individual section describing the equipment or system.

C. Wiring Systems:

1. Perform and record ground tests on all grounding conductors.
2. Check wiring identification at both ends of each circuit.
3. Perform continuity and insulation (meggar) resistance testing of all feeders. Submit written test results to DPS as part of operation and maintenance data.
4. Each receptacle on the project shall be tested to ensure that it is labeled and all wiring installed properly with respect to ground, neutral and phase wire with a tester.

D. Grounding:

1. Perform field testing of ground resistance from service neutral connection to ground reference point. Maximum permitted resistance 0.5 ohms.
2. For ground rods, perform fall of potential test with results not greater than five (5) ohms. Contractor shall add length to ground rods or add more ground rods and connections to meet requirement of five (5) ohms or less.

E. Motors:

1. Check rotation of motor in relation to marking on case; confirm that it matches the direction required by the driven equipment.
2. Measure motor amperage and compare to nameplate value.
3. Correct conditions that produce excessive current flow, and which exist due to equipment malfunction.
4. Check bearing vibration levels to confirm that they are within vendor's tolerances. Replace motors or bearings that operate with excessive vibration.
5. Compare overload element rating with motor full-load current rating to verify correct sizing.
6. Program motor protection relays with settings provided by Engineer, if applicable.
7. Confirm operation of RTDs for motors and transformers (status, alarm, trip), if applicable.
8. Verify operation of space heaters, if applicable.

F. Dry Type Transformers:

1. Verify proper core grounding.

2. Verify taps, if applicable, are connected to desired tap setting per Engineer.
3. Measure secondary voltage phase-to-phase and phase-to-ground after final energization and prior to loading.

G. Switchboards:
1. Check bolt torque for bus sections.
2. Verify secondary voltage on control power transformers, potential transformers (PTs) and current transformers (CTs).
3. Verify operation of space heaters, if applicable.
4. Verify fuse and/or circuit breaker sizes and types correspond to drawings.
5. Program relays with settings provided by engineer, if applicable.
6. Verify any mechanical and/or electrical interlocks function as intended in design.
7. Verify proper operation of ground fault relays.
8. Verify proper operation of TVSS units. Utilize equipment vendor's representative if necessary.
9. Perform measurement of resistance of switchboard insulation after assembly is complete. Test voltage shall be 1,000V or as recommended by the equipment vendor. Acceptable minimum resistance shall be 100 meg-ohms (all sections), phase-to-phase, and phase-to-ground with other phases grounded.
10. Provide ground fault testing in accordance with NETA ATS.
11. Provide infrared testing of main switchboard and panelboards six months after final acceptance.

H. Motor Control:
1. Verify that control sequences, time delay and adjustments are as indicated on documents.
2. Verify proper operation of motor starters, VFDs, and other motor control not covered under Division 23.

I. Panelboards:
1. Verify GFI and AFI type breakers function properly.
2. Verify TVSS units operate properly. Utilize equipment vendor's representative if necessary.
3. Verify lockout devices are installed on fire alarm, kitchen hood, security, and telecom circuits.
4. Phase balance and show phase balancing to within 20 percent on the record drawings of completed panelboard installation.

J. Lighting:
1. Each luminaire shall be checked to ensure that all lamps are working and the luminaire(s) are controlled by a light switch. For any lighting control systems ensure that the controls work as specified and where a photocell is involved that works accordingly.

2. Test all interior lighting controls systems such as stage lighting to ensure that it works per the design requirements. Test operation, sensitivity and time out settings for all occupancy sensors. Test daylight response photo-sensors and make to ensure lighting is being controlled per recommended light level settings.

K. Fire Alarm System (per DPS Section 28 31 11):

1. Testing:

a. The engineer and Owner shall be present during the contractor's pretest of the system, and subsequent fire department tests of the completed system. If the pretest of the system is unsuccessful, the contractor shall compensate the engineer and Owner for witnessing all subsequent tests until the system is ready for acceptance testing by the Fire Department. The engineer shall provide a written report of each test to the Owner. These requirements shall be included in the specifications so that the contractor will notify the engineer of the times and dates of the tests, and will be aware that he will be responsible for reimbursing the Engineer should there be a need for subsequent tests.

b. The service of a competent, factory-trained engineer or technician (minimum NICET level 2) authorized by the vendor of the fire alarm equipment shall be provided to technically supervise and participate during all of the adjustments and tests for the system. All testing shall be in accordance with NFPA 72, Chapter 7, as amended in Part I, UFC Standard 10-2.

c. Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.

d. Close each sprinkler system flow valve and verify proper supervisory alarm at the FACP.

e. Verify activation of all water flow switches.

f. Open initiating device circuits and verify that the trouble signal actuates.

g. Open and short signaling line circuits and verify that the trouble signal actuates.

h. Open and short notification appliance circuits and verify that trouble signal actuates.

j. Ground all circuits and verify response of trouble signals.

k. Check presence and audibility of tone at all alarm notification devices.

l. Check the digital communicator as follows: disconnect the primary phone line (a trouble signal shall be sent through the secondary phone line). Disconnect the secondary phone line (a trouble signal shall be sent through the primary phone line). If another telephone is on the same phone line as the fire alarm system, take the telephone off the hook to check for line seizure by the digital communicator.

m. Check installation, supervision, and operation of all intelligent smoke detectors using the walk test. Canned smoke (provided by Contractor and acceptable to the fire alarm equipment vendor) will be used at the final inspection to verify actuation of smoke detectors.

n. Each of the alarm conditions that the system is required to detect should be introduced on the system. Verify the proper receipt and the proper processing of the signal at the FACP and the correct activation of the control points.

o. When the system is equipped with optional features, the vendor's manual shall be

consulted to determine the proper testing procedures. This is intended to address such items as verifying controls performed by individually addressed or grouped devices, sensitivity monitoring, verification functionality and similar.

L. Final Inspection:

a. At the final inspection, a factory-trained representative of the vendor of the major equipment shall demonstrate that the system functions properly in every respect. The contractor is responsible for providing all tools and equipment necessary to demonstrate that the system functions as specified herein. Submit a request for a formal inspection at least five working days prior to the date the inspection is to take place. Any or all of the required tests shall be conducted by the contractor at his own expense and additional tests required for the system to demonstrate compliance with all contract documents shall also be incurred by the Contractor. The contractor shall furnish all appliances, equipment, instruments, connecting devices, two-way radios and personnel for the tests. Any costs incurred by Owner for repeat tests, due to the failure of the contractor to adequately demonstrate that the system complies with the contract requirements, shall be borne by the Contractor.

M. Special Systems:

a. Test each PA/Intercom speaker to ensure that each one works at an acceptable sound level and without distortion.

2. Test each security device and ensure that each works and that the overall system is operational.

3. Test the clock system to ensure that the system and each device is operating correctly.

4. Test each voice enhancement system to ensure it is operational.

5. Test lightning protection systems per vendor’s instructions.

3.04 ELECTRICAL SYSTEM STARTUP

A. Energize switchgear.

B. Check voltages at mechanical equipment.

C. Check polarity for all receptacles.

D. Check lighting levels throughout building, within office spaces, on roof and at parking and storage areas.

3.05 ACCEPTANCE FOR OPERATION

A. Each piece of equipment installed by this contract shall carry "Acceptance for Operation Checklist." Each checklist shall be signed by the contractor's representative and Owner, or owner's representative. Each list shall have applicable blanks filled in and attached to items indicating that it is prepared for operation.

B. Owner will accept equipment and systems for operation when construction has been substantially completed by contractor. "Acceptance for Operation" shall mean owner will assume operational and routine maintenance duties. "Acceptance for Operation" does not relieve contractor from responsibilities related to defective materials and workmanship; neither does it constitute final acceptance of materials and equipment.

C. After owner has accepted a system for operation, contractor shall continue to perform the

following as requested and scheduled by owner at no additional cost to owner until final acceptance:

1. Troubleshooting, adjustments, and repairs until system operation and performance is accepted by owner.
2. Assist instrument and control personnel with instrument calibration.
3. Craft labor as required.

D. After owner has accepted a system for operation, contractor shall continue to supply technical services when needed until final acceptance.

END OF SECTION 260800

SECTION 260923 – LIGHTING CONTROL SYST EMS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:

1. Time switches.
2. Photoelectric switches.
3. Standalone daylight-harvesting switching controls.
4. Indoor occupancy sensors.
5. Outdoor motion sensors.
6. Lighting contactors.
7. Emergency shunt relays.

B. Related Requirements:

1. Section 262726 "Wiring Devices" for wall-box dimmers, and manual light switches.

1.03 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show installation details for occupancy and light-level sensors.

1. Interconnection diagrams showing field-installed wiring.
2. Include diagrams for power, signal, and control wiring.

1.04 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

1.05 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For each type of lighting control device to include in emergency, operation, and maintenance manuals.

PART 2 PRODUCTS

2.01 TIME SWITCHES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton, Inc.
2. Intermatic, Inc.
3. Invensys Controls.
4. Leviton Manufacturing Co., Inc.
5. NSi Industries LLC; TORK Products.

6. Tyco Electronics; ALR Brand.

B. Electronic Time Switches: Solid state, programmable, with alphanumeric display; complying with UL 917.
   1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
   2. Contact Configuration: SPST.
   3. Contact Rating: 20-A ballast load, 120-/240-V ac.
   4. Programs: Two on-off set points on a 24-hour schedule, allowing different set points for each day of the week and an annual holiday schedule that overrides the weekly operation on holidays.
   5. Circuitry: Allow connection of a photoelectric relay as substitute for on-off function of a program on selected channels.
   6. Astronomic Time: All channels.
   7. Automatic daylight savings time changeover.
   8. Battery Backup: Not less than seven days reserve, to maintain schedules and time clock.

C. Electromechanical-Dial Time Switches: Comply with UL 917.
   1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
   2. Contact Configuration: SPST.
   3. Contact Rating: 20-A ballast load, 120-/240-V ac.
   4. Circuitry: Allows connection of a photoelectric relay as a substitute for the on-off function of a program.
   5. Astronomic time dial.
   6. Eight-Day Program: Uniquely programmable for each weekday and holidays.
   7. Skip-a-day mode.
   8. Wound-spring reserve carryover mechanism to keep time during power failures, minimum of 24 hours.

2.2 OUTDOOR PHOTOELECTRIC SWITCHES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Eaton, Inc.
   2. Intermatic, Inc.
   3. NSi Industries LLC; TORK Products.
   4. Tyco Electronics; ALR Brand.

B. Description: Solid state, with SPST dry contacts rated for 1800-VA tungsten or 1000-VA inductive, to operate connected relay, contactor coils, or microprocessor input; complying with UL 773A.
   1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
   2. Light-Level Monitoring Range: 1.5 to 10 fc, with an adjustment for turn-on and turn-off levels

within that range, and a directional lens in front of the photocell to prevent fixed light sources from causing turn-off.

3. Time Delay: Fifteen second minimum, to prevent false operation.
4. Surge Protection: Metal-oxide varistor.
5. Mounting: Twist lock complies with NEMA C136.10, with base-and-stem mounting or stem-and- swivel mounting accessories as required to direct sensor to the north sky exposure.

2.3 DAYLIGHT-HARVESTING SWITCHING CONTROLS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Eaton Corporation.
   2. Hubbell Building Automation, Inc.
   3. Leviton Manufacturing Co., Inc.
   4. Lithonia Lighting; Acuity Brands Lighting, Inc.
   5. NSi Industries LLC; TORK Products.
   6. Sensor Switch, Inc.
   7. Tyco Electronics; ALR Brand.
   8. Watt Stopper.

B. Ceiling-Mounted Switching Controls: Solid-state, light-level sensor unit, with separate power pack, to detect changes in indoor lighting levels that are perceived by the eye.

C. Electrical Components, Devices, and Accessories:
   1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
   2. Operating Ambient Conditions: Dry interior conditions, 32 to 120 deg F.
   3. Sensor Output: Contacts rated to operate the associated power pack, complying with UL 773A. Sensor is powered by the power pack.
   4. Power Pack: Dry contacts rated for 20-A ballast load at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Sensor has 24-V dc, 150-mA, Class 2 power source, as defined by NFPA 70.
   5. General Space Sensors Light-Level Monitoring Range: 10 to 200 fc, with an adjustment for turn- on and turn-off levels within that range.
   6. Atrium Space Sensors Light-Level Monitoring Range: 100 to 1000 fc, with an adjustment for turn- on and turn-off levels within that range.
   7. Skylight Sensors Light-Level Monitoring Range: 1000 to 10,000 fc, with an adjustment for turn- on and turn-off levels within that range.
   8. Time Delay: Adjustable from 5 to 300 seconds to prevent cycling.
   9. Set-Point Adjustment: Equip with deadband adjustment of 25, 50, and 75 percent above the "on" set point, or provide with separate adjustable "on" and "off" set points.
   10. Test Mode: User selectable, overriding programmed time delay to allow settings check.
   11. Control Load Status: User selectable to confirm that load wiring is correct.

12. Indicator: Two digital displays to indicate the beginning of on-off cycles.

2.4 DAYLIGHT-HARVESTING DIMMING CONTROLS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton, Inc.
2. Hubbell Building Automation, Inc.
3. Leviton Mfg. Company Inc.
4. Lithonia Lighting; Acuity Lighting Group, Inc.
5. Watt Stopper.

B. System Description: Sensing daylight and electrical lighting levels, the system adjusts the indoor electrical lighting levels. As daylight increases, the lights are dimmed.

1. Lighting control set point is based on two lighting conditions:
   a) When no daylight is present (target level).
   b) When significant daylight is present.
2. System programming is done with two hand-held, remote-control tools.
   a) Initial setup tool.
   b) Tool for occupants to adjust the target levels by increasing the set point up to 25 percent, or by minimizing the electric lighting level.

C. Ceiling-Mounted Dimming Controls: Solid-state, light-level sensor unit, with separate controller unit, to detect changes in lighting levels that are perceived by the eye.

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Sensor Output: 0- to 10-V dc to operate electronic dimming ballasts. Sensor is powered by controller unit.
3. Power Pack: Sensor has 24-V dc, Class 2 power source, as defined by NFPA 70.
4. Light-Level Sensor Set-Point Adjustment Range: 20 to 60 fc.

2.5 INDOOR OCCUPANCY SENSORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Bryant Electric.
2. Eaton, Inc.
3. Hubbell Building Automation, Inc.
4. Leviton Manufacturing Co., Inc.
5. Lightolier Controls.
6. Lithonia Lighting; Acuity Brands Lighting, Inc.
7. Lutron Electronics Co., Inc.
8. NSi Industries LLC; TORK Products.
9. RAB Lighting.

10. Sensor Switch, Inc.
11. Square D.
12. Watt Stopper.

B. General Requirements for Sensors: Wall- or ceiling-mounted, solid-state indoor occupancy sensors with a separate power pack.
   1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
   2. Operation: Unless otherwise indicated, turn lights on when coverage area is occupied, and turn them off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
   3. Sensor Output: Contacts rated to operate the connected relay, complying with UL 773A. Sensor is powered from the power pack.
   4. Power Pack: Dry contacts rated for 20-A ballast load at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Sensor has 24-V dc, 150-mA, Class 2 power source, as defined by NFPA 70.
   5. Mounting:
      a) Sensor: Suitable for mounting in any position on a standard outlet box.
      b) Relay: Externally mounted through a 1/2-inch knockout in a standard electrical enclosure.
      c) Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.
   6. Indicator: Digital display, to show when motion is detected during testing and normal operation of sensor.
   7. Bypass Switch: Override the "on" function in case of sensor failure.
   8. Automatic Light-Level Sensor: Adjustable from 2 to 200 fc; turn lights off when selected lighting level is present.

C. PIR Type: Ceiling mounted; detect occupants in coverage area by their heat and movement.
   1. Detector Sensitivity: Detect occurrences of 6-inch- minimum movement of any portion of a human body that presents a target of not less than 36 sq. in..
   2. Detection Coverage (Room): Detect occupancy anywhere in a circular area of 1000 sq. ft. when mounted on a 96-inch- high ceiling.
   3. Detection Coverage (Corridor): Detect occupancy within 90 feet when mounted on a 10-foot- high ceiling.

D. Ultrasonic Type: Ceiling mounted; detect occupants in coverage area through pattern changes of reflected ultrasonic energy .
   1. Detector Sensitivity: Detect a person of average size and weight moving not less than 12 inches in either a horizontal or a vertical manner at an approximate speed of 12 inches/s.
   2. Detection Coverage (Small Room): Detect occupancy anywhere within a circular area of 600 sq. ft. when mounted on a 96-inch- high ceiling.
   3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. when mounted on a 96-inch- high ceiling.

4. Detection Coverage (Large Room): Detect occupancy anywhere within a circular area of 2000 sq. ft. when mounted on a 96-inch- high ceiling.
5. Detection Coverage (Corridor): Detect occupancy anywhere within 90 feet when mounted on a 10-foot- high ceiling in a corridor not wider than 14 feet.

E. Dual-Technology Type: Ceiling mounted; detect occupants in coverage area using PIR and ultrasonic detection methods. The particular technology or combination of technologies that control on-off functions is selectable in the field by operating controls on unit.

1. Sensitivity Adjustment: Separate for each sensing technology.
2. Detector Sensitivity: Detect occurrences of 6-inch- minimum movement of any portion of a human body that presents a target of not less than 36 sq. in., and detect a person of average size and weight moving not less than 12 inches in either a horizontal or a vertical manner at an approximate speed of 12 inches/s.
3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. when mounted on a 96-inch- high ceiling.

2.6 SWITCHBOX-MOUNTED OCCUPANCY SENSORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Bryant Electric.
2. Eaton, Inc.
3. Hubbell Building Automation, Inc.
4. Leviton Manufacturing Co., Inc.
5. Lightolier Controls.
6. Lithonia Lighting; Acuity Brands Lighting, Inc.
7. Lutron Electronics Co., Inc.
8. NSi Industries LLC; TORK Products.
9. RAB Lighting.
10. Sensor Switch, Inc.
11. Square D.
12. Watt Stopper.

B. General Requirements for Sensors: Automatic-wall-switch occupancy sensor, suitable for mounting in a single gang switchbox.

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Operating Ambient Conditions: Dry interior conditions, 32 to 120 deg F.
3. Switch Rating: Not less than 800-VA fluorescent at 120 V, 1200-VA fluorescent at 277 V, and 800-W incandescent.

C. Wall-Switch Sensor Tag WS1:

1. Standard Range: 180-degree field of view, field adjustable from 180 to 40 degrees; with a minimum coverage area of 900 sq. ft..
2. Sensing Technology: Dual technology - PIR and ultrasonic.
3. Switch Type: SP, manual "on," automatic "off."

4. Voltage: Match the circuit voltage; dual-technology type.
5. Ambient-Light Override: Concealed, field-adjustable, light-level sensor from 10 to 150 fc. The switch prevents the lights from turning on when the light level is higher than the set point of the sensor.
6. Concealed, field-adjustable, "off" time-delay selector at up to 30 minutes.
7. Concealed "off" time-delay selector at 30 seconds, and 5, 10, and 20 minutes.
8. Adaptive Technology: Self-adjusting circuitry detects and memorizes usage patterns of the space and helps eliminate false "off" switching.

D. Wall-Switch Sensor Tag WS2:

1. Standard Range: 210-degree field of view, with a minimum coverage area of 900 sq. ft..
2. Sensing Technology: PIR.
3. Switch Type: SP, manual "on," automatic "off."
4. Voltage: Match the circuit voltage; dual-technology type.
5. Ambient-Light Override: Concealed, field-adjustable, light-level sensor from 10 to 150 fc. The switch prevents the lights from turning on when the light level is higher than the set point of the sensor.
6. Concealed, field-adjustable, "off" time-delay selector at up to 30 minutes.
7. Concealed "off" time-delay selector at 30 seconds, and 5, 10, and 20 minutes.
8. Adaptive Technology: Self-adjusting circuitry detects and memorizes usage patterns of the space and helps eliminate false "off" switching.

2.7 HIGH-BAY OCCUPANCY SENSORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Hubbell Building Automation, Inc.

B. General Description: Solid-state unit. The unit is designed to operate with the lamp and ballasts indicated.

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Operation: Turn lights on when coverage area is occupied, and to half-power when unoccupied; with a time delay for turning lights to half-power that is adjustable over a minimum range of 1 to 16 minutes.
3. Continuous Lamp Monitoring: When lamps are dimmed continuously for 24 hours, automatically turn lamps on to full power for 15 minutes for every 24 hours of continuous dimming.
4. Operating Ambient Conditions: 32 to 149 deg F.
5. Mounting: Threaded pipe.
6. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.
7. Detector Technology: PIR.
8. Power and dimming control from the lighting fixture ballast that has been modified to include the dimming capacitor and MyzerPORT option.

C. Detector Coverage: User selectable by interchangeable PIR lenses, suitable for mounting heights from 12 to 50 feet.

D. Accessories: Obtain manufacturer's installation and maintenance kit with laser alignment tool for sensor positioning and power port connectors.

2.8 EXTREME-TEMPERATURE OCCUPANCY SENSORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cooper Industries, Inc.
2. Sensor Switch, Inc.

B. Description: Ceiling-mounted, solid-state, extreme-temperature occupancy sensors with a separate power pack.

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended application in damp locations.
2. Operation: Turn lights on when coverage area is occupied, and turn them off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 30 minutes.
3. Operating Ambient Conditions: From minus 40 to plus 125 deg F.
4. Sensor Output: Contacts rated to operate the connected relay, complying with UL 773A. Sensor is powered from the power pack.
5. Power Pack: Dry contacts rated for 20-A ballast load at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Sensor has 24-V dc, 150-mA, Class 2 power source, as defined by NFPA 70.
6. Mounting:
   a) Sensor: Suitable for mounting in any position on a standard outlet box.
   b) Relay: Externally mounted through a 1/2-inch knockout in a standard electrical enclosure.
   c) Time-Delay and Sensitivity Adjustments: Recessed and concealed behind cover.
7. Bypass Switch: Override the "on" function in case of sensor failure.
8. Automatic Light-Level Sensor: Adjustable from 2 to 10 fc; keep lighting off when selected lighting level is present.

C. Detector Technology: PIR. Ceiling mounted; detect occupants in coverage area by their heat and movement.

1. Detector Sensitivity: Detect occurrences of 6-inch- minimum movement of any portion of a human body that presents a target of not less than 36 sq. in..
2. Detection Coverage (Room): Detect occupancy anywhere in a circular area of 1500 sq. ft. when mounted on a 96-inch- high ceiling.
3. Detection Coverage (High Bay): Detect occupancy within 25 feet when mounted on a 25-foot- high ceiling.

2.9 OUTDOOR MOTION SENSORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Bryant Electric.
2. Cooper Industries, Inc.
3. Hubbell Building Automation, Inc.

4. Leviton Manufacturing Co., Inc.
5. Lithonia Lighting; Acuity Brands Lighting, Inc.
6. NSi Industries LLC; TORK Products.
7. RAB Lighting.
8. Sensor Switch, Inc.
9. Watt Stopper.

B. General Requirements for Sensors: Solid-state outdoor motion sensors.

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Dual-technology (PIR and infrared) type, weatherproof. Detect occurrences of 6-inch-minimum movement of any portion of a human body that presents a target of not less than 36 sq. in.. Comply with UL 773A.
3. Switch Rating:
   a) Lighting-Fixture-Mounted Sensor: 500-VA fluorescent.
   b) Separately Mounted Sensor: Dry contacts rated for 20-A ballast load at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Sensor has 24-V dc, 150-mA, Class 2 power source, as defined by NFPA 70.
4. Switch Type: SP, manual "on," automatic "off" with bypass switch to override the "on" function in case of sensor failure.
5. Voltage: Match the circuit voltage type.
6. Detector Coverage:
   a) Standard Range: 210-degree field of view, with a minimum coverage area of 900 sq. ft..
   b) Long Range: 180-degree field of view and 110-foot detection range.
7. Ambient-Light Override: Concealed, field-adjustable, light-level sensor from 10 to 150 fc. The switch prevents the lights from turning on when the light level is higher than the set point of the sensor.
8. Concealed, field-adjustable, "off" time-delay selector at up to 30 minutes.
9. Concealed "off" time-delay selector at 30 seconds, and 5, 10, and 20 minutes.
10. Adaptive Technology: Self-adjusting circuitry detects and memorizes usage patterns of the space and help eliminate false "off" switching.
11. Operating Ambient Conditions: Suitable for operation in ambient temperatures ranging from minus 40 to plus 130 deg F, rated as "raintight" according to UL 773A.

2.10 LIGHTING CONTACTORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Allen-Bradley/Rockwell Automation
2. ASCO Power Technologies
3. Eaton
4. General Electric Company
5. Square D

B. Description: Electrically operated and electrically held, lighting contactors complying with NEMA ICS 2 and UL 508.

1. Current Rating for Switching: Listing or rating consistent with type of load served, including tungsten filament, inductive, and high-inrush ballast (ballast with 15 percent or less THD of normal load current).
2. Fault Current Withstand Rating: Equal to or exceeding the available fault current at the point of installation.
3. Enclosure: Comply with NEMA 250.
4. Provide with control and pilot devices as [indicated on Drawings] [scheduled], matching the NEMA type specified for the enclosure.

2.11 EMERGENCY SHUNT RELAY

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Lighting Control and Design.
2. Watt Stopper.

B. Description: Normally closed, electrically held relay, arranged for wiring in parallel with manual or automatic switching contacts; complying with UL 924.

1. Coil Rating: 277 V.

2.12 CONDUCTORS AND CABLES

A. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

B. Classes 2 and 3 Control Cable: Multi-conductor cable with stranded-copper conductors not smaller than No. 18 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

C. Class 1 Control Cable: Multi-conductor cable with stranded-copper conductors not smaller than No. 14 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

PART 3 EXECUTION

3.1 SENSOR INSTALLATION

A. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire- suppression systems, and partition assemblies.

B. Install and aim sensors in locations to achieve not less than 90 percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

3.2 CONTACTOR INSTALLATION

A. Mount electrically held lighting contactors with elastomeric isolator pads to eliminate structure-borne vibration, unless contactors are installed in an enclosure with factory-installed vibration isolators.

3.3 WIRING INSTALLATION

A. Wiring Method: Comply with Section 260519 "Low-Voltage Electrical Power Conductors and Cables." Minimum conduit size is 1/2 inch.

B. Wiring within Enclosures: Comply with NECA 1. Separate power-limited and nonpower-

limited conductors according to conductor manufacturer's written instructions.

C. Size conductors according to lighting control device manufacturer's written instructions unless otherwise indicated.

D. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

3.4 IDENTIFICATION

A. Identify components and power and control wiring according to Section 260553 "Identification for Electrical Systems."

1. Identify controlled circuits in lighting contactors.
2. Identify circuits or luminaires controlled by photoelectric and occupancy sensors at each sensor.

B. Label time switches and contactors with a unique designation.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to evaluate lighting control devices and perform tests and inspections.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

C. Perform the following tests and inspections with the assistance of a factory-authorized service representative:

1. Operational Test: After installing time switches and sensors, and after electrical circuitry has been energized, start units to confirm proper unit operation.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Lighting control devices will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports.

3.6 ADJUSTING

A. Occupancy Adjustments: When requested within 11 months from date of Substantial Completion, provide on-site assistance in adjusting sensors to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

1. For occupancy and motion sensors, verify operation at outer limits of detector range. Set time delay to suit Owner's operations.
2. For daylighting controls, adjust set points and deadband controls to suit Owner's operations.
3. Align high-bay occupancy sensors using manufacturer's laser aiming tool.

3.7 DEMONSTRATION

A. Coordinate demonstration of products specified in this Section.

B. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain lighting control devices.

END OF SECTION 260923

SECTION 262726 – WIRING DEVICES

PART 1 PRODUCTS

1.1 ACCEPTABLE MANUFACTURERS

A. Wall switches, receptacles and plates shall be of the same manufacturer insofar as possible.

B. Wall switches shall be manufactured by:

1. Hubbell
2. Leviton
3. Eaton
4. Legrand

C. Products shall comply with Federal Specification W-S-896G.

1.2 TOGGLE SWITCHES

A. 120/277-volt wall switches shall be commercial grade rated 20 amperes and shall be quiet, quick-make, quick- break with toggle handle, and totally enclosed case.

B. Two-pole, three-way and four-way switches shall be of the same construction.

C. Key-operated switches shall be Hubbell as above with locking-type mechanism.

D. Switches with pilot light shall be the same as above, except that switches shall be equipped with and connected to an integral pilot light.

E. Switch color to be ivory unless otherwise specified. Verify color with architect prior to ordering.

F. Switch for life safety circuits shall be red.

G. Grounding screw on all devices.

1.3 WALL-BOX DIMMERS

A. Dimmer Switches: Modular, full-wave, solid-state units with integral, quiet on-off switches, with audible frequency and EMI/RFI suppression filters.

B. Control: Continuously adjustable slider; with single-pole or three-way switching. Comply with UL 1472.

C. LED Dimmer Switches, 0-10V Type: Modular; compatible with 0-10V dimmer drivers; dimmer-driver combination capable of consistent dimming with low end not greater than 10 percent of full brightness.

D. LED Dimmer Switches, Electronic Phase Dimming Type: Modular, compatible with non 0-10V drivers capable of consistent dimming with low end not greater than 10 percent of full brightness. Dimmer and LED driver shall be rated for use in combination.

PART 2 PRODUCTS

2.1 MATERIALS

A. Smooth Metal: Stainless steel in all locations unless otherwise directed.

B. Smooth Lexan: Only as approved by Owner.

C. Cast Metal or Aluminum: Die-cast profile, ribbed for strength, flash removed, primed with gray enamel.

D. Gaskets: resilient rubber or closed-cell foam urethane.

E. Weatherproof: Cast metal or aluminum, gasketed; provide spring-loaded gasketed covers. All devices in areas subject to frequent use shall be “in-use” type of covers.

F. Materials shall comply with Federal Specification W-C-596H.

G. Receptacles shall be heavy-duty industrial-grade and shall be of the grounding type. Provide grounding screw.

H. Tamper resistant receptacles shall be factory marked per NEMA and NEC requirements.

I. Device color to be ivory unless otherwise specified. Verify color with architect prior to ordering.

J. Device color for life safety circuits shall be red.

K. Isolated ground receptacles shall be marked with an orange triangle or shall be orange in color.

PART 3 EXECUTION

3.1 INSTALLATION

A. Switches shall be arranged singularly or in gangs, and within 18” of the door jamb on the strike side of the door openings. Verify the door swings with the architectural drawings prior to rough-in.

B. Install life safety system switches separately from normal power switches. Do not include in the multiple-gang configuration.

C. Switch and receptacle combinations shall be as above in a two-gang box where both are of the same voltage. Provide separate boxes where different voltages are present.

D. All switches in mechanical rooms, electrical rooms and other such places shall be a lighted-handle, single-pole light switch(es) as required.

E. Wall box dimmer switches installed in multiple gangs shall be rated for connected load, with deration factored in for ganged installation.

F. Where wall box dimmers and toggle switches are ganged together, all switches shall be of similar design for appearance and matching finish.

G. Provide circuit and panelboard identification on outside of all switch plates per Section 260553 Identification for Electrical Systems.

H. Install device plates for all outlet boxes and including empty outlet boxes.

I. All light switch device plates in classrooms shall be labeled with circuit and panel identification on the lights controlled. Light switches shall be labeled as to lights controlled. Receptacles shall be labeled with source circuit. All other device plates shall be labeled per direction in Section 260553 Identification for Electrical Systems.

J. Lighting controls installed in ganged combinations shall have single cover plate.

K. Lighting controls installed in ganged cover plates shall have identification of items controlled labeled on cover at each switch.

L. Over-counter devices shall be horizontally-mounted, neutral side up.

M. Switch and receptacle combinations shall comply with Toggle Switches, this Section.

N. Where convenience outlets or similar devices are installed within one stud-spacing width from a switch, the convenience outlet and switch shall align vertically.

O. Provide separate green ground wire for all isolated ground receptacles.

P. Provide tamper resistant receptacles where shown on drawings or required by code.

Q. Provide heavy-duty commercial-grade receptacles in all areas.

R. Vertical-mounted receptacles to be installed with the ground side up.

S. Provide circuit and panelboard identification on the outside of all receptacle plates per Section 260553 Identification for Electrical Systems.

END OF SECTION 262726

SECTION 265100 – INTERIOR LIGHTING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Interior lighting fixtures, lamps, and drivers.
2. Emergency lighting units.
3. Exit signs.
4. Lighting fixture supports.

B. Related Sections:

1. Section 26 09 23 "Lighting Control Devices" for automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multipole lighting relays and contactors.
2. Section 26 27 26 "Wiring Devices" for manual wall-box dimmers for incandescent lamps.

1.3 DEFINITIONS

A. CCT: Correlated color temperature.

B. CRI: Color-rendering index.

C. Driver: Electronics components that couple to Light engine to convert power from line voltage AC to light engine operating mA output and voltage.

D. LED: Light Emitting Diode

E. LER: Luminaire efficacy rating.

F. Light Engine: One or more LEDs coupled to a circuit board with or without on board optics.

G. Lumen: Measured output of lamp and luminaire, or both.

H. Luminaire: Complete lighting fixture, including remote driver housing if provided.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, finishes, and the following:

1. Physical description of lighting fixture including dimensions.
2. Emergency lighting units including battery and charger.
3. Energy-efficiency data.
4. LED light engines for each type used. Provide compatibility information for LED light engines used in conjunction with dimming systems.
5. Life, output (lumens, CCT, and CRI), of each light engine, and energy-efficiency data for light engines.

6. Photometric data and adjustment factors based on laboratory tests, complying with IESNA Lighting Measurements Testing & Calculation Guides, of each lighting fixture type. The adjustment factors shall be for lamps, ballasts, and accessories identical to those indicated for the lighting fixture as applied in this Project. Solid state LED lighting photometric data based on IES LM-79 laboratory tests of each luminaire type, complete with indicated LED engines, power supplies, operating current in milliamps (mA), and accessories.

   a. Testing Agency Certified Data: For indicated fixtures, photometric data shall be certified by a qualified independent testing agency. Photometric data for remaining fixtures shall be certified by manufacturer.

7. Power supplies, including energy-efficiency data.

8. LED engines, including life based on IES LM-80, output based on IES LM-79 testing methods, CCT, CRI, lumens, operating current in milliamps (mA), and energy-efficiency data.

B. Installation instructions.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For lighting equipment and fixtures to include in emergency, operation, and maintenance manuals.

1. Provide a list of all LED light engine and driver types used on Project; use manufacturers' codes.

2. Provide recommended LED light engine and driver replacement schedule for each lamp type based on manufacturer’s listed lamp life ratings.

3. Provide manufacturer’s maintenance and trouble-shooting information for all luminaire.

1.6 QUALITY ASSURANCE

A. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by manufacturers' laboratories that are accredited under the National Volunteer Laboratory Accreditation Program for Energy Efficient Lighting Products.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Comply with NFPA 70.

1.7 COORDINATION

A. Coordinate layout and installation of lighting fixtures and suspension system with other construction that penetrates ceilings or is supported by them, including HVAC equipment, fire-suppression system, and partition assemblies.

1.8 WARRANTY

A. Special Warranty for Emergency Lighting Batteries: Manufacturer's standard form in which manufacturer of battery-powered emergency lighting unit agrees to repair or replace components of rechargeable batteries that fail in materials or workmanship within specified warranty period.

1. Warranty Period for Emergency LED luminaire Batteries: Seven years from date of Substantial Completion. Full warranty shall apply for first year, and prorated warranty for the remaining six years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the products indicated on Drawings.

B. Product Substitutions: Provide product data per “Action Submittals” for all proposed substitute products submitted during bid period for Architect and Engineer review. Substitute products are any products not specifically detailed on Drawings with full model numbers. Substitute products are subject to review and acceptance of Architect and Engineer. Listing on Drawings of alternate manufacturer’s names without detailed full model numbers does not equate to specific product approval or acceptance.

2.2 GENERAL REQUIREMENTS FOR LIGHTING FIXTURES AND COMPONENTS

A. Recessed Fixtures: Comply with NEMA LE 4 for ceiling compatibility for recessed fixtures.

B. LED Fixtures: Test in accordance with IES LM79 & LM80.

C. Metal Parts: Free of burrs and sharp corners and edges.

D. Sheet Metal Components: Steel unless otherwise indicated. Form and support to prevent warping and sagging.

E. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit re-lamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during re-lamping and when secured in operating position.

F. Diffusers and Globes:

1. Acrylic Lighting Diffusers: 100 percent virgin acrylic plastic. High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
    a. Lens Thickness: At least 0.125 inch minimum unless otherwise indicated.
    b. UV stabilized.
2. Glass: Annealed crystal glass unless otherwise indicated.

G. Factory-Applied Labels: Comply with UL 1598. Include recommended replacement LED light engines and drivers. Labels shall be located where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.

1. Label shall include the following LED light engine and driver characteristics:
    a. "USE ONLY" and include specific LED light engine type.
    b. Driver info including operating mA output and wattage.
    c. CCT and CRI for all luminaires.

2.3 LED LIGHT SOURCE REQUIREMENTS

A. Solid State Lighting (LED) sources must meet the following requirements:

1. Luminaires must be rated for -40°C to +50°C operation.
2. Correlated Color Temperature (CCT) shall be 4000.
3. Color Rendering Index (CRI) of: ≥ 80.
4. Lumen Maintenance: ≥ 50,000 hours to 70% Lumen Maintenance per IES LM-80, tested per IES LM-79 procedures.
5. Luminaire efficiency shall be ≥ 100 lumens per watt. Small lumen output fixtures (less

than 1000 lumens) and decorative fixtures may be below 100 lumens per watt.

6. Fixtures shall be Energy Start or DesignLights Consortium “DLC” labeled / qualified.

2.4 DRIVER REQUIREMENTS

A. Power Supply Units (PSUs) including drivers must meet the following requirements:

1. Must have a minimum efficiency of 85%.
2. Must be rated to operate between -40°C to +50°C
3. Input Voltage: capable of 120 to 277 (±10%) volt, single phase as required by the site.
4. Power supplies can be UL Class I or II output.
5. Operating frequency must be 60 Hz.
6. Drivers must have a Power Factor (PF) of: ≥ 0.90.
7. Drivers must have a Total Harmonic Distortion (THD) of: ≤ 20%.
8. Drivers must comply with FCC 47 CFR part 15 non-consumer RFI/EMI standards.
9. Drivers must be Reduction of Hazardous Substances (RoHS) compliant.
10. Drivers for fixtures connected to dimmers must be compatible with specified dimming controls.

2.5 EMERGENCY LIGHTING UNITS

A. General Requirements for Emergency Lighting Units: Self-contained units complying with UL 924.

1. Battery: Sealed, maintenance-free, lead-acid type.
2. Charger: Fully automatic, solid-state type with sealed transfer relay.
3. Operation: Relay automatically turns lamp on when power-supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep- discharge level. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
4. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
5. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.
6. Integral Self-Test: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and a flashing red LED.

2.6 EXIT SIGNS

A. General Requirements for Exit Signs: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.

B. Internally Lighted Signs:

1. Lamps for AC Operation: LEDs, 50,000 hours minimum rated lamp life.

2.7 LIGHTING FIXTURE SUPPORT COMPONENTS

A. Comply with Section 26 05 29 "Hangers and Supports for Electrical Systems" for channel-

and angle-iron supports and nonmetallic channel and angle supports.

B. Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated steel, 12 gage.

C. Wires for Humid Spaces: ASTM A 580/A 580M, Composition 302 or 304, annealed stainless steel, 12 gage.

D. Lamps, and sockets.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Lighting fixtures:

1. Set level, plumb, and square with ceilings and walls unless otherwise indicated.

2. Install lamps in each luminaire.

B. Temporary Lighting: If it is necessary, and approved by Architect, to use permanent luminaires for temporary lighting, install and energize the minimum number of luminaires necessary. When construction is sufficiently complete, remove the temporary luminaires, disassemble, clean thoroughly, install new lamps, and reinstall.

C. Remote Mounting of Drivers: Distance between the ballast and fixture shall not exceed that recommended by luminaire and driver manufacturer. Verify, with driver manufacturers, maximum distance between driver and luminaire.

D. Lay-in Ceiling Lighting Fixtures Supports: Use grid as a support element.

1. Install ceiling support system rods or wires, independent of the ceiling suspension devices, for each fixture. Locate not more than 6 inches from lighting fixture corners at minimum of two corners.

2. Support Clips: Fasten to lighting fixtures and to ceiling grid members at or near each fixture corner with clips that are UL listed for the application.

3. Fixtures of Sizes Less Than Ceiling Grid: Install as indicated on reflected ceiling plans or center in acoustical panel, and support fixtures independently with at least two 3/4-inch metal channels spanning and secured to ceiling tees.

4. Install at least two independent support rod or wire from structure to a tab on lighting fixture. Wire or rod shall have breaking strength of the weight of fixture at a safety factor of 3.

E. Suspended Lighting Fixture Support:

1. Do not use grid as support for pendant luminaires. Connect support wires or rods to building structure.

F. Connect wiring according to Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."

3.2 IDENTIFICATION

A. Install labels with panel and circuit numbers on concealed junction and outlet boxes. Comply with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."

3.3 FIELD QUALITY CONTROL

A. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery and retransfer to normal.

B. Test all dimmed luminaires with manual and automatic dimming controls. Verify proper dimming from low output to full output with each device type.

C. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

3.4 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting aim-able luminaires to suit actual occupied conditions. Provide up to one visits to Project during other-than-normal occupancy hours for this purpose. Some of this work may be required after dark.

1. Adjust aim-able luminaires in the presence of Architect.

3.5 SPARE PARTS AND TOOLS

A. Replace non-functioning lamps at time of final acceptance and provide 20% spare lamps for each lamp type on project.

END OF SECTION 265100

SECTION 270000 - COMMUNICATIONS

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following:
   1. Information Technology

1.03 Related Sections

A. Division 26 - Conduit

1.04 SYSTEM DESCIPTION

A. The low voltage system shall be designed by the subcontractor as a complete system. All components of the system shall be designed, supplied, specified, and installed by the same vendor to meet Douglas County requirements.

B. Douglas County Requirements:
   1. Access Points:
      a) Provide one access point for every 3,000 square feet of work area.
      b) Locate access points based on self-performed heat map study.
   2. Provide 2 Cat 6A cables for every unit of office furniture and built in casework workstation.
   3. Provide 2 Cat 6A cables at the printer.
   4. Provide 1 Cat 6a at peripherals.

1.05 SUBMITTALS

A. Design: Provide shop drawings for review by the county.

B. Product Data: Provide data on cabling, cable hangers, access points, jacks, faceplates, and outlets.

C. Shop Drawings.

D. Project Record Documents.

1.06 QUALIFICATIONS

A. Installer: The company providing and installing the products specified in this Section shall have a minimum of 10 years' experience.

PART 2 – PRODUCTS

2.01 PREFERRED VENDOR

A. S-COMM Fiber
   1. Stacy Martin
      smartin@s-commfiber.com
      (303) 907-5210

PART 3 – EXECUTION

3.01 EXECUTION

A. Verify site conditions under provisions of Section 017300 Execution.

END OF SECTION 270000