PROJECT MANUAL

CONSTRUCTION DOCUMENTS SPECIFICATIONS

ARCHITECTURAL PROJECT SPECIFICATION

WRK.ULO2302

23 AUGUST 2024

GOTTSCHALK HALL

EXTERIOR IMPROVEMENTS

2301 S. THIRD STREET

LOUISVILLE, KY 40208

ARCHITECT

WorK Architecture + Design

127 S. 6th Street

Louisville, KY 40202

502.632.3232

OWNER

University of Louisville

2215 S. Third Street

Louisville, KY 40208

CONSTRUCTOR

TBD

SECTION 00000

INDEX TO PROJECT MANUAL

END OF SECTION

SECTION 00020
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PART 1 GENERAL

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END OF SECTION

WORK
ARCHITECTURE
DESIGN

DIVISION 01

GENERAL REQUIREMENTS

SECTION 01010
SUMMARY OF WORK

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Work covered by Contract Documents.
B. Coordination of Work by Owner and Work by Contractor.

1.02 WORK COVERED BY CONTRACT DOCUMENTS
A. This project encompasses the limited exterior restoration of Gottschalk Hall, a circa 1887 building primarily used for classrooms and offices on the University of Louisville Campus. Improvements primarily include new windows. The Contractor will be responsible for the complete coordination of all work associated with this Project.
B. Project Location: 2301 S. 3rd Street, Louisville, KY 40208 Building #10
C. General Building Construction Documents were prepared for this Project by WorK Architecture + Design, 127 S. 6TH ST, Louisville, KY 40202.

1.03 COORDINATION OF WORK BY OWNER AND WORK BY CONTRACTOR
A. Owner Furnished Items:
1. Items noted "OFOI" (Owner Furnished, Owner Installed) will be furnished and installed by the Owner. The Contractor shall be responsible for receiving, storing, protecting, providing all rough-in services, and providing all mechanical and electrical connections.
2. Items noted "OFCI" (Owner Furnished, Contractor Installed) will be furnished by the Owner and installed by the Contractor. The Contractor shall be responsible for receiving, storing, protecting, providing all rough-in services, providing all mechanical and electrical connections, and installation and testing of the equipment or system.
3. The Owner will arrange for and deliver necessary shop drawings, product data, and samples to the Contractor for O.F.O.I./O.F.C.I. items.
4. The Owner will arrange and pay for delivery of O.F.O.I./O.F.C.I. items according to the Contractor's Construction Schedule.
5. Following delivery, the Owner will inspect O.F.O.I./O.F.C.I. items for damage.
6. If O.F.O.I./O.F.C.I. items are damaged, defective, or missing, the Owner will arrange for replacement.
7. The Owner will arrange for manufacturer's field services and for the delivery of manufacturer's warranties to the appropriate Contractor.
8. The Contractor shall designate delivery dates of O.F.O.I./O.F.C.I. items in the Contractor's Construction Schedule.
9. The Contractor shall review shop drawings, product data, and samples and return them to the Architect noting discrepancies or problems anticipated in the use of any O.F.O.I./O.F.C.I. item.
10. The Contractor shall be responsible for receiving, unloading, and handling O.F.O.I./O.F.C.I. items at the site.
11. The Contractor shall be responsible for protecting O.F.O.I./O.F.C.I. items from damage, including damage from exposure to elements. The Contractor shall repair or replace items damaged as a result of his operations.

B. Contractor Furnished Items:
1. All items, unless otherwise noted, and items noted "CFCI" (Contractor Furnished, Contractor Installed) shall be furnished and installed by the Contractor. The Contractor shall be responsible for ordering, receiving, storing, protecting, providing all rough in services, providing all mechanical and electrical connections, and installation and testing of the equipment or system.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

END OF SECTION

SECTION 01039
COORDINATION AND MEETINGS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Coordination.

B. Field Engineering.

C. Alteration Project Procedures.

D. Cutting and Patching.

E. Preconstruction and Site Mobilization Conference.

F. Progress Meetings.

G. Pre-installation Conferences.

1.02 COORDINATION
A. Coordinate scheduling, submittals, and Work of the various Sections of specifications to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

B. Verify that utility requirement characteristics of operating equipment are compatible with building utilities. Coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

C. Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

D. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

E. Coordinate completion and clean-up of Work of separate Sections in preparation for Substantial Completion.

F. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.03 FIELD ENGINEERING
A. Employ a Land Surveyor registered in the jurisdiction in which the Project is located and acceptable to the Architect/Engineer.

B. Contractor to locate and protect survey control and reference points.

C. Control datum for survey is shown on Drawings.

D. Provide field engineering services. Establish elevations, lines, and levels, utilizing recognized engineering practices.

E. Submit a copy of registered site drawing and certificate signed by the Land Surveyor that the elevations and locations of the Work are in conformance with the Contract Documents.

1.04 ALTERATION PROJECT PROCEDURES
A. Materials: As specified in product Sections. Match existing products and work for patching and extending work.

B. Close openings in exterior surfaces to protect existing work from weather and extremes of temperature/humidity.

C. Remove, cut, and patch work in a manner to minimize damage and to provide a means of restoring products and finishes to original and or specified condition.

D. Refinish visible existing surfaces to remain in renovated rooms and spaces, to specified condition for each material, with a neat transition to adjacent finishes.

E. Where new work abuts or aligns with existing, perform a smooth and even transition. Patched work to match existing adjacent work in texture and appearance.

F. When finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect/Engineer.

G. Where a change of plane of 1/4 inch or more occurs, submit recommendation for providing a smooth transition for Architect/Engineer review.

H. Patch or replace portions of existing surfaces which are damaged, lifted, discolored, or showing other imperfections.

I. Finish surfaces as specified in individual product Sections.

1.05 CUTTING AND PATCHING

A. Employ skilled and experienced installer to perform cutting and patching.

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

C. Execute cutting, fitting, and patching including excavation and fill, to complete Work, and to:
   1. Fit the several parts together, to integrate with other Work.
   2. Uncover Work to install or correct ill-timed Work.
   3. Remove and replace defective and non-conforming Work.
   4. Remove samples of installed Work for testing.
   5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.

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

E. Cut rigid materials using masonry saw or core drill.

F. Restore Work with new products in accordance with requirements of Contract Documents.

G. Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

H. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

I. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.

J. Identify any hazardous substance or condition exposed during the Work to the Architect/Engineer for decision or remedy.

1.06 PRECONSTRUCTION/SITE MOBILIZATION CONFERENCE

A. Owner will schedule Conference after Notice to Proceed.

B. Attendance Required: Owner, Architect/Engineer, Contractor, and major Subcontractors.

C. Agenda:
   1. Execution of Owner/Contractor Agreement.
   2. Submission of executed bonds and insurance certificates.
   3. Distribution of Contract Documents.
   4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
   5. Designation of personnel representing the parties in Contract, including the Owner and the Architect/ Engineer.
   6. Procedures and processing of field decisions, submittals, substitutions, applications for payment, proposal requests, change orders and contract closeout procedures.
   7. Scheduling.
   8. Use of premises by Owner and Contractor.
   9. Infection/dust control procedures.
   10. Owner's requirements.
   11. Construction facilities and controls provided by Owner.
   12. Temporary utilities provided by Owner.
   13. Survey and building layout.

14. Security procedures.
15. Procedures for testing.
16. Procedures for maintaining record documents.
17. Requirements for start-up of equipment.
18. Inspection and acceptance of equipment put into service during construction period.

1.07 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at maximum once every other week intervals.

B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings, record minutes, and distribute copies within two days to Architect/Engineer, Owner, participants, and those affected by decisions made.

C. Attendance Required: Job superintendent, major subcontractors and suppliers, and Owner, as appropriate to agenda topics for each meeting.

D. The Contractor shall prepare and issue appropriate Meeting Agendas and Attendance Records for use during all meetings as follows:
   1. Review minutes of previous meetings.
   2. Review of Work progress.
   3. Field observations, problems, and decisions.
   4. Identification of problems which impede planned progress.
   5. Review of submittals schedule and status of submittals.
   6. Review of off-site fabrication and delivery schedules.
   7. Maintenance of progress schedule.
   8. Corrective measures to regain projected schedules.
   9. Planned progress during succeeding work period.
   10. Coordination of projected progress.
   11. Maintenance of quality and work standards.
   12. Effect of proposed changes on progress schedule and coordination.
   13. Other business relating to Work.

1.08 PREINSTALLATION CONFERENCES

A. When required in an individual specification Section, convene a preinstallation conference at Work site prior to commencing Work of the Section.

B. Require attendance of parties directly affecting, or affected by, work of the specific Section.

C. Notify Architect/Engineer four days in advance of meeting date.

D. Prepare agenda, preside at conference, record minutes, and distribute copies within two days after conference to participants, with two copies to Architect/Engineer, and Owner.

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

F. **Exterior Materials Pre-Installation Conference**: The Contractor shall schedule and conduct an Exterior Materials Pre-Installation Conference prior to commencement of exterior wall construction. Required attendance shall include the Contractor, Owner, and Architect - plus representatives of the following trades: Masonry, Exterior Wall Framing, Building Insulation, Exterior Insulation and Finish System, Weather Resistant Membranes (including the local Weather Resistant Membrane product representative), Insulated Metal Wall Panels, Composite Metal Panels, Single-Ply Membrane Roofing System, Sheet Metal Roofing, Sheet Metal Flashing and Trim, Aluminum Storefront/Entrances and Curtain Wall, and Gypsum Wall Board.

G. **Owner-Furnished Equipment Pre-Installation Conference:** The Contractor shall schedule and conduct an Owner-Furnished Equipment Pre-Installation Conference prior to the commencement of rough-in activities for owner-furnished equipment. Required attendance shall include the Contractor, Owner, Architect, Mechanical/Electrical Engineer, Equipment Planner, Communications Systems Planner, and all affected Equipment Vendors - plus representatives of the following trades: Plumbing, Mechanical, and Electrical.

END OF SECTION

SECTION 01230
ALTERNATES

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Section includes administrative and procedural requirements for alternates.

1.02 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specifications, apply to this Section.

1.03 DEFINITIONS
A. Alternate: An amount proposed by bidders and state don the Bid Form for certain work defined in the bidding requirements that ay be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
    a. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
    b. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.04 PROCEDURES
A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into the Project.
    a. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated revisions to alternates.
C. Execute accepted alternates under the same conditions as other work of the Contract.
D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.01 SCHEDULE OF ALTERNATES
A. Alternate No. 01: Window Treatments
    a. Base Bid: Remove and reinstall window treatments.
    b. Alternate: Remove and discard window treatments.
B. Alternate No. 02: Windows
    a. Base Bid: Provide aluminum-clad wood historic replacement windows that meet the following sound requirements minimums: 32 STC and 26 OITC. Windows must follow all other specified requirements in Section 08511 of the Project Manual.
    b. Alternate: Provide aluminum-clad wood historic replacement windows that meet the following sound requirements: FAA and LRAA recommendations for aircraft noise compatibility minimum 40 STC and 30 OITC. Windows must follow all other specified requirements in Section 08511 of the Project Manual.

END OF SECTION

SECTION 01260

REQUEST FOR INTERPRETATION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section includes administrative and procedural requirements for handling and processing Requests for Interpretation.

1.03 DEFINITIONS

A. Requests for Interpretation (RFI): Contractor initiated written instrument related to the execution of the Work that is addressed to the Architect. The RFI shall be used by the Contractor as the means to ask questions related to the Work; subject to the conditions contained within this Section.

1.04 ACTION SUBMITTALS

A. Requests for Interpretation: Include a detailed, legible description of an 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. Reference to appropriate documents:
      a. Specification Section number and title and related paragraphs.
      b. Drawing number and detail references.
      c. Schedule.
      d. Bulletin number.
      e. Other Contract Documents, if any.
   9. Field dimensions and conditions, as appropriate.
   10. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
   11. Contractor's and RFI Manager's signature.
   12. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
      a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
   13. Attachments shall be electronic files in Adobe Acrobat PDF format.

1.05 INFORMATIONAL SUBMITTALS

A. RFI Log: Prepare, maintain, and submit a tabular log of RFI organized by the RFI number. Submit log weekly. Include the following:
   1. Project name.
   2. Name and address of Contractor.
   3. Name and address of Architect.
   4. RFI number including RFIs that were returned without action or withdrawn.
   5. RFI description.
   6. Date the RFI was submitted.
   7. Date Architect's response was received.

1.06 QUALITY ASSURANCE

A. Authorship: Prior to the commencement of the RFI process, designate a full time "RFI Manager" whose duties shall include the responsibility for enforcing the Request for Interpretation provisions of this Section, to maintain an up-to-date log of all RFI, advise the Architect, in writing, of the status and disposition of all RFI at the progress meetings, and be a member of the Contractor's staff. The RFI Manager shall be experienced in administration and supervision of the type of Work indicated on the Contract Documents.
   1. RFI Manager may be the Contractor's Job Superintendent.
   2. Each RFI shall originate solely from the RFI Manager. An RFI submitted to the Architect by an entity, or individual, other than the RFI Manager shall be returned to the Contractor.

1.07 ADMINISTRATIVE REQUIREMENTS

A. Processing Time: Allow five working days for Architect's response for each RFI. RFI received by Architect after 3:00 p.m. will be considered as received the following business day.
   1. Allow additional time if coordination with other work is required. Architect will advise Contractor when a RFI being processed must be delayed for coordination.
   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.

B. Architect's action on RFI that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Proposal Request according to Section 01 26 00 "Contract Modification Procedures."
   1. 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.

C. Frivolous RFI:
   1. RFI shall not be used for the following:
      a. Request for approval of submittals.
      b. Request approval of substitutions.
      c. Requests for approval of Contractor's means and methods.
      d. Request for adjustment in the Contract Time or the Contract Sum.
      e. Requests for interpretation of Architect's actions on submittals.
      f. Requests for coordination information already indicated in the Contract Documents, or to transfer coordination responsibility from the Contractor to the Owner or Architect.
      g. Incomplete RFI or inaccurately prepared RFI.
   2. The Owner reserves the right to assess the Contractor for the cost (based on time and materials) of a RFI response performed by the Architect, and any of its consultants, which is deemed by the Owner and the Architect as being frivolous or unnecessary.
   3. Frivolous RFI shall be removed from the RFI log.

1.08 COORDINATION

A. Coordination: Coordinate preparation and processing of RFI with performance of construction activities.
   1. Submit RFI with such promptness as to cause no delays in the Work. No adjustments of Contract Time or Contract Sum will be granted because of failure to have an RFI submitted with sufficient time to allow for the orderly processing of a response by the Architect.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.01 CONTRACTOR'S ACTION

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, prepare and submit an RFI in the form specified.

B. Prior to submission of the RFI, coordinate the nature of the inquiry with the requirements of other Sections or trades as related thereto and responses to previous RFI.

C. Complete each blank on the RFI form.

D. In preparing each RFI, verify the applicable dimension(s), field conditions, Drawing requirements (small through large scale details), and/or Specification Section requirements pertaining thereto.

E. Each RFI shall be reviewed and signed by the RFI Manager prior to transmitting to the Architect.

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.

3.02 ARCHITECT'S ACTION

A. Architect's Action: Architect will review each RFI, determine action required, and respond.
   1. Frivolous RFI will be returned without action.

B. RFI which fail to conform to requirements, (for example, is incomplete or contain numerous errors) shall be returned to the Contractor without a response. No adjustments for Contract Time or Contract Sum shall be granted for an RFI failing to conform to requirements.

END OF SECTION

SECTION 01300
SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Submittal Procedures.

B. Construction Progress Schedules.

C. Proposed Products List.

D. Shop Drawings.

E. Product Data.

F. Samples.

G. Manufacturers' Instructions.

H. Manufacturers' Certificates.

I. Construction Photographs.

1.02 RELATED SECTIONS
A. Section 01019 - Contract Considerations: Schedule of values.

B. Section 01400 - Quality Control: Manufacturers' field services and reports.

C. Section 01700 - Contract Closeout: Contract, warranty and manufacturer's certificates, and closeout submittals.

1.03 SUBMITTAL PROCEDURES
A. Transmit each submittal with Architect/Engineer accepted form.

B. Sequentially number the transmittal forms. Resubmittals to have original number with an alphabetic suffix.

C. Identify Project, Contractor, Subcontractor or supplier; pertinent Drawing sheet and detail number(s), and specification Section number, as appropriate.

D. Apply Contractor's stamp, signed or initialed certifying that review, verification of Products required, field dimensions, adjacent construction Work, and coordination of information, is in accordance with the requirements of the Work and Contract Documents.

E. Schedule submittals to expedite the Project and deliver to Architect/Engineer at business address. Coordinate submission of related items.

F. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.

G. Provide space for Contractor and Architect/Engineer review stamps.

H. Revise and resubmit submittals as required, identify all changes made since previous submittal.

I. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

1.04 CONSTRUCTION PROGRESS SCHEDULES
A. Submit initial progress schedule in duplicate within 15 days after date established in Notice to Proceed for Architect/Engineer review.

B. Revise and resubmit as required.

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

D. Submit a computer-generated chart with separate line for each major section of Work or operation, identifying first work day of each week.

E. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates, and duration.

F. Indicate estimated percentage of completion for each item of Work at each submission.

G. Indicate submittal dates required for Shop Drawings, product data, samples, and product delivery dates, including those furnished by Owner and under Allowances.

1.05 PROPOSED PRODUCTS LIST

A. Within 15 days after date of Notice to Proceed, submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.06 SHOP DRAWINGS

A. Submit the number of opaque reproductions which Contractor requires, plus two copies which will be retained by Architect/Engineer, and Owner.

B. After review, reproduce and distribute in accordance with Article on Procedures above and for Record Documents described in Section 01700 - Contract Closeout.

1.07 PRODUCT DATA

A. Submit the number of copies which the Contractor requires, plus two copies which will be retained by the Architect/Engineer and Owner.

B. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information unique to this Project.

C. After review, distribute in accordance with Article on Procedures above and provide copies for Record Documents described in Section 01700 - Contract Closeout.

1.08 SAMPLES

A. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

B. Submit samples of finishes from the full range of manufacturers' standard colors in custom colors selected, textures, and patterns for Architect/Engineer's selection.

C. Include identification on each sample, with full Project information.

D. Submit the number or samples specified in individual specification Sections; one of which will be retained by Architect/Engineer.

1.09 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual specification Sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, in quantities specified for Product Data.

B. Identify conflicts between manufacturers' instructions and Contract Documents.

1.10 MANUFACTURER'S CERTIFICATES

A. When specified in individual specification Sections, submit manufacturers' certificate to Architect/Engineer for review, in quantities specified for Product Data.

B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference date, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or Product but must be acceptable to Architect/Engineer.

1.11 CONSTRUCTION PHOTOGRAPHS

A. Monthly, submit printed copies of digital photographs indicating progress of major components of project to Architect/Engineer with Application for Payment.

B. Photographs: Color, digital copies, minimum 300 DPI at 5" x 7" size.

C. Take a minimum of four site photographs from the same locations each period (including location(s) from top of existing Jouett Hall towards construction site), and other photographs as required to indicate the relative progress of the Work, 5 days maximum prior to submitting.

D. Identify photographs with date, time, orientation, and Project identification.

END OF SECTION 01300

SECTION 01320

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
   1. Startup construction schedule.
   2. Contractor's construction schedule.
   3. Daily construction reports.
   4. Material location reports.
   5. Site condition reports.
   6. Special reports.

B. Related Sections include the following:
   1. Section 01019 "Payment Procedures" for submitting the Schedule of Values.
   2. Section 01300 "Submittal Procedures" for submitting schedules and reports.
   4. Section 01400 "Quality Requirements" for submitting a schedule of tests and inspections.

1.03 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
   1. Critical activities are activities on the critical path. They must start and finish on the planned early start and finish times.
   2. Predecessor activity is an activity that must be completed before a given activity can be started.
   3. Successor Activity: An activity that follows another activity in the network.

B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

C. Critical Path: The longest continuous chain of activities through the network schedule that establishes the minimum overall Project duration and contains no float.

D. Event: The starting or ending point of an activity.

E. Float: The measure of leeway in starting and completing an activity.
   1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
   2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the following activity.
   3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

F. Fragnet: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.

G Major Area: A story of construction, a separate building, or a similar significant construction element.

H. Milestone: A key or critical point in time for reference or measurement.

I. Network Diagram: A graphic diagram of a network schedule, showing activities and activity relationships.

1.04 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format, unless indicated otherwise:
   1. PDF electronic file.

B. Startup construction schedule.

1. Approval of cost-loaded, startup construction schedule will not constitute approval of schedule of values for cost-loaded activities.

C. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.

D. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
1. Submit a working electronic copy of schedule, using software indicated, and labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label.

E. Construction Schedule Updating Reports: Submit with each Application for Payment.

F. Daily Construction Reports: Submit at weekly intervals.

G. Material Location Reports: Submit at weekly intervals.

H. Site Condition Reports: Submit at time of discovery of differing conditions.

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

J. Qualification Data: For scheduling consultant.

1.05 QUALITY ASSURANCE

A. Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting, with capability of producing CPM reports and diagrams within 24 hours of Architect's Project Manager's request.

B. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination." Review methods and procedures related to the Preliminary Construction Schedule and Contractor's Construction Schedule, including, but not limited to, the following:
1. Review software limitations and content and format for reports.
2. Verify availability of qualified personnel needed to develop and update schedule.
3. Discuss constraints, including phasing, work stages, area separations, interim milestones, and partial Owner occupancy.
4. Review delivery dates for Owner-furnished products.
5. Review schedule for work of Owner's separate contracts.
6. Review submittal requirements and procedures.
7. Review time required for review of submittals and resubmittals.
8. Review requirements for tests and inspections by independent testing and inspecting agencies.
9. Review time required for Project closeout and Owner startup procedures, including commissioning activities.
10. Review and finalize list of construction activities to be included in schedule.
11. Review procedures for updating schedule.

1.06 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

B. Coordinate Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.
1. Secure time commitments for performing critical elements of the Work from parties involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

C. Coordinate Contractor's construction schedule with Owner's construction schedule for Owner's own forces. Revise Contractor's construction schedule, if necessary, after a joint review and mutual agreement. The construction schedule shall then constitute the schedule to be used by Contractor, separate contractors and Owner until subsequently revised.

PART 2 PRODUCTS

2.01 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of final completion.
1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

B. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:
   1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
   2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
   3. Submittal Review Time: Include review and resubmittal times indicated in Section 01 33 00 "Submittal Procedures" in schedule. Include selection process activities for finishes and products specified by allowances or specified to be selected during the sample review process. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
   4. Startup and Testing Time: Include not less than 15 days for startup and testing.
   5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's and Project Manager's administrative procedures necessary for certification of Substantial Completion.
   6. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.
   7. Demonstration and Training: Training of Owner's personnel as indicated in Section

C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
   1. Phasing: Arrange list of activities on schedule by phase.
   2. Work under More Than One Contract: Include a separate activity for each contract.
   3. Work Restrictions: Show the effect of the following items on the schedule:
      a. Coordination with existing construction.
      b. Limitations of continued occupancies.
      c. Uninterruptible services.
      d. Partial occupancy before Substantial Completion.
      e. Use of premises restrictions.
      f. Provisions for future construction.
      g. Seasonal variations.
      h. Environmental control.
   4. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
      a. Subcontract awards.
      b. Submittals.
      c. Purchases.
      d. Mockups.
      e. Fabrication.
      f. Sample testing.
      g. Deliveries.
      h. Installation.
      i. Tests and inspections.
      j. Adjusting.
      k. Curing.
      l. Building flush-out.
      m. Startup and placement into final use and operation.
   5. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
      a. Structural completion.
      b. Temporary enclosure and space conditioning.
      c. Permanent space enclosure.
      d. Completion of mechanical installation.
      e. Completion of electrical installation.
      f. Substantial Completion.

D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion.

E. Cost Correlation: At the head of schedule, provide a cost correlation line, indicating planned and actual costs. On the line, show dollar volume of the Work performed as of dates used for preparation of payment requests.
   1. Refer to Section 01019 "Payment Procedures" for cost reporting and payment procedures.

F. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
   1. Unresolved issues.
   2. Unanswered RFI.
   3. Rejected or unreturned submittals.
   4. Notations on returned submittals.
   5. Pending modifications affecting the Work and Contract Time.

G. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.

H. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules. Coordinate with Architect regarding which project management software will be used on the Project.

2.02 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

A. General: Prepare network diagrams using AON (activity-on-node) format.

B. Startup Network Diagram: Submit diagram within 14 days of date established for the Notice to Proceed. Outline significant construction activities for the first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

C. CPM Schedule: Prepare Contractor's Construction Schedule using a time-scaled CPM network analysis diagram for the Work.
   1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 30 days after date established for the Notice to Proceed.
      a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Architect's approval of the schedule.
   2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
   3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
   4. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule in order to coordinate with the Contract Time.

D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the preliminary network diagram, prepare a skeleton network to identify probable critical paths.
   1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
      a. Preparation and processing of submittals.
      b. Mobilization and demobilization.
      c. Purchase of materials.
      d. Delivery.
      e. Fabrication.
      f. Utility interruptions.
      g. Installation.
      h. Work by Owner that may affect or be affected by Contractor's activities.
      i. Testing and commissioning.
      j. Punch list and final completion.

k. Activities occurring following final completion.

2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
3. Processing: Process data to produce output data or a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
   a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.

E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall project schedule.

F. Initial Issue of Schedule: Prepare initial network diagram from a list of straight "early start total float" sort. Identify critical activities. Prepare tabulated reports showing the following:
1. Contractor or subcontractor and the Work or activity.
2. Description of activity.
3. Principal events of activity.
4. Immediate preceding and succeeding activities.
5. Early and late start dates.
6. Early and late finish dates.
7. Activity duration in workdays.
8. Total float or slack time.
9. Average size of workforce.
10. Dollar value of activity (coordinated with the Schedule of Values).

G. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
1. Identification of activities that have changed.
2. Changes in early and late start dates.
3. Changes in early and late finish dates.
4. Changes in activity durations in workdays.
5. Changes in the critical path.
6. Changes in total float or slack time.
7. Changes in the Contract Time.

2.03 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. Equipment at Project site.
5. Material deliveries.
6. High and low temperatures and general weather conditions, including rain or snow accumulation.
7. Accidents.
8. Meetings and significant decisions.
9. Unusual events (refer to special reports).
10. Stoppages, delays, shortages, and losses.
11. Meter readings and similar recordings.
12. Tests and inspections, including name(s) of testing and inspection agency(ies).
13. Emergency procedures.
14. Orders and requests of authorities having jurisdiction.
15. Change Orders received and implemented.
16. Construction Change Directives received and implemented.
17. Services connected and disconnected.

18. Equipment or system tests and startups.
19. Partial Completions and occupancies.
20. Substantial Completions authorized.

B. Material Location Reports: At weekly intervals, prepare a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:
   1. Material stored prior to previous report and remaining in storage.
   2. Material stored prior to previous report and since removed from storage and installed.
   3. Material stored following previous report and remaining in storage.

C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare a detailed report. Submit with a Request for Interpretation (RFI). Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.04 SPECIAL REPORTS

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

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

PART 3 EXECUTION

3.01 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Scheduling Consultant: Engage a consultant to provide planning, evaluation, and reporting using CPM scheduling.
   1. In-House Option: Owner may waive the requirement to retain a consultant if Contractor employs skilled personnel with experience in CPM scheduling and reporting techniques. Submit qualifications.
   2. Meetings: Scheduling consultant shall attend all meetings related to Project progress, alleged delays, and time impact

B. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
   1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
   2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
   3. As the Work progresses, indicate Actual Completion percentage for each activity.
   4. Notify Owner, Project Manager, and Architect a minimum of one week prior to issuance of updated schedule of all anticipated significant revisions to the Construction Schedule.

C. Distribution: Distribute copies of approved schedule to Architect, Project Manager, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
   1. Post electronic copies of the updated project schedule on the project website.
   2. Post copies in Project meeting rooms and temporary field offices.
   3. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION

SECTION 013591
HISTORICAL TREATMENT PROCEDURES

PART 1 GENERAL

1.0 SUMMARY

A. Section includes general protection and treatment procedures for designated historic spaces, areas, rooms, and surfaces in Project and the following specific work:
   1. Historic removal and dismantling.

1.1 DEFINITIONS

A. Consolidate: To strengthen loose or deteriorated materials in place.

B. Dismantle: To disassemble and detach items by hand from existing construction to the limits indicated, using small hand tools and small one-hand power tools, so as to protect nearby historic surfaces; and legally dispose of dismantled items off-site, unless indicated to be salvaged or reinstalled.

C. Existing to Remain: Existing items that are not to be removed or dismantled.

D. Historic: Spaces, areas, rooms, surfaces, materials, finishes, and overall appearance which are important to the successful preservation restoration and reconstruction as determined by Architect. Designated historic spaces areas rooms and surfaces are indicated on Drawings.

E. Match: To blend with adjacent construction and manifest no apparent difference in material type, species, cut, form, detail, color, grain, texture, or finish; as approved by Architect.

F. Reconstruct: To remove existing item, replicate damaged or missing components, and reinstall in original position.

G. Refinish: To remove existing finishes to base material and apply new finish to match original, or as otherwise indicated.

H. Reinstall: To protect removed or dismantled item, repair and clean it as indicated for reuse, and reinstall it in original position, or where indicated.

I. Remove: Specifically, for historic spaces, areas, rooms, and surfaces, the term means to detach an item from existing construction to the limits indicated, using hand tools and hand-operated power equipment, and legally dispose of it off-site, unless indicated to be salvaged or reinstalled.

J. Repair: To correct damage and defects, retaining existing materials, features, and finishes while employing as little new material as possible. Includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials.

K. Replace: To remove, duplicate, and reinstall entire item with new material. The original item is the pattern for creating duplicates unless otherwise indicated.

L. Replicate: To reproduce in exact detail, materials, and finish unless otherwise indicated.

M. Reproduce: To fabricate a new item, accurate in detail to the original, and in either the same or a similar material as the original, unless otherwise indicated.

N. Restore: To consolidate, replicate, reproduce, repair, and refinish as required to achieve the indicated results.

O. Retain: To keep existing items that are not to be removed or dismantled.

P. Reversible: New construction work, treatments, or processes that can be removed or undone in the future without damaging historic materials unless otherwise indicated.

Q. Salvage: To protect removed or dismantled items and deliver them to Owner ready for reuse.

R. Stabilize: To provide structural reinforcement of unsafe or deteriorated items while maintaining the essential form as it exists at present; also, to reestablish a weather-resistant enclosure.

S. Strip: To remove existing finish down to base material unless otherwise indicated.

1.2 INFORMATIONAL SUBMITTALS

A. Construction Schedule for Historic Treatments: Indicate for entire Project the following for each activity to be performed in historic spaces, areas, and rooms, and on historic surfaces:
   1. Detailed sequence of historic treatment work, with starting and ending dates, coordinated with Owner's continuing operations and other known work in progress.
   2. Utility Services: Indicate how long utility services will be interrupted.
   3. Use of elevator and stairs.

B. Preconstruction Documentation: Show preexisting conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by Contractor's historic treatment operations.

C. Historic Treatment Program: Submit before work begins.

1.3 STORAGE AND PROTECTION OF HISTORIC MATERIALS

A. Salvaged Historic Materials:
   1. Clean only loose debris from salvaged historic items unless more extensive cleaning is indicated.
   2. Pack or crate items after cleaning; cushion against damage during handling.
   3. Label contents of containers.
   4. Store items in a secure area until delivery to Owner.
   5. Transport items to Owner's storage area on-site.
   6. Protect items from damage during transport and storage.

B. Historic Materials for Reinstallation:
   1. Repair and clean historic items as indicated and to functional condition for reuse.
   2. Pack or crate items after cleaning and repairing; cushion against damage during handling. Label contents of containers.
   3. Protect items from damage during transport and storage.
   4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment unless otherwise indicated. Provide connections, supports, and miscellaneous materials to make item functional for use indicated.

C. Existing Historic Materials to Remain: Protect construction indicated to remain against damage and soiling from construction work. Where permitted by Architect, items may be dismantled and taken to a suitable, protected storage location during construction work and reinstalled in their original locations after historic treatment and construction work in the vicinity is complete.

D. Storage and Protection: When taken from their existing locations, catalog and store historic items within a weathertight enclosure where they are protected from wetting by rain, snow, condensation, or ground water, and from freezing temperatures.
   1. Identify each item with a nonpermanent mark to document its original location. Indicate original locations on plans elevations, sections, or photographs by annotating the identifying marks.
   2. Secure stored materials to protect from theft.

1.4 PROJECT CONDITIONS

A. Hazardous Materials: Hazardous materials are present in construction affected by removal and dismantling work. A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.

B. Storage or sale of removed or dismantled items on-site is not permitted unless otherwise indicated.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 EXAMINATION

A. Preparation for Removal and Dismantling: Examine construction to be removed or dismantled to determine best methods to safely and effectively perform removal and dismantling work. Examine adjacent work to determine what protective measures will be necessary. Make explorations, probes, and inquiries as necessary to determine condition of construction to be removed or dismantled and location of utilities and services to remain that may be hidden by construction that is to be removed or dismantled.
   1. Verify that affected utilities have been disconnected and capped.
   2. Inventory and record the condition of items to be removed and dismantled for reinstallation or salvage.
   3. Before removal or dismantling of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.
   4. Engage a professional engineer to survey condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures as a result of removal and dismantling work.

B. Survey of Existing Conditions: Record existing conditions by use of measured drawings and preconstruction photographs.

C. Perform surveys as the Work progresses to detect hazards resulting from historic treatment procedures.

3.2 PROTECTION, GENERAL

A. Protect persons, motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm resulting from historic treatment procedures.
   1. Use only proven protection methods, appropriate to each area and surface being protected.
   2. Provide barricades, barriers, and temporary directional signage to exclude public from areas where historic treatment work is being performed.
   3. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during course of historic treatment work.
   4. Contain dust and debris generated by removal and dismantling work and prevent it from reaching the public or adjacent surfaces.
   5. Provide shoring, bracing, and supports as necessary. Do not overload structural elements.
   6. Protect floors and other surfaces along haul routes from damage, wear, and staining.
   7. Provide supplemental sound-control treatment to isolate removal and dismantling work from other areas of the building.

B. Temporary Protection of Historic Materials:
   1. Protect existing historic materials with temporary protections and construction. Do not deface or remove existing materials.
   2. Do not attach temporary protection to historic surfaces except as indicated as part of the historic treatment program and approved by Architect.

C. Comply with each product manufacturer's written instructions for protections and precautions. Protect against adverse effects of products and procedures on people and adjacent materials, components, and vegetation.

D. Utility and Communications Services:
   1. Notify Owner, Architect, authorities having jurisdiction, and entities owning or controlling wires, conduits, pipes, and other services affected by the historic treatment work before commencing operations.

2. Disconnect and cap pipes and services as required by authorities having jurisdiction, as required for the historic treatment work.
3. Maintain existing services unless otherwise indicated; keep in service and protect against damage during operations. Provide temporary services during interruptions to existing utilities.

E. Existing Drains: Prior to the start of work in an area, test drainage system to ensure that it is functioning properly. Notify Architect immediately of inadequate drainage or blockage. Do not begin work in an area until the drainage system is in working order.
1. Prevent solids such as stone or mortar residue from entering the drainage system. Clean out drains and drain lines that become sluggish or blocked by sand or other materials resulting from historic treatment work.
2. Protect drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.

F. Existing Roofing: Prior to the start of work in an area, install roofing protection as indicated.

3.3 PROTECTION DURING APPLICATION OF CHEMICALS

A. Protect motor vehicles, surrounding surfaces of building being restored, building site, plants, and surrounding buildings from harm or damage resulting from applications of chemical cleaners and paint removers.

B. Cover adjacent surfaces with protective materials that are proven to resist chemicals selected for Project unless chemicals being used will not damage adjacent surfaces as indicated in historic treatment program. Use covering materials and masking agents that are waterproof, UV resistant, and will not stain or leave residue on surfaces to which they are applied. Apply protective materials according to manufacturer's written instructions. Do not apply liquid masking agents or adhesives to painted or porous surfaces. When no longer needed, promptly remove protective materials staining.

C. Do not apply chemicals during winds of sufficient force to spread them to unprotected surfaces.

D. Neutralize and collect alkaline and acid wastes and legally dispose of off Owner's property.

E. Collect and dispose of runoff from chemical operations by legal means and in a manner, that prevents soil contamination, soil erosion, undermining of paving and foundations, damage to landscaping, or water penetration into building interior.

3.4 GENERAL HISTORIC TREATMENT

A. Halt the process of deterioration and stabilize conditions, unless otherwise indicated. Perform work as indicated on Drawings. Follow the procedures in subparagraphs below and procedures approved in historic treatment program:
1. Retain as much existing material as possible; repair and consolidate rather than replace.
2. Use additional material or structure to reinforce, strengthen, prop, tie, and support existing material or structure.
3. Use reversible processes wherever possible.
4. Use historically accurate repair and replacement materials and techniques unless otherwise indicated.
5. Record existing work before each procedure (preconstruction) and progress during the work with digital pre-construction documentation. Comply with requirements in Section 013233 "Photographic Documentation."

B. Notify Architect of visible changes in the integrity of material or components whether due to environmental causes including biological attack, UV degradation, freezing, or thawing; or due to structural defects including cracks, movement, or distortion.
1. Do not proceed with the work in question until directed by Architect.

C. Where missing features are indicated to be repaired or replaced, provide features whose designs are based on accurate duplications rather than on conjectural designs, subject to approval of Architect.

D. Where Work requires existing features to be removed or dismantled and reinstalled, perform these operations without damage to the material itself, to adjacent materials, or to the substrate.

E. Identify new and replacement materials and features with permanent marks hidden in the completed work to distinguish them from original materials. Record a legend of identification marks and the locations of the items on record Drawings.

3.5 HISTORIC REMOVAL AND DISMANTLING

A. General: Have removal and dismantling work performed by a qualified historic treatment specialist.

B. Perform work according to the historic treatment program.

C. Water-Mist Sprinkling: Use water-mist sprinkling and other wet methods to control dust only with adequate, approved procedures and equipment that ensure that such water will not create a hazard or adversely affect other building areas or materials.

D. Anchorages:
   1. Remove anchorages associated with removed items.
   2. Dismantle anchorages associated with dismantled items.
   3. In non-historic surfaces, patch holes created by anchorage removal or dismantling according to the requirements for new work.
   4. In historic surfaces, patch or repair holes created by anchorage removal or dismantling according to Section specific to the historic surface being patched.

END OF SECTION 01359

SECTION 01400
QUALITY CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Quality assurance and control of installation.

B. References.

C. Industry Standards

D. Field samples.

E. Mock-ups.

F. Inspection and testing laboratory services.

G. Manufacturers' field services and reports.

1.02 RELATED SECTIONS
A. Section 01300 - Submittals: Submission of Manufacturers' Instructions and Certificates.

B. Section 01600 - Material and Equipment: Requirements for material and product quality.

1.03 QUALITY ASSURANCE/CONTROL OF INSTALLATION
A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce Work of specified quality.

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

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

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

E. Perform Work by persons qualified to produce workmanship of specified quality.

F. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

1.04 REFERENCES
A. Conform to reference standard by date of issue current as of date of Contract Documents.

B. Obtain copies of standards when required by Contract Documents.

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

D. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.05 INDUSTRY STANDARDS
A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents, except comply with standards having different revision dates as referenced in the codes as indicated on Drawings.

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

1.06 FIELD SAMPLES
A. Install field samples at the site as required by individual specifications Sections for review.

B. Acceptable samples represent a quality level for the Work.

C. Where field sample is specified in individual Sections to be removed, clear area after field sample has been accepted by Architect/Engineer.

1.07 MOCK-UPS

A. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish specified in individual Sections, to comply with the following requirements, using materials indicated for the completed Work.
   1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect or Construction Manager.
   2. Notify Architect and Construction Manager seven days in advance of dates and times when mockups will be constructed.
   3. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at Project.
   4. Demonstrate the proposed range of aesthetic effects and workmanship.
   5. Obtain Architect's and Construction Manager's approval of mockups before starting work, fabrication, or construction.
      a. Allow seven days for initial review and each re-review of each mockup.
   6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
   7. Demolish and remove mockups when directed, unless otherwise indicated.

1.08 INSPECTION AND TESTING LABORATORY SERVICES

A. Unless noted otherwise, Owner shall appoint, employ, and pay for services of and Contractor shall coordinate services of an independent firm to perform inspection and testing.

B. The independent firm will perform inspections, tests, and other services specified in individual specification Sections and as required by the Architect/Engineer.

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

D. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage and assistance as requested.
   1. Notify Architect/Engineer and independent firm hours prior to expected time for operations requiring services.
   2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.

E. Retesting required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the Architect/Engineer. Payment for retesting will be charged to the Contractor by deducting inspection or testing charges from the Contract Sum/Price.

1.09 MANUFACTURERS' FIELD SERVICES AND REPORTS

A. Submit qualifications of observer to Architect/Engineer 30 days in advance of required observations. Observer subject to approval of Architect/Engineer, and or Owner.

B. When specified in individual specification Sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, and test, adjust, and balance of equipment as applicable, and to initiate instructions when necessary.

C. Individuals to report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

D. Submit report in duplicate within 30 days of observation to Architect/Engineer for review.

E. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 01330 "Submittal Procedures"

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

END OF SECTION

SECTION 01500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary Utilities: Electricity, lighting, heat, ventilation, telephone service, water, and sanitary facilities.

B. Temporary Controls: Barriers, enclosures, protection of the Work, and water control.

C. Construction Facilities: Security, access roads, parking, progress cleaning, field offices and sheds, and removal of temporary utilities, facilities and controls.

1.02 RELATED SECTIONS

A. Section 01700 - Contract Closeout: Final cleaning.

1.03 TEMPORARY ELECTRICITY

A. Provide and pay for power service required from Utility source.

B. Provide temporary electric feeder from electrical service at location as directed.

C. Provide power outlets for construction operations, with branch wiring and distribution boxes located at each floor. Provide flexible power cords as required.

D. Provide main service disconnect and overcurrent protection at convenient location.

E. Permanent convenience receptacles may be utilized during construction.

F. Provide adequate distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting.
   1. Provide 20 ampere duplex outlets, single phase circuits for power tools for every 1000 sq ft of active work area.
   2. Provide 20 ampere, single phase branch circuits for lighting.

1.04 TEMPORARY LIGHTING

A. Provide and maintain lighting for construction operations to achieve a minimum lighting level of 2 watt/sq ft.

B. Provide and maintain 1 watt/sq ft lighting to exterior staging and storage areas after dark for security purposes.

C. Provide and maintain 0.25 watt/sq ft H.I.D. lighting to interior work areas after dark for security purposes.

D. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.

E. Maintain lighting and provide routine repairs.

F. Permanent building lighting may be utilized during construction.

1.05 TEMPORARY HEAT

A. Provide and pay for heat devices and heat as required to maintain specified conditions for construction operations.

B. Prior to operation of permanent equipment for temporary heating purposes, verify that installation is approved for operation, equipment is lubricated, and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.

C. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress, unless indicated otherwise in specifications.

1.06 TEMPORARY VENTILATION

A. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

B. Unless Owner authorizes use of permanent or existing HVAC system, provide independent vented, self-contained heaters with individual space thermostatic control.
   1. Permanent HVAC System: If Owner authorizes use of permanent or existing HVAC system, provide filter with a minimum MERV of 8 at each return air grille and clean HVAC system.

1.07 TEMPORARY TELEPHONE SERVICE

A. Provide, maintain and pay for telephone service to field office at time of Project mobilization.

1.08 TEMPORARY WATER SERVICE

A. Provide, maintain and pay for suitable quality water service required for construction operations. Level of quality shall be sufficient for any construction activities using the temporary water service.

B. Extend branch piping with outlets located so water is available by hoses with threaded connections. Provide temporary pipe insulation as necessary to prevent freezing.

1.09 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures.

1.10 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

B. Provide barricades and covered walkways required by governing authorities for public rights-of-way.

C. Provide protection for plant life designated to remain. Replace all plant life designated to remain which is damaged as a result of construction activities at no cost to owner.

D. Protect non-owned vehicular traffic, stored materials, site and adjacent structures from damage.

1.11 WATER CONTROL

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

B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

1.12 PROTECTION OF INSTALLED WORK

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

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

C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

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

F. Prohibit traffic from landscaped areas.

1.13 SECURITY

A. Provide security and facilities to protect Work from unauthorized entry, vandalism, or theft.

B. Protect with fencing any area of excavation or construction where the public may access the site area.

1.14 ACCESS ROADS

A. Construct and maintain temporary access to public thoroughfares to serve construction area.

B. Extend and relocate as Work progress requires. Provide detours necessary for unimpeded traffic flow around existing facility.

C. Provide and maintain access to fire hydrants, free of obstructions.

D. Unless otherwise noted locate temporary roads and paved areas in same location as existing and/or proposed permanent roads and paved areas.

E. Construct and maintain access to the Ekstrom Library loading dock for Library use.

1.15 PARKING

A. Arrange for off-site parking to accommodate construction personnel.

1.16 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing and continue cleaning to eliminate dust.

D. Remove waste materials, debris, and rubbish from site weekly and dispose off site. Continual inspections shall be performed to ensure excessive, damaging, or unsightly conditions are not present from waste materials.

1.17 FIELD OFFICES AND SHEDS

A. Provide space for Project meetings, with table and chairs to accommodate 10 persons.

B. Provide provisions and equipment for conference call capabilities.

C. Provide hard hats, vest, and other required personal safety accessories for 10 persons.

1.18 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary above grade or buried utilities, equipment, facilities, materials, prior to Substantial Completion inspection.

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

END OF SECTION

SECTION 01563

TEMPORARY TREE AND PLANT PROTECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes general protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.

1.2 DEFINITIONS

A. Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and indicated on Drawings.

1.3 SUBMITTALS

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

B. Samples: For each type of organic mulch in sealed plastic bags labeled with composition of materials by percentage of weight protection-zone fencing and protection-zone signage.

C. Tree Pruning Schedule: Written schedule detailing scope and extent of pruning of trees to remain that interfere with or are affected by construction.

D. Certification: From arborist, certifying that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.

E. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing the Work.

F. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.

1.4 QUALITY ASSURANCE

A. Arborist Qualifications: Certified Arborist as certified by ISA, licensed arborist in jurisdiction where Project is located, current member of ASCA, or registered Consulting Arborist as designated by ASCA.

B. Pre-installation Conference: Conduct conference at Project site.

1.5 PROJECT CONDITIONS

A. The following practices are prohibited within protection zones:
   1. Storage of construction materials, debris, or excavated material.
   2. Parking vehicles or equipment.
   3. Foot traffic.
   4. Erection of sheds or structures.
   5. Impoundment of water. Excavation or other digging unless otherwise indicated.
   6. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

B. Do not direct vehicle or equipment exhaust toward protection zones.

C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

PART 2 PRODUCTS

2.1 MATERIALS

A. Topsoil: Natural or cultivated top layer of the soil profile or manufactured topsoil; containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying

subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 1 inch (25 mm) in diameter; and free of weeds, roots, and toxic and other nonsoil materials.

B. Topsoil: Stockpiled topsoil from location shown on Drawings.

C. Organic Mulch: Shredded hardwood, free from deleterious materials.

D. Protection-Zone Fencing: Fencing fixed in position and meeting one of the following requirements. Previously used materials may be used when approved by Architect.
   1. Chain-Link Protection-Zone Fencing: Galvanized-steel fencing fabricated from minimum 2-inch (50-mm) opening, 0.148-inch- (3.76-mm-) diameter wire chain-link fabric; with 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 and 0.177- inch- (4.5-mm-) diameter bottom tension wire; with tie wires, hog ring ties, and other accessories for a complete fence system.
   2. Plywood Protection-Zone Fencing: Plywood framed with four 2-by-4-inch (50-by-100- mm) rails, with 4-by-4-inch (100-by-100-mm) preservative-treated wood posts spaced not more than 8 feet (2.4 m) apart.
   3. Wood Protection-Zone Fencing: Constructed of two 2-by-4-inch (50-by-100-mm) horizontal rails, with 4-by-4-inch (100-by-100-mm) preservative-treated wood posts spaced not more than 8 feet (2.4 m) apart, and lower rail set halfway between top rail and ground.
   4. Plastic Protection-Zone Fencing: Plastic construction fencing constructed of high-density extruded and stretched polyethylene fabric with 2-inch (50-mm) maximum opening in pattern and supported by tubular or T-shape galvanized-steel posts spaced not more than 8 feet (2.4 m) apart. High-visibility orange color, nonfading.
   5. Height of Fencing: 4 feet (1.2 m).
   6. Gates: Swing access gates matching material and appearance of fencing, to allow for maintenance activities within protection zones.

E. Protection-Zone Signage: Shop-fabricated, rigid plastic or metal sheet with attachment holes prepunched and reinforced; legibly printed with nonfading lettering.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

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

B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

C. Protection Zones: Mulch areas inside protection zones and other areas indicated with 4-inch (100-mm) average thickness of organic mulch. Do not place mulch within 6 inches (150 mm) of tree trunks.

3.2 PROTECTION ZONES

A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones in a manner that will prevent people from easily entering protected area except by entrance gates.
   1. Chain-Link Fencing: Install to comply with ASTM F 567 and with m a n u f a c t u r e r ' s written instructions.
   2. Posts: Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing paving or concrete to remain, provide appropriate means of post support acceptable to Architect.
   3. Access Gates: Install where indicated.

B. Protection-Zone Signage: Install protection-zone signage in visibly prominent locations in a manner approved by Architect.

C. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.

D. Maintain protection-zone fencing and signage in good condition as acceptable to Architect and remove when construction operations are complete and equipment has been removed from the site.

3.3 EXCAVATION

A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Section 312000 "Earth Moving."

B. Trenching near Trees: Where utility trenches are required within protection zones, hand excavate under or around tree roots or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots as required for root pruning.

C. Do not allow exposed roots to dry out before placing permanent backfill.

3.4 ROOT PRUNING

A. Prune roots that are affected by temporary and permanent construction. Prune roots as follows:
   1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
   2. Temporarily support and protect roots from damage until they are permanently covered with soil.
   3. Cover exposed roots with burlap and water regularly.
   4. Backfill as soon as possible according to requirements in Section 312000 "Earth Moving."

B. Root Pruning at Edge of Protection Zone: Prune roots by cleanly cutting all roots to the depth of the required excavation.

C. Root Pruning within Protection Zone: Clear and excavate by hand to the depth of the required excavation to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.

3.5 CROWN PRUNING

A. Prune branches that are affected by temporary and permanent construction. Prune branches as follows:
   1. Prune trees to remain to compensate for root loss caused by damaging or cutting root system. Provide subsequent maintenance during Contract period as recommended by arborist.
   2. Pruning Standards: Prune trees according to ANSI A300 (Part 1).
   3. Cut branches with sharp pruning instruments; do not break or chop.
   4. Do not apply pruning paint to wounds.

B. Chip removed branches and dispose of off-site.

3.6 REGRADING

A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

B. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

C. Minor Fill within Protection Zone: Where existing grade is 2 inches (50 mm) or less below elevation of finish grade, fill with topsoil. Place topsoil in a single compacted layer and hand grade to required finish elevations.

3.7 FIELD QUALITY CONTROL

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

3.8 REPAIR AND REPLACEMENT

A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.
   1. Have arborist perform the root cutting, branch pruning, and damage repair of trees and shrubs.
   2. Treat damaged trunks, limbs, and roots according to arborist's written instructions.
   3. Perform repairs within 24 hours.
   4. Replace vegetation that cannot be repaired and restored to full-growth status, as determined by Architect.

3.9 DISPOSAL OF SURPLUS AND WASTE MATERIALS

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

END OF SECTION 01563

SECTION 01600
MATERIAL AND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Products.

B. Transportation and handling.

C. Storage and protection.

D. Product options.

E. Substitutions.

1.02 RELATED SECTIONS
A. Section 00100 - Instructions to Bidders: Product options and substitution procedures during bidding process.

B. Section 01300 - Submittals.

1.03 PRODUCTS
A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for reuse.

B. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.

C. Provide interchangeable components of the same manufacturer, for similar components.

1.04 TRANSPORTATION AND HANDLING
A. Transport and handle products in accordance with manufacturer's instructions.

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

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

1.05 STORAGE AND PROTECTION
A. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight, climate controlled enclosures.

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

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

D. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation.

E. Store loose granular materials on solid flat surfaces in a well-drained area. Provide mixing with foreign matter.

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

G. Arrange storage of products to permit access for inspection. Periodically inspect to assure products are undamaged and are maintained under specified conditions.

1.06 PRODUCT OPTIONS
A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.

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

C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named subject to Substitutions requirements specified herein.

1.07 SUBSTITUTIONS

A. Section 00100 - Instructions to Bidders specifies time restrictions for submitting requests for Substitutions during the bidding period. Requests for substitutions after award of Contract shall only be permitted for the specific condition(s) specified in this Section.

B. Permitted Requests for Substitutions:
   1. Substitutions after award of Contract shall only be considered when a product becomes unavailable through no fault of the Contractor, subject to the conditions and procedures specified in this Section.
   2. No other substitutions shall be permitted after award of Contract.

C. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.

D. A Request for Substitution constitutes a representation that the Bidder:
   1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
   2. Will provide the same warranty for the Substitution as for the specified product.
   3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
   4. Waives claims for additional costs or time extension which may subsequently become apparent.
   5. Will reimburse Owner for review or redesign services associated with re-approval by authorities.

E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

F. Substitution Submittal Procedure:
   1. Submit three copies of request for Substitution for consideration. Limit each request to one proposed Substitution.
   2. Submit Shop Drawings, product data, and certified test results attesting to the proposed product equivalence.
   3. The Architect/Engineer will notify Contractor, in writing, of decision to accept or reject request.

END OF SECTION

SECTION 01650
STARTING OF SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Starting systems.
B. Demonstration and instructions.
C. Testing, adjusting, and balancing.

1.02 RELATED SECTIONS
A. Section 01400 - Quality Control: Manufacturers field reports.
B. Section 01700 - Contract Closeout: System operation and maintenance data and extra materials.

1.03 STARTING SYSTEMS
A. Coordinate schedule for start-up of various equipment and systems.

B. Notify Architect/Engineer and or Owner seven days prior to start-up of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or other conditions which may cause damage.

D. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

E. Verify wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision of responsible manufacturer's representative and or Contractors' personnel in accordance with manufacturers' instructions.

G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

H. Submit a written report in accordance with Section 01400 that equipment or system has been properly installed and is functioning correctly.

1.04 DEMONSTRATION AND INSTRUCTIONS
A. Demonstrate operation and maintenance of Products to Owner's personnel two weeks prior to date of Substantial Completion.

B. Demonstrate Project equipment on site with instruction by a qualified manufacturers' representative who is knowledgeable about the Project.

C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owners' personnel in detail to explain all aspects of operation and maintenance.

E. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled times, at equipment location.

F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

1.05 TESTING, ADJUSTING, AND BALANCING
A. Owner shall appoint and Contractor shall employ, pay for, and coordinate services of an independent firm to perform testing, adjusting and balancing. Contract with independent firm shall be held and administered by the Contractor, not by the mechanical subcontractor.

B. The independent firm will perform services specified in Mechanical Specifications.

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

END OF SECTION

SECTION 01700
CONTRACT CLOSEOUT

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Closeout Procedures.

B. Final Cleaning.

C. Adjusting.

D. Project Record Documents.

E. Operation and Maintenance Data.

F. Warranties.

G. Spare Parts and Maintenance Materials.

H. Project Closeout Books.

1.02 RELATED SECTIONS
A. Section 01500 - Construction Facilities and Temporary Controls: Progress cleaning.

B. Section 01650 - Starting of Systems: System start-up, testing, adjusting, and balancing.

1.03 CLOSEOUT PROCEDURES
A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Architect/Engineer's inspection.

B. Provide submittals to Architect/Engineer and or Owner that are required by governing or other authorities.

C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

D. Owner will occupy all portions of the building as specified in Section 01010.

1.04 FINAL CLEANING
A. Execute final cleaning prior to final inspection.

B. Clean interior and exterior glass and surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

C. Clean equipment and fixtures to a sanitary condition.

D. Clean or replace filters of operating equipment.

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

F. Clean site, sweep paved areas, rake clean landscaped surfaces.

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

1.05 ADJUSTING
A. Adjust operating Products and equipment to ensure smooth and unhindered operation.

1.06 PROJECT RECORD DOCUMENTS
A. Maintain on site, one set of the following record documents; record actual revisions to the Work:
   1. Contract Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other Modifications to the Contract.
   5. Reviewed Shop Drawings, product data, and samples.

B. Store Record Documents separate from documents used for construction.

C. Record information concurrent with construction progress.

D. Specifications: Legibly mark and record at each Product Section description of actual Products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates utilized.
   3. Changes made by Addenda and Modifications.

E. Record Documents and Shop Drawings: Legibly mark each item to record actual construction including:
   1. Measured depths of foundations in relation to finish first floor datum.
   2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
   4. Field changes of dimension and detail.
   5. Details not on original Contract Drawings.

F. Delete Architect/Engineer title block and seal from all documents.

G. Submit documents to Architect/Engineer with claim for final Application for Payment.

1.07 OPERATION AND MAINTENANCE DATA

A. Submit two sets prior to final inspection, bound in 8-1/2 x 11-inch text pages, three D side ring binders with durable plastic covers.
   1. Note: Include 2 physical hard drive copies.

B. Prepare binder covers with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of Project, and subject matter of binder when multiple binders are required.

C. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

D. Contents: Prepare a Table of Contents for each volume, with each Product or system description identified, type on 24-pound white paper. Provide the following 3 components in each copy:

E. Part 1: Directory, listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.

F. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification Section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
   1. Significant design criteria.
   2. List of equipment: Excel spreadsheet with equipment name, type, manufacturer, model, serial number, and location.
   3. Parts list for each component.
   4. Operating instructions.
   5. Maintenance instructions for equipment and systems.
   6. Maintenance instructions for finishes, including recommended cleaning methods and materials and special precautions identifying detrimental agents.

G. Part 3: Project documents and certificates, including the following:
   1. Shop Drawings and product data.
   2. Air and water balance reports.
   3. Certificates.
   4. Photocopies of warranties.

H. Submit one copy of completed volumes in final form 15 days prior to final inspection. This copy will be returned after final inspection, with Architect/Engineer comments. Revise content of documents as required prior to final submittal.

I. Submit final volumes revised, within ten days after final inspection.

1.08 RECORD DRAWINGS (ELECTRONIC FORMAT)

A. Record Prints: Maintain a set of prints of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued. Mark to show actual installation where installation varies from that shown originally. Accurately record information in an acceptable drawing technique.
   1. Identify and date each record Drawing; include the designation "AS-BUILT RECORD DRAWING" in a prominent location.
B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Complete, review marked-up record prints with Architect.

1.09 WARRANTIES

A. Provide duplicate notarized copies.

B. Execute and assemble documents from Subcontractors, suppliers, and manufacturers.

C. Provide Table of Contents and assemble in three D side ring binder with durable plastic cover.
   1. Note: Include 2 physical hard drive copies.

D. Submit prior to final Application for Payment.

E. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

1.10 SPARE PARTS AND MAINTENANCE MATERIALS

A. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification Sections.

B. Deliver to Project site and place in location as directed; obtain receipt prior to final payment.

1.11 PROJECT CLOSEOUT BOOKS

A. Provide General Construction Project Closeout Book (BOOK 01) containing all aforementioned general construction project closeout information and all additional required information (as applicable to Project) as follows:
   1. Certificate of Occupancy.
   2. Certificate of Substantial Completion.
   3. Copy of Building Permit(s).
   4. Project Data Sheet.
   5. List of Contractors and Suppliers (List is to include local sales representative as well as service representative with telephone number for each).
   6. Receipt for "As-Built" Drawings.
   7. Receipt for Shop Drawings.
   8. Receipt for all Keys.
   9. Receipt for Extra Material (Attic Stock).
   10. General Warranty from General Contractor and each Subcontractor.
   11. Lien Releases from General Contractor and each Subcontractor.
   12. Final Inspection Report from Fire Marshal.
   13. Certificate of Acceptance for Elevator(s).
   14. Bond or Guarantee on Roof.
   15. Guarantee on Wood Doors.
   16. Guarantee on Windows.
   17. Guarantee on Paving.
   18. Guarantee on Termite Protection.
   19. Certification of Spray-on Fireproofing (Independent Testing Lab).
   20. Certification for Non-Combustible Lumber.
   21. Flame Spread Ratings for Paint and Vinyl Wallcovering.
   22. Flame Spread Ratings for Adhesives used for VT, Vinyl Wallcovering, Insulation, Etc.
   23. Flame Spread Rating for Carpet.
   24. Flame Spread Rating for Draperies and Cubicle Curtains.
   25. Flame Spread Rating on Insulation.
   26. Certification for Fire Retardant Caulk.
   27. Copy of the Final Punchlist with a Letter Certifying that all Punchlist Items have been corrected.

28. Note: All Certifications, Flame Spread, and Smoke Development Ratings/Certificates are to be from an Independent Testing Lab (not the manufacturer) with the item clearly identified with the Certificate.

B. Provide Plumbing/Mechanical Systems Project Closeout Book (**BOOK 02**) containing all aforementioned plumbing/mechanical project closeout information and all additional required information (as applicable to Project) as follows:
   1. Copy of Mechanical Building Permit(s) and Copy of Plumbing Building Permit(s).
   2. Final Inspection Report from Mechanical/Plumbing Inspector(s).
   3. General Warranty against Faulty Material and Workmanship.
   4. List of Subcontractors and Material Suppliers (List to include local sales representative as well as local service representative with telephone numbers for each).
   5. Certification by Facility Maintenance Department for In-Service Training for All Equipment.
   6. Receipt for Operation and Maintenance Manuals (3 complete sets).
   7. Certification for Medical Gas Systems
   8. Pressure Test Reports.
   9. Approved Water Purification Certificate.
   10. Certification for Sprinkler System.
   11. Certification(s) for Dry Chemical and/or Halon System.
   12. HVAC Test and Balance Certification.
   13. Fire Damper Submittal with U.L. Approval.
   14. Flexible Duct Submittal showing Class and U.L. Approval.
   15. Receipt for extra set(s) of Filters or Filter Media.
   16. Receipt for extra Sprinkler Heads, Special Wrenches and any other Spare Parts specified (List each item under this heading in the Index).
   17. Manufacturers' Warranties on all Equipment.
   18. Copy of Final Punchlist with a Letter Certifying that all Punchlist Items have been corrected.

C. Provide Electrical Systems Project Closeout Book (**BOOK 03**) containing all aforementioned electrical project closeout information and all additional required information (as applicable to Project) as follows:
   1. Copy of Electrical Building Permit.
   2. Final Inspection Report by Electrical Inspector.
   3. General Warranty against Faulty Material and Workmanship.
   4. List of Subcontractors and Material Suppliers (List to include local sales representative as well as local service representative with telephone numbers for each).
   5. Receipt for Operation and Maintenance Manuals (3 complete sets).
   6. Certification by Facility Maintenance Department for In-Service Training for all Equipment and Systems.
   7. Fire Alarm System Certification.
   8. Certification of Fire Alarm System Connection to Fire Department.
   9. Emergency Generator Load Bank Test.
   10. Receipt for Spare Fuses and any other Spare Parts Specified (List each item under this heading in the Index).
   11. Copy of all Electrical Panel Indexes.
   12. Manufacturers' Warranties on Electrical Materials and Equipment.
   13. Copy of Final Punchlist with a Letter Certifying that all Punchlist Items have been corrected.

END OF SECTION

SECTION 01740

CONSTRUCTION WASTE MANAGEMENT/ DISPOSAL

PART 1 GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for the following:
   1. Salvaging nonhazardous demolition and construction waste.
   2. Recycling nonhazardous demolition and construction waste.
   3. Disposing of nonhazardous demolition and construction waste.

B. Related Requirements:
   1. Section 024116 "Structure Demolition" for disposition of waste resulting from demolition of buildings, structures, and site improvements, and for disposition of hazardous waste.
   2. Section 024119 "Selective Structure Demolition" for disposition of waste resulting from partial demolition of buildings, structures, and site improvements, and for disposition of hazardous waste.
   3. Section 042000 "Unit Masonry" for disposal requirements for masonry waste.

1.2 DEFINITIONS

A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.

C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.3 PERFORMANCE REQUIREMENTS

A. General: Achieve end-of-Project rates for salvage/recycling of 50 percent by weight of total non- hazardous solid waste generated by the Work. Facilitate recycling and salvage of materials.

1.4 ACTION SUBMITTALS

A. Waste Management Plan: Submit plan within 30 days of date established for commencement of the Work.

1.5 INFORMATIONAL SUBMITTALS

A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Include the following information:
   1. Material category.
   2. Generation point of waste.
   3. Total quantity of waste in tons (tones).
   4. Quantity of waste salvaged, both estimated and actual in tons (tonnes).
   5. Quantity of waste recycled, both estimated and actual in tons (tonnes).
   6. Total quantity of waste recovered (salvaged plus recycled) in tons (tonnes).
   7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.

B. Waste Reduction Calculations: Before request for Substantial Completion, submit calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.

C. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.

D. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.

E. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

F. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

G. Qualification Data: For waste management coordinator.

1.6 QUALITY ASSURANCE

A. Waste Management Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination."

1.7 WASTE MANAGEMENT PLAN

A. General: Develop a waste management plan according to ASTM E 1609 and requirements in this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Distinguish between demolition and construction waste. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.

B. Waste Identification: Indicate anticipated types and quantities of demolition site-clearing and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.

C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
   1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
   2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
   3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
   4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
   5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
   6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 PLAN IMPLEMENTATION

A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan.

C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.
   1. Distribute waste management plan to everyone concerned within three days of submittal return.
   2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
   1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
   2. Comply with Section 015000 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 SALVAGING DEMOLITION WASTE

A. Salvaged Items for Reuse in the Work:
   1. Clean salvaged items.
   2. Pack or crate items after cleaning. Identify contents of containers.
   3. Store items in a secure area until installation.
   4. Protect items from damage during transport and storage.
   5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.

B. Salvaged Items for Sale: Not permitted on Project site.

C. Salvaged Items for Owner's Use:
   1. Clean salvaged items.
   2. Pack or crate items after cleaning. Identify contents of containers.
   3. Store items in a secure area until delivery to Owner.
   4. Transport items to Owner's storage area on-site.
   5. Protect items from damage during transport and storage.

3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

A. General: Recycle paper and beverage containers used by on-site workers.

B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Owner.

C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.
   1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
      a. Inspect containers and bins for contamination and remove contaminated materials if found.
   2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
   3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
   4. Store components off the ground and protect from the weather.
   5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor.

3.4 RECYCLING DEMOLITION WASTE

A. Asphalt Paving: Grind asphalt to maximum 4-inch (100-mm) size.

B. Asphalt Paving: Break up and transport paving to asphalt-recycling facility.

C. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
   1. Pulverize concrete to maximum 4-inch (100-mm) size.

D. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.
   1. Pulverize masonry to maximum 4-inch (100-mm) size.
   2. Clean and stack undamaged, whole masonry units on wood pallets.

E. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.

F. Metals: Separate metals by type.
   1. Structural Steel: Stack members according to size, type of member, and length.
   2. Remove and dispose of bolts, nuts, washers, and other rough hardware.

G. Asphalt Shingle Roofing: Separate organic and glass-fiber asphalt shingles and felts. Remove and dispose of nails, staples, and accessories.

H. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.

I. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.

J. Metal Suspension System: Separate metal members including trim, and other metals from acoustical panels and tile and sort with other metals.

K. Carpet and Pad: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.
   1. Store clean, dry carpet in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.

L. Carpet Tile: Remove debris, trash, and adhesive.
   1. Stack tile on pallet and store clean, dry carpet in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.

M. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.

N. Conduit: Reduce conduit to straight lengths and store by type and size.

3.5 RECYCLING CONSTRUCTION WASTE

A. Packaging:
   1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
   2. Polystyrene Packaging: Separate and bag materials.
   3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
   4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Wood Materials:
   1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
   2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.
   1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

3.6 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
   1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
   2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials.

C. Burning: Burning of waste materials is permitted only at designated areas on Owner's property, provided required permits are obtained. Provide full-time monitoring for burning materials until fires are extinguished.

D. Disposal: Remove waste materials and dispose of at designated spoil areas on Owner's property.

E. Disposal: Remove waste materials from Owner's property and legally dispose of them.

END OF SECTION 01741

SECTION 01742
FINAL CLEANING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES

A. Cleaning during construction.
B. Cleaning for Contract Completion review and final acceptance of the Work.

1.3 RELATED SECTIONS

A. Additional Requirements: Cleaning for specific products or elements of Work are described in individual product Specification Sections.

1.4 SUBMITTALS

A. Product List: Contractor shall submit complete list of all cleaning agents and materials for University's Representative's review and approval.
B. Cleaning Procedures: Contractor shall submit description of cleaning processes, agents and materials to be used for final cleaning of the Work. Processes and degree of cleanliness shall be as directed by University's Representative. All cleaning processes, agents and materials shall be subject to University's Representative's review and approval.

1.5 QUALITY ASSURANCE

A. Cleaning and Disposal Requirements, General: Contractor shall conduct cleaning and disposal operations in compliance with all applicable codes, ordinances and regulations, including environmental protection laws, rules and practices.
B. Cleaning Workers: Contractor shall employ experienced workers or professional cleaners for final cleaning. Contractor shall clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Contractor shall comply with manufacturer's instructions.

PART 2 PRODUCTS

2.1 MATERIALS

A. Cleaning Agents and Materials: Contractor shall use only those cleaning agents and materials which will not create hazards to health or property and which will not damage or degrade surfaces. Contractor shall:
   1. Use only those cleaning agents, materials and methods recommended by manufacturer of the material to be cleaned.
   2. Use cleaning materials only on surfaces recommended by cleaning agent manufacturer.

PART 3 EXECUTION

3.1 CLEANING DURING CONSTRUCTION

A. Garbage Control: Contractor shall control accumulation of debris, waste materials and rubbish. Contractor shall leave the site each day clean and neat. Contractor shall dispose of debris, waste and rubbish off-site in a legal manner.
B. Cleaning, General: Contractor shall clean sidewalks, driveways and streets frequently to maintain public thoroughfares

free of dust, debris and other contaminants. This shall be at no cost to the University.

C. Cleaning of Existing Facilities: Contractor shall clean surfaces in existing buildings where alteration and renovation Work is being performed or where other construction activities have caused soiling and accumulation of dust and debris. Contractor shall:
   1. Clean dust and soiling from floor surfaces.
   2. Clean dust from horizontal and vertical surfaces, including lighting fixtures.
   3. Replace HVAC filters.

D. Parking Area Cleaning: Contractor shall keep parking areas clear of construction debris, especially debris hazardous to vehicle tires.

E. Thoroughfare Clearing and Cleaning: Contractor shall keep site accessways, parking areas and building access and exit facilities clear of mud, soiling and debris. Contractor shall:
   1. Remove mud, soil and debris and dispose in a manner which will not be injurious to persons, property, plant materials and site.
   2. Comply with runoff control requirements stated above and as required by governing authorities having jurisdiction.

F. Cleaning Frequency: At a minimum, Contractor shall clean Work areas and site daily. Contractor shall leave the site each day clean and neat.

G. Failure to Clean: At any point during the course of Work, should cleaning by Contractor not be sufficient or acceptable to University's Representative, especially regarding paths of travel, University may engage cleaning service to perform cleaning and deduct costs for such cleaning from sums owed to Contractor.

3.2 CONTRACT COMPLETION REVIEW CLEANING, GENERAL

A. Contract Completion Review Cleaning, General: Contractor shall execute a thorough cleaning prior to Contract Completion review by University's Representative and Architect. Contractor shall complete final cleaning before submitting final Application for Payment. Contractor shall:
   1. Conduct cleaning in compliance with regulations of authorities having jurisdiction and industrial safety standards for cleaning.
   2. Employ professional building cleaners to thoroughly clean building.
   3. Complete cleaning operations specified below before requesting inspection for Certification of Completion. Contractor shall:
      a. Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films and similar foreign substances. Restore reflective surfaces to their original reflective condition. Leave concrete floors broom clean. Vacuum carpeted surfaces.
      b. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.
      c. Clean the site, including landscape development areas, of rubbish, litter and foreign substances. Sweep paved areas broom clean; remove stains, spills and other foreign deposits.

B. Waste Disposal, Contractor shall:
   1. Remove waste materials from the site and conduct disposal in a lawful manner.
   2. Do not burn waste materials.
   3. Do not bury debris or excess materials on the University property.
   4. Do not discharge volatile, harmful or hazardous materials into drainage systems.
   5. Where extra materials of value remaining after completion of associated work have become the University's property, arrange for disposition of these materials as directed.

3.3 INTERIOR CLEANING

A. Interior Cleaning, Contractor shall:
   1. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program.
   2. Remove labels that are not permanent labels.
   3. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from all

visible interior and exterior surfaces.

4. Remove dust from all horizontal surfaces not exposed to view, including light fixtures, ledges and plumbing fixtures.
5. Clean all horizontal surfaces to dust-free condition, including tops of door and window frames, tops of doors and interiors of cabinets and casework.
6. Remove waste and surplus materials, rubbish and temporary construction facilities, utilities and controls.

B. Accessories and Fixtures Cleaning: Contractor shall clean building accessories, including toilet partitions, fire extinguisher cabinets, lockers and toilet accessories, all plumbing fixtures and all lighting fixture lenses and trim.

C. Glass and Mirror Cleaning: Contractor shall clean and polish all glass and mirrors as specified in all Division 08 specifications. Contractor shall remove glazing compound and other substances that are noticeable vision-obscuring materials. Contractor shall replace chipped or broken glass and other damaged transparent materials.

D. Metalwork: Contractor shall clean and buff all metalwork, to be free of soiling and fingerprints. Mirror finished metalwork shall be buffed to high luster.

E. Floor Cleaning: Contractor shall clean floors to dust-free condition, free of stains, films and similar foreign substances.

1. Exposed concrete floors: Contractor shall thoroughly sweep and wet mop floors in enclosed spaces. Contractor shall mop concrete floors and, at concrete floors in occupied spaces, apply floor finish as specified for resilient flooring. At unoccupied spaces, Contractor shall leave concrete floors broom clean.
2. Ceramic tile flooring: Contractor shall thoroughly sweep and mop tile flooring. Contractor shall comply with specific requirements in tile and installation materials manufacturers for cleaning materials.
3. Resilient flooring: Contractor shall thoroughly sweep all resilient flooring. Contractor shall damp wash and wax (as appropriate) all resilient flooring. Contractor shall comply with specific requirements in applicable resilient flooring Sections, and notes of the Drawings.
4. Carpet cleaning: Contractor shall comply with accepted industry practices for cleaning commercial carpet, subject to review and acceptance by University's Representative. Contractor shall vacuum, spot clean and generally clean carpet using commercial carpet cleaning solution, scrubbers and solution extraction-type vacuuming equipment.

F. Ventilation System Cleaning: Contractor shall replace filters and clean heating and ventilating equipment used for temporary heating, cooling and ventilation.

3.4 EXTERIOR CLEANING

A. Building Exterior Cleaning: Contractor shall clean exterior of adjacent facilities where construction activities have caused soiling and accumulation of dust and debris. Contractor shall:

1. Remove labels that are not permanent labels.
2. Wash down exterior surfaces to remove dust.
3. Clean exterior surfaces of mud and other soiling.
4. Clean exterior side of windows, storefronts and curtainwalls, including window framing.

B. Glass and Mirror Cleaning: Contractor shall clean and polish all glass and mirrors as specified in all Division 08 specifications. Contractor shall remove glazing compound and other substances that are noticeable vision-obscuring materials. Contractor shall replace chipped or broken glass and other damaged transparent materials.

C. Site Cleaning: Contractor shall broom clean exterior paved surfaces. Contractor shall rake clean other surfaces of the grounds. Contractor shall:

1. Wash down and scrub where necessary all paving soiled as a result of construction activities. Thoroughly remove mortar droppings, paint splatters, stains and adhered soil.
2. Remove from the site all construction waste, unused materials, excess soil and other debris resulting from the Work. Legally dispose of waste.

3.5 PEST CONTROL

A. Pest Control: Contractor shall engage an experienced, licensed exterminator to inspect and rid the project area of insects, rodents and other pests. Pests shall not be allowed to roost, nest or otherwise inhabit the Work at any point during construction. All animal/insect debris shall be promptly cleaned and disposed of in accordance with all

applicable regulations to prevent surfaces becoming stained, or compromised in any manner.

1. Exterminator shall prepare and submit report of inspection and extermination.
2. Extermination materials shall comply with applicable pest control regulations and not leave toxic residue harmful to humans.

3.6 CLEANING INSPECTION

A. Cleaning Inspection: Prior to Final Payment or acceptance by University for partial occupancy or beneficial use of the premises, Contractor and University's Representative shall jointly conduct an inspection of interior and exterior surfaces to verify that entire Work is acceptably clean. Punchlist shall be utilized for recording any deficiencies.

B. Inadequate Cleaning: Should final cleaning be inadequate, as determined by University's Representative, and Contractor fails to correct conditions, University may engage cleaning service under separate contract and deduct cost from Contract Sum.

END OF SECTION

SECTION 01750
CUTTING AND PATCHING

PART 1 GENERAL

1.01 SUMMARY
A. This Section includes procedural requirements for cutting and patching.

1.02 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.

1.03 QUALITY ASSURANCE
A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.

B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operating elements include the following:
1. Primary operational systems and equipment.
2. Fire-suppression systems.
3. Mechanical systems piping and ducts.
4. Control systems.
5. Communication systems.
6. Conveying systems.
7. Electrical wiring systems.

C. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Miscellaneous elements include the following:
1. Water, moisture, or vapor barriers.
2. Membranes and flashings.
3. Exterior curtain-wall construction.
4. Equipment supports.
5. Piping, ductwork, vessels, and equipment.

D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

1.04 WARRANTY
A. 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. General: Comply with requirements specified in other Sections.

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. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.

1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut.

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

C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

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

3.03 PERFORMANCE

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
   1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
   1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
   2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
   3. Concrete or Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
   4. Excavating and Backfilling: Comply with requirements in applicable Division 31 Sections where required by cutting and patching operations.
   5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.

C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.
   1. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
      a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
      b. Restore damaged pipe covering to its original condition.
   2. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
      a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
   3. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even plane surface of uniform appearance.
   4. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

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

END OF SECTION

SECTION 01760
EXECUTION

PART 1 GENERAL

1.01 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.

1.02 SUBMITTALS

A. Qualification Data: For land surveyor.

B. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.

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. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
   2. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
   3. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
   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 local utility 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/Engineer promptly.

B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
   1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
   2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
   3. Inform installers of lines and levels to which they must comply.
   4. Check the location, level and plumb, of every major element as the Work progresses.
   5. Notify Architect/Engineer when deviations from required lines and levels exceed allowable tolerances.

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

D. 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.

E. 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/Engineer.

3.04 FIELD ENGINEERING

A. Identification: Owner will provide survey that identifies existing benchmarks, control points, and property corners.

B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
   1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect/Engineer. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect/Engineer before proceeding.
   2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
   1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
   2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
   3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

3.05 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 8-0 in spaces without a suspended ceiling, unless noted otherwise.

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.

3.06 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.

3.07 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
   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.

3.08 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 01 Section "Quality Requirements."

3.09 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.

3.10 CORRECTION OF WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 01 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

SECTION 01770
PROJECT CLOSE OUT PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
   1. Substantial Completion procedures.
   2. Final completion procedures.
   3. Warranties.
   4. Final cleaning.
   5. Repair of the Work.

B. Related Requirements:
   1. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.2 ACTION SUBMITTALS

A. Product Data: For cleaning agents.

B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

C. Certified List of Incomplete Items: Final submittal at Final Completion.

1.3 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

C. Field Report: For pest control inspection.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.5 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
   1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
   2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
   3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
   4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Construction Manager. Label with manufacturer's name and model number where applicable.
      a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Construction Manager's signature for receipt of submittals.
   5. Submit test/adjust/balance records.
   6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
   1. Advise Owner of pending insurance changeover requirements.
   2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.

3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training."
6. Advise Owner of changeover in heat and other utilities.
7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
9. Complete final cleaning requirements, including touchup painting.
10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect and Construction Manager 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. Re-inspection: Request re-inspection 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.

1.6 FINAL COMPLETION PROCEDURES

A. Preliminary Procedures: Before requesting final inspection for determining final completion, complete the following:
   1. Submit a final Application for Payment according to Section 012900 "Payment Procedures."
   2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
   3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
   4. Submit pest-control final inspection report and warranty.
   5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

B. Inspection: Submit a written request for final inspection to determine acceptance. On receipt of request, Architect and Construction Manager 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. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.7 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction. Use CSI Form 14.1A.
   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.
   3. Submit list of incomplete items in the following format:
      a. Three paper copies unless otherwise indicated. Architect, through Construction Manager, will return two copies.

1.8 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
   1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (215-by-280-mm) paper.
   2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the

product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.

3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

C. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 PRODUCTS

2.1 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.

1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and 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 designated 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. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
   j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
   k. Remove labels that are not permanent.
   l. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
   m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
   n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
   o. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
   p. Leave Project clean and ready for occupancy.

C. Pest Control: Comply with pest control requirements in Section 015000 "Temporary Facilities and Controls." Prepare written report.

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
   1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
   2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.
      a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
   3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
   4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 01770

SECTION 01782
OPERATION AND MAINTENANCE

PART 1 GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
   1. Operation and maintenance documentation directory.
   2. Emergency manuals.
   3. Operation manuals for systems, subsystems, and equipment.
   4. Product maintenance manuals.
   5. Systems and equipment maintenance manuals.

1.2 CLOSEOUT SUBMITTALS

A. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
   1. Architect will comment on whether content of operations and maintenance submittals are acceptable.
   2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

B. Format: Submit operations and maintenance manuals in the following format:
   1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Architect.
      a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
      b. Enable inserted reviewer comments on draft submittals.
   2. Three paper copies. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves. Architect, through Construction Manager, will return two copies.
   3. Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect and Commissioning Authority will return copy with comments.
   4. Correct or revise each manual to comply with Architect's and Commissioning Authority's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's and Commissioning Authority's comments and prior to commencing demonstration and training.

PART 2 PRODUCTS

2.1 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information.

B. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
   1. Title page.
   2. Table of contents.
   3. Manual contents.

C. Title Page: Include the following information:
   1. Subject matter included in manual.
   2. Name and address of Project.
   3. Name and address of Owner.
   4. Date of submittal.
   5. Name and contact information for Contractor.
   6. Name and contact information for Construction Manager.

7. Name and contact information for Architect.
8. Name and contact information for Commissioning Authority.
9. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
10. Cross-reference to related systems in other operation and maintenance manuals.

D. Table of Contents: List each product included in manual, identified by product name, Indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

E. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

F. Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.
1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch (215-by-280-mm) paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
   a. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.
2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.
4. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
   a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
   b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.2 EMERGENCY MANUALS

A. Content: Organize manual into a separate section for each of the following:
1. Type of emergency.
2. Emergency instructions.
3. Emergency procedures.

B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
1. Fire.
2. Flood.
3. Gas leak.
4. Water leak.
5. Power failure.
6. Water outage.
7. System, subsystem, or equipment failure.
8. Chemical release or spill.

C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

D. Emergency Procedures: Include the following, as applicable:
1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

2.3 OPERATION MANUALS

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
   1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
   2. Performance and design criteria if Contractor is delegated design responsibility.
   3. Operating standards.
   4. Operating procedures.
   5. Operating logs.
   6. Wiring diagrams.
   7. Control diagrams.
   8. Piped system diagrams.
   9. Precautions against improper use.
   10. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:
   1. Product name and model number. Use designations for products indicated on Contract Documents.
   2. Manufacturer's name.
   3. Equipment identification with serial number of each component.
   4. Equipment function.
   5. Operating characteristics.
   6. Limiting conditions.
   7. Performance curves.
   8. Engineering data and tests.
   9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:
   1. Startup procedures.
   2. Equipment or system break-in procedures.
   3. Routine and normal operating instructions.
   4. Regulation and control procedures.
   5. Instructions on stopping.
   6. Normal shutdown instructions.
   7. Seasonal and weekend operating instructions.
   8. Required sequences for electric or electronic systems.
   9. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.4 PRODUCT MAINTENANCE MANUALS

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Product Information: Include the following, as applicable:
   1. Product name and model number.
   2. Manufacturer's name.
   3. Color, pattern, and texture.
   4. Material and chemical composition.
   5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
   1. Inspection procedures.
   2. Types of cleaning agents to be used and methods of cleaning.
   3. List of cleaning agents and methods of cleaning detrimental to product.
   4. Schedule for routine cleaning and maintenance.
   5. Repair instructions.

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

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

2.5 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
   1. Standard maintenance instructions and bulletins.
   2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
   3. Identification and nomenclature of parts and components.
   4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
   1. Test and inspection instructions.
   2. Troubleshooting guide.
   3. Precautions against improper maintenance.
   4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
   5. Aligning, adjusting, and checking instructions.
   6. Demonstration and training video recording, if available.

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

PART 3 EXECUTION

3.1 MANUAL PREPARATION

A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner’s operating personnel for types of emergencies indicated.

B. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

C. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

D. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete reference to information not applicable.

E. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawing to ensure correct illustration of completed installation.
   1. Do not use original project record documents as part of operation and maintenance manuals.

F. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION

WORK ARCHITECTURE + DESIGN

DIVISION 07

THERMAL AND MOISTURE PROTECTION

SECTION 07190
CLEAR PENETRATING SEALERS

PART 1 GENERAL

1.01 SECTION INCLUDES
Installation of CLEAR PENETRATING SEALER on surfaces indicated on drawings, consisting of preparation of existing and new surfaces.

1.02 RELATED SECTIONS
A. Section 03 30 00 – Cast-in-Place Concrete

B. Section 04 01 40 – Maintenance of Stone Assemblies

1.03 REFERENCES
A. ASTM C 140 - Methods for Sampling and Testing Concrete Masonry Units

B. ASTM E 96 - Test Methods for Water Vapor Transmission of Materials

C. ASTM E 514 - Standard Test Method for Water Penetration and Leakage Through Masonry

D. ASTM G 53 - Standard Practice for Operating Light- and Water-Exposure Apparatus for Exposure of Nonmetallic Materials

1.04 SYSTEM DESCRIPTION
Product provided by this Section CLEAR PENETRATING SEALER is a concentrated, water dilutable, VOC compliant, breathable, water repellant protectant and will not harm vegetation and glass.

1.05 SUBMITTALS
A. General: Submit in accordance with Section 01 30 00.

B. Product Data: Submit manufacturer's product literature and installation instructions.

C. Samples: Submit samples of concrete masonry units approved for use in Project with water repellent treatment applied to half of each sample face; indicate which half has been coated.

D. Warranty: Submit a sample warranty identifying the terms and conditions stated in Section 1.7.

1.06 QUALITY ASSURANCE
A. Applicator Qualifications: Applicator shall be experienced in applying the same or similar materials and shall be specifically approved in writing by the membrane manufacturer.

B. Regulatory Requirements: Comply with applicable codes, regulations, ordinances, and laws regarding use and application of products that contain volatile organic compounds (VOC).

C. Pre-Application Conference: Prior to beginning work, convene a conference to review conditions, installation procedures, schedules and coordination with other work.

1.07 WARRANTY
A. Special Warranty: Provide for correcting failure of water repellent treatment to resist penetration of water.
   1. Warranty Period: Five years.

1.08 DELIVERY, STORAGE, AND HANDLING
A. Deliver materials to project site in original, factory-sealed, unopened containers bearing manufacturer's name and label intact and legible with following information.
   1. Name of material.
   2. Manufacturer's stock number and date of manufacture.
   3. Material safety data sheet.

B. Store material under shaded area away from direct sunlight between 40°F to 110°F. Keep away from heat, ignition/sparks and from rain/standing water. Prevent the product from freezing. Keep the container of CLEAR PENETRATING SEALER tightly closed after every withdrawal (product can start reacting with moisture in the ambient air) when not in use.

1.09 PROJECT CONDITIONS

A. Do not apply CLEAR PENETRATING SEALER when temperatures are expected to fall below 40° F (4° C) within 12 hours or when rain is expected within 4 hours following the application.

B. Coordinate installation work with other trades. The applicator shall have sole right of access to the specified areas for the time needed to complete the application.

C. Warn personnel against contact of material eyes. Wear applicable protective clothing and respiratory protection gear.

D. Maintain work area in a neat and orderly condition, removing empty containers, rags, and rubbish daily from the site.

PART 2 PRODUCTS

2.01 MANUFACTURERS

Provide products manufactured and supplied by Carlisle Coatings and Waterproofing Incorporated, 900 Hensley Lane, Wylie Texas 75098, phone (800) 338-8701, fax (972) 442-0076.

2.02 PRODUCTS

A. MATERIALS

1. CLEAR PENETRATING SEALER: Shall be breathable, water-based, VOC compliant, penetrating sealer which reacts chemically with the substrate to form a long-lasting, water-repellant surface.
    a. Clear, non-yellowing water repellent treatment shall not alter appearance, color, or texture of substrate under any lighting conditions.
    b. Shall be compatible with glass and protection not required.
    c. Shall be compatible with landscaping/vegetation and protection not required.
    d. Shall be compatible with sealants and joint sealers and protection not required.

2.03 ACCESSORY PRODUCTS

A. Potable water: use clean potable water to mix with CLEAR PENETRATING SEALER.

PART 3 EXECUTION

3.01 INSPECTION

A. Before any waterproofing work is started the waterproofing applicator shall thoroughly examine all surfaces for any deficiencies. Should any deficiencies exist, the architect, owner, or general contractor shall be notified in writing and corrections made.

3.02 PREPARATION

A. Protection:

1. Sealant Coordination: Compatible with all sealants and no protection or coordination required.
2. Protection of glass, glazed products, and prefinished products from contact with CLEAR PENETRATING SEALER is not required. Will not harm surfaces.
3. Protection of landscape materials from contact with CLEAR PENETRATING SEALER is not required. Will not harm vegetation.

B. Surface Preparation: Prepare substrates in accordance with CLEAR PENETRATING SEALER manufacturer's recommendations.

1. Clean surfaces by chipping and removing all the loose cement mortar.
2. Clean surfaces of dust, dirt and foreign matter detrimental to proper installation of water repellent treatment by grinding and clean the dust using a non-compressed air blower or industrial vacuum cleaner followed by high pressure water-jet cleaning.

3.03 APPLICATIONS

A. Add sealer concentrate to water and mix.

1. CLEAR PENETRATING SEALER should be diluted with potable water (TDS below 1000 ppm) to obtain clear transparent solution.

2. CLEAR PENETRATING SEALER solution (1:20) is made by adding 1 liter CLEAR PENETRATING SEALER in 5 gallons of water or 20 liters to 100 gallons of potable water. In the document hereafter, diluted CLEAR PENETRATING SEALER solution will mean the dilution ratio unless specified otherwise.
3. CLEAR PENETRATING SEALER is best applied at ambient temperatures of 40°F to 110°F.

B. Apply to wall using low-pressure non-atomizing spray.
   1. Spray until saturated; no run down requirement
   2. Pot life: 24 hours once mixed
   3. Coats required: One application

3.04 INTEGRITY TESTING

A. Test is required for all integrity testing required by architect or owner and for expanded warranties beyond the standard 5 year material warranty.

B. The test can be done using the RILEM Test.
   1. RILE M Test Method II.4 is for measuring the volume of water absorbed by a material within a specified time period. The test can be performed at the site for vertical or horizontal surfaces. It simulates pressure created by wind-driven rain of 85mph.
      a. Affix the bottom end of the tube on the masonry surface with clay or putty. Apply manual pressure to ensure adhesion.
      b. Add water through the upper, open end of the pipe using long pipette to prevent any air bubbles in the tube until the column reaches the zero graduation mark.
      c. After 20 minutes, check the quantity of water absorbed by the material in a specified time (20 minutes). This can be read directly from the graduated tube.

3.05 CLEANING

A. Should glass cleaning be required, use a product containing nonionic cleaners

END OF SECTION

SECTION 07900
JOINT SEALERS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Sealant systems, including surface preparation and joint backing, required for all intersections of dissimilar materials and other locations as indicated in Drawings.

1.02 RELATED SECTIONS
A. Section 08015 – Historic Treatment of Wood Windows.
B. Section 08800 - Glass and Glazing: Sealants required in conjunction with glazing methods.
C. Section 09900 - Painting.

1.03 REFERENCES
A. ASTM C790 - Use of Latex Sealing Compounds.
B. ASTM C804 - Use of Solvent-Release Type Sealants.
C. ASTM C834 - Latex Sealing Compounds.
D. ASTM C919 - Use of Sealants in Acoustical Applications.
E. ASTM C920 - Elastomeric Joint Sealants.
F. ASTM D1056 - Flexible Cellular Materials - Sponge or Expanded Rubber.
G. ASTM D1565 - Flexible Cellular Materials - Vinyl Chloride Polymers and Copolymers (Open-Cell Foam).
H. SWRI (Sealant, Waterproofing and Restoration Institute) - Sealant and Caulking Guide Specification.

1.04 SUBMITTALS
A. Submit under provisions of Section 01300.
B. Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, color availability.
C. Samples: Submit two samples, 1x1 inch in size illustrating sealant colors for selection.
D. Manufacturer's Installation Instructions: Indicate special procedures, surface preparation, perimeter conditions requiring special attention.

1.05 QUALITY ASSURANCE
A. Perform Work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
B. Perform acoustical sealant application Work in accordance with ASTM C919.
C. Maintain one copy of each document on site.

1.06 QUALIFICATIONS
A. Manufacturer: Company specializing in manufacturing the Products specified in this Section with minimum five years documented experience.
B. Applicator: Company specializing in performing the Work of this Section with minimum five years documented experience and approved by manufacturer.

1.07 ENVIRONMENTAL REQUIREMENTS
A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.08 COORDINATION
A. Coordinate Work under provisions of Section 01039.
B. Coordinate the Work with all Sections referencing this Section.

1.09 WARRANTY
A. Provide five year warranty under provisions of Section 01700.
B. Warranty: Include coverage for installed sealants and accessories which fail to achieve air tight seal, water tight seal, and exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 SEALANTS

A. (Type A) Oil Based: Single component, resinous compound, elongation capability of 0 to 2 percent of joint width.
A. (Type B) Bituminous Based: Single component, asphalt compound, elongation capability of 0 to 2 percent of joint width.

C. (Type C) Acrylic Emulsion Latex: ASTM C920, Grade 1, Class A, Single component, non-staining, non-bleeding, non-sagging; color as selected.
   1. Elongation Capability: 2 to 5 percent
   2. Service Temperature Range: 2 to 160 degrees F
   3. Shore A Hardness Range: 15 to 40

D. (Type D) Acrylic Sealant: ASTM C920, Grade 1, Class A, single component, solvent curing, non-staining, non-bleeding, non-sagging; color as selected.
   1. Elongation Capability: 7.5 to 12 percent
   2. Service Temperature Range: -13 to 180 degrees F
   3. Shore A Hardness Range: 25 to 50

E. (Type E) Butyl Sealant: ASTM C920, Grade 1, Class A, single component, solvent release, non-skinning, non-sagging, black color.
   1. Elongation Capability: 7 to 10 percent
   2. Service Temperature Range: -13 to 180 degrees F
   3. Shore A Hardness Range: 10 to 30

F. (Type F) Polysulfide Sealant: ASTM C920, Grade 1, Class A, two component, chemical curing, non-staining, non-bleeding, capable of continuous water immersion, non-sagging type; color as selected.
   1. Elongation Capability: 25 percent
   2. Service Temperature Range: -40 to 180 degrees F
   3. Shore A Hardness Range: 20 to 35

G. (Type G) Polyurethane Sealant: ASTM C920, Grade 1, Class A, single component, chemical curing, non-staining, non-bleeding, capable of continuous water immersion, non-sagging type; color as selected.
   1. Elongation Capability: 25 percent
   2. Service Temperature Range: -40 to 180 degrees F
   3. Shore A Hardness Range: 20 to 35

H. (Type H) Polyurethane Sealant: ASTM C920, Grade 1, Class A, multi-component, chemical curing, non-staining, non-bleeding, capable of continuous water immersion, non-sagging type; color as selected.
   1. Elongation Capability: 25 percent
   2. Service Temperature Range: -40 to 180 degrees F
   3. Shore A Hardness Range: 20 to 35

I. (Type I) Silicone Sealant: ASTM C920, Grade 1, Class A, single component, solvent curing, non-sagging, non-staining, fungus resistant, non-bleeding; color as selected.
   1. Elongation Capability: 25 percent
   2. Service Temperature Range: -65 to 180 degrees F
   3. Shore A Hardness Range: 15 to 35

J. (Type J) Silicone Sealant: ASTM C920, Grade 1, Class A, single component, fungus resistant, chemical curing, non-sagging, non-staining, non-bleeding; color as selected.
   1. Elongation Capability: 25 percent
   2. Service Temperature Range: -65 to 180 degrees F
   3. Shore A Hardness Range: 15 to 25

K. (Type K) Silicone Sealant: ASTM C920, Grade 1, Class A, single component, fungus resistant, acidic curing, non-sagging, non-staining, non-bleeding; color as selected.
   1. Elongation Capability: 25 percent
   2. Service Temperature Range: -65 to 180 degrees F
   3. Shore A Hardness Range: 15 to 25

L. (Type L) Acoustical Sealant: TBD
   1. Interior acoustical joints in vertical surfaces and horizontal nontraffic surfaces.

2.02 ACCESSORIES

A. Primer: Non-staining type as recommended by sealant manufacturer to suit application.
B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
C. Joint Backing: ASTM D1565; round, open cell polyethylene foam rod; oversized 30 to 50 percent larger than joint width.
D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces and joint openings are ready to receive Work.
B. Verify that joint backing and release tapes are compatible with sealant.

3.02 PREPARATION

A. Remove loose materials and foreign matter which might impair adhesion of sealant.
B. Clean and prime joints in accordance with manufacturer's instructions.
C. Perform preparation in accordance with manufacturer's instructions.
D. Protect elements surrounding the Work of this Section from damage or disfiguration.

3.03 INSTALLATION

A. Install sealant in accordance with manufacturer's instructions.
B. Measure joint dimensions and size materials to achieve required width/depth ratios.
C. Install joint backing to achieve a neck dimension no greater than 1/3 of the joint width.
D. Install bond breaker where joint backing is not used.
E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
F. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
G. Tool joints concave.

3.04 CLEANING

A. Clean Work under provisions of Section 01700.
B. Clean adjacent soiled surfaces.

3.05 PROTECTION OF FINISHED WORK

A. Protect finished installation under provisions of Section 01500.
B. Protect sealants until cured.

END OF SECTION 07900

WORK
ARCHITECTURE
DESIGN

DIVISION 08

DOORS AND WINDOWS

SECTION 08140
WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes
   1. This Section specifies stile and rail wood doors of the following types:
      a. Exterior wood doors and sidelights.
      b. Exterior French and sash doors and sidelights.
      c. Interior wood doors and sidelights.
      d. Interior fire-rated wood doors.
      e. Custom wood doors.

B. Related Sections
   1. Section 061000 - Rough Carpentry: For rough opening and blocking.
   2. Section 062000 - Finish Carpentry: For casing and trim.
   3. Section 087100 - Door Hardware: For operating and locking hardware.
   4. Section 099000 - Painting and Coating: For staining of doors and sidelights.

1.2 ACTION SUBMITTALS

A. Product Data: Submit manufacturer's product data for each type of stile-and-rail wood door including elevations and details of construction. 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.
   5. Indicate fire-protection ratings for fire-rated doors.

C. Verification Samples: Submit two corner samples, minimum 6 inches by 6 inches representing actual products and materials specified indicating visual characteristics and finish. Include range samples if variation of appearance is anticipated.

D. Warranty: Submit manufacturer’s standard warranty.

1.3 QUALITY ASSURANCE

A. Manufacturer’s Qualifications: Company specializing in manufacturing doors with a minimum of five years documented experience and qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.

B. Quality Standard: In addition to requirements specified, comply with AWI's "Architectural Woodwork Quality Standards Illustrated."

C. Single Source Requirements: To the greatest extent practical, wood doors shall be supplied from a single manufacturer.

D. Sustainable Construction: Paneled door construction shall limit use of formaldehyde products during fabrication. Paneled door shall bear the Four Star rating from the Japanese Ministry of Land, Infrastructure, Transportation and be compliant with California’s CARB Phase II program.

E. Project Conditions: Maintain environmental conditions (temperature, humidity and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer’s recommended limits.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle materials and products in strict compliance with manufacturer's instructions, recommendations and industry standards.

B. Store materials in manufacturer's original labeled packaging until ready for installation and in accordance with manufacturer's instructions. Protect from damage.

1.5 WARRANTY

A. Manufacturer's Warranty: Provide manufacturer's standard limited warranty that each panel door bearing the manufacturer's brand and identification mark complies with Industry Standard WDMA I.S.6A and all revisions in effect as of the date of manufacture, and that each such door, at the time of the shipment, is of good material and workmanship and free from defects that would render such door unserviceable or unfit for the ordinary, recommended use. This limited warranty applies to new doors other than those sold "as is".

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Algoma Hardwoods, Inc.
2. Ampco, Inc.
3. Buell Door Company Inc.
4. Chappell Door Co.
5. Eagle Plywood & Door Manufacturing, Inc.
6. Eggers Industries.
7. Graham; an Assa Abloy Group company.
8. Haley Brothers, Inc.
9. Ideal Architectural Doors & Plywood.
10. Ipik Door Company.
11. Lambton Doors.
12. Marlite.
13. Marshfield Door Systems, Inc.
14. Mohawk Flush Doors, Inc.; a Masonite company.
15. Oshkosh Architectural Door Company.
16. Poncraft Door Company.
17. Simpson Door Company
17. Vancouver Door Company.
18. VT Industries Inc.

2.2 EXTERIOR DOORS

A. Exterior Doors Basis of Design: Traditional Exterior Doors as manufactured by Simpson Door Company.
1. Construction:
    a. Grade: Custom.
    b. Faces: Any closed-grain hardwood of mill option.
    c. Core: Particleboard.
    d. Construction: Five or seven plies. Stiles and rails are bonded to core, then entire unit abrasive planed before veneering.
    e. Adhesives: Type I per WDMA TM-6.
5. Thickness: 1-3/4".
6. Panel Detail:
    a. ¾" DHRP
7. Moulding: Ovolo Sticking

2.3 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
   1. Comply with requirements in NFPA 80 for fire-rated doors.

B. Factory machine doors for hardware that is not surface applied.

C. Openings: Cut and trim openings through doors in factory.
   1. Light Openings: Trim openings with moldings of material and profile indicated.
   2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."
   3. Louvers: Factory install louvers in prepared openings.

2.4 SHOP PRIMING

A. Doors for Opaque Finish: Shop prime doors with one coat of wood primer specified in Section 099113 "Exterior Painting." Or Section 099123 "Interior Painting." Seal all four edges, edges of cutouts, and mortises with primer.

2.5 FACTORY FINISHING

A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
   1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.

B. Finish doors at factory that are indicated to receive transparent finish. Field finish doors indicated to receive opaque finish.

C. Use only paints and coatings that 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."

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Examine and prepare openings and substrates using the methods recommended by manufacturer.

3.2 INSTALLATION

A. Hardware: For installation, see Section 087100 "Door Hardware."

B. Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.
   1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.

C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
   1. Clearances: Provide 1/8 inch (3.2 mm) at heads, jambs, and between pairs of doors. Provide 1/8 inch (3.2 mm) from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch (6.4 mm) from bottom of door to top of threshold unless otherwise indicated.
      a. Comply with NFPA 80 for fire-rated doors.

D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

E. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

END OF SECTION 08140

SECTION 08511
ALUMINUM WINDOWS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aluminum-Clad Wood Windows:
   1. Casement windows. (historic)
   2. Double-hung windows. (historic)

1.02 REFERENCES

A. American Architectural Manufacturer Association (AAMA):
   1. AAMA 1304: Voluntary Specification for Forced-Entry Resistance of Side-Hinged Door Systems.
   2. AAMA 2603: Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
   2. ANSI/AAMA/NWWDA 101/I.S.2 /NAFS - Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors.

B. ASTM International (ASTM):
   1. ASTM E 283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
   2. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

C. National Fenestration Rating Council (NFRC):
   1. NFRC 100 - Procedure for Determining Fenestration Thermal Properties.
   2. NFRC 200 - Solar Heat Gain Coefficient and Visible Transmittance.

D. Window and Door Manufacturers Association (WDMA): WDMA I.S.4; Water Repellent Preservative Non-Pressure treatment for Millwork.

1.03 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Shop Drawings: Submit shop drawings indicating details of construction, flashings and relationship with adjacent construction.

D. Selection Samples: For each factory-finished product specified, two complete sets of color chips representing manufacturer's full range of available finishes.

E. Verification Samples: For each factory-finished product specified, two samples, minimum size 6 inches (150 mm) square, representing actual finishes.

F. Quality Assurance Submittals:
   1. Design Data, Test Reports: Provide manufacturer test reports indicating product compliance with indicated requirements.

G. Closeout Submittals: Refer to Section 01700 Closeout Submittals.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Minimum 2 years installing similar assemblies.

B. Mock-Up: Provide a mock-up for evaluation of installation techniques and workmanship.
   1. Mock-ups shall incorporate surrounding construction, including wall assembly fasteners, flashing, and other related accessories installed in accordance with manufacturer's approved installation methods.
   2. Do not proceed with remaining work until workmanship is approved by Architect.
   3. Rework mock-up as required to produce acceptable work.
   4. At Substantial Completion, approved mockups may become part of completed work.
   5. Demolish mockups and remove from site.

C. Pre-installation Meeting: Conduct pre-installation meeting on-site two weeks prior to commencement of installation.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle materials and products in strict compliance with manufacturer's instructions and recommendations and industry standards.

B. Deliver and store assembly materials and components in manufacturer's original, unopened, undamaged containers with identification labels intact. Protect from damage.

1.06 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.07 WARRANTY

A. Manufacturer's Standard Warranty: Assemblies will be free from defects in materials and workmanship from the date of Substantial Completion for the time periods indicated below:
   1. Window Units: 20 years.
   2. Clad Finishes: 20 years against peeling, checking, cracking caulk or color change.
   3. Glazing:
      a. Insulated Glass: 20 years against seal breakage.
      b. Laminated Glass: 5 years.
      c. Specialty Glazing: 5 years against delamination.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers:
   1. Marvin
   2. Sun Windows
   3. Andersen Windows
   4. Jeld-wen
   5. Pella Windows

B. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.02 ALUMINUM-CLAD WOOD WINDOWS

A. Design Requirements:
   1. Compliance: Provide assemblies capable of complying with requirements indicated, based on testing manufacturer's windows that are representative of those specified.
   2. NFRC Requirements: Provide assemblies complying with the following total window ratings:
      a. U-Factor: In accordance with NFRC 100.
      b. Solar Heat Gain Coefficient (SHGC): In accordance with NFRC 200.

c. Visible Transmittance (VT): In accordance with NFRC 200.

B. Installation Accessories:
1. Sealants: Refer to Section 07900 - Joint Sealants.
2. Sealants: Provide manufacturer recommended sealants to maintain watertight conditions.

C. Materials:
1. Exterior Cladding: Roll formed and extruded aluminum.
2. Exterior Wood: Western Pine, preservative treated in accordance with WDMA I.S.4.
3. Interior Wood:
a. Material: Basis of Design: Primed White or White Factory Painted on Pine, White Oak, or Douglas Fir.

D. Finishes:
1. Interior Finishes for Windows:
a. Finish: Standard, provide primed white finish. Owner and Architect to select field-painted color to match interior trim and wall color.
b. Finish: Provide optional pre-finished with factory white paint.
2. Exterior Finishes for Windows:
a. Pre-finished factory coating. Architect to choose from manufacturer's full line of color options.

2.03 ALUMINUM-CLAD WOOD WINDOW ASSEMBLIES

A. Window Fabrication:
1. Window Type: Casement windows.
a. Frame: Head corner joints mechanically fastened over silicone injected nylon corner key. Sill corner joints sealed with foam gasket and screw boss construction. Factory-applied historic profile extrusion.
b. Sash: Corner joints slot-and-tenoned, and mechanically fastened.
c. Glass: Mounted using silicone glazing compound and secured with interior applied profiled wood stops.
2. Window Type: Double-hung windows.
a. Frame: Head corner joints mechanically fastened over silicone injected nylon corner key. Sill corner joints sealed with foam gasket and screw boss construction. Factory-applied historic profile extrusion.
b. Sash: Corner joints slot-and-tenoned, and mechanically fastened.
c. Glass: Mounted using silicone glazing compound and secured with interior applied profiled wood stops.

B. Frames:
1. Material: Select kiln-dried Western Pine, water-repellant, preservative treated in accordance with WDMA I.S.4. Jambliner shall be high impact, exterior weathering grade polyvinyl chloride with locking clutch balance shoes.
2. Jamb Width: Match Historic Replacement.
3. Cladding: Match Historic Replacement.

C. Sashes:
1. Material: Select kiln-dried Western Pine, water-repellant, preservative treated in accordance with WDMA I.S.4. Sash should have a built-in water management system. Glass shall be set to the sash frame using an AAMA approved silicone glazing material and secured with interior profiled wood stops.
2. Sash Thickness: Match Historic Replacement
3. Cladding: Match Historic Replacement.

D. Exterior Trim:
1. Nailing Fin and Drip Cap: Match Historic Replacement.
2. Casing: Match Historic Replacement.
3. Frame Expanders: Match Historic Replacement.
4. Mull Expanders: Match Historic Replacement.
5. Mull Caps: Match Historic Replacement.

E. In-Sash Interior Radius Trim:
   1. Material: Match Historic Replacement.
   2. Pattern: As scheduled and indicated on Drawings/Match Historic Replacement.
   3. Casing: As scheduled and indicated on Drawings/Match Historic Replacement.

F. Factory Applied Extension Jambs: Provide on four sides of frame interior, 21/32 inch (16.7 mm) up to 12 inches (304.8 mm). Match interior frame finish.

G. Weatherstripping:
   1. For Casement Windows: Flexible hinged leaf applied to top of sash and thermoplastic rubber bulb at full perimeter of frame.
   2. For Double-hung Windows: Dual bulb at head and sill, thermoplastic rubber bulb at check rail, rigid vinyl water stops at sill. Weatherstrip to meet or exceed standards required by AAMA 702.
      a. Jamb Liner Color: To Match Window Finish

H. Window Hardware:
   1. Casement Windows:
      a. Sash Limiter: Optional Factory-applied Window Opening Control Device (WOCD) that limits the operation of the sash to an opening of less than 4" (102mm) and meets ASTM F2090-17 specifications for window fall prevention standards. The system should consist of two single action devices that allows for egress (when applied to an egress size window) by bypassing the 4" stop feature.
      b. Hinges: Concealed.
      c. Locks: Multi-point sequential concealed locking system in the jamb opposite the hinge side for casement units.
      d. Handle Profile: Standard, Folding Handle.
      e. Handle Profile: Provide optional T-Handle.
      f. Finish: Architect to choose from manufacturers full line of color options.
   2. Double-Hung Windows:
      a. Locking system that provides locking, unlocking, balancing, and tilting of the sash members.
      b. Sash Limiter: Factory-applied Window Opening Control Device (WOCD) that prevents the window opening more than 4" vertically and meets ASTM F2090-17 specifications for window fall prevention standards. The system should consist of two single action devices that allows for egress (when applied to an egress size window) by bypassing the 4" stop feature.
      c. Balance: Dual block and tackle.
      d. Lock: Recessed cam action.
      e. Stop: Provide Stop in same finish.
      f. Finish: Architect to choose from manufacturers full line of color options.

I. Glass/Glazing for Windows
   1. (Type G-01) Vision – Clear Insulating Solar Low-E Glass Unit:
      a. Select quality complying with ASTM C1036. Insulating glass SIGMA/IGCC certified to performance level CBA when tested in accordance with ASTM E2190.e. Warranty Ten (10) year.
      b. Seal: silicone bedding on interior and exterior
      c. Fill: Air with capillary tubes, Argon
      d. Performance Values: Visible Light Transmission: 32%/43%
         U-Value Winter: .28
         U-Value Summer: .26
         SHGC: .19
         Shading Coefficient: .24/.20
         Outdoor Visible Light Reflectance: 7%/33%
         STC Rating: 32 Minimum
         OITC Rating: 26 Minimum

k. Provide units meeting the aforementioned Performance Values which comply with all requirements of Section 2406 - Safety Glazing of the Kentucky Building Code (KBC - Latest Edition) at all locations indicated in the Drawings or required by the KBC.

J. Grilles:
1. Type: Simulated Divided Lites (SDL).
a. Exterior Muntins:
1) Material: Extruded aluminum permanently applied to exterior of insulating glass unit. Match exterior frame finish.
2) Profiles: Bead stop profiles.
(a) Bead Stop Profile Width: Match Historic Replacement.
3) Pattern: As scheduled and indicated on Drawings/Match Historic Replacement.
4) Finish: Match frame finish.
b. Interior Muntins
1) Material: Clear pine permanently bonded to interior of insulating glass unit. Match finish of interior frame.
2) Width: Match exterior muntin.
2. Type: Grilles Between the Glass (GBG).
a. Material: Made of roll formed aluminum suspended within the air cavity.
b. Profile: Contour.
1) Contour Profile Width: Match Historic Replacement.
2) Pattern: As scheduled and indicated on Drawings.
c. Finish: Match frame finish.

PART 3 EXECUTION

3.01 EXAMINATION AND PREPARATION

A. Inspect and prepare openings and substrates using the methods recommended by the manufacturer for achieving best result for the substrates under project conditions.
1. Inspect assembly components prior to installation.
2. Verify rough opening conditions are within recommended tolerances.
3. Form sheet metal sill pan in accordance with manufacturer's recommendations.
4. Prepare assembly components for installation in accordance with manufacturer's recommendations.

B. Do not proceed with installation until openings and substrates have been prepared using the methods recommended by the manufacturer and deviations from manufacturer's recommended tolerances are corrected. Commencement of installation constitutes acceptance of conditions.

C. If preparation is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.

3.02 INSTALLATION

A. Install assemblies in accordance with manufacturer's installation guidelines and recommendations including the following.

B. Installation of Windows With Nailing Fins: Insert windows into rough opening.
1. Shim side jambs straight.
2. Inspect window for square, level and plumb.
3. Fasten window through nailing fins around entire window.
4. Test and adjust for smooth operation of window.
5. Set all nails below wood surface.

C. Installation of Windows Without Nailing Fins: Insert windows into rough opening.
1. Inspect window for square, level and plumb.

2. Fasten window through jamb, shim and into rough opening jamb.
3. Test and adjust for smooth operation of window.
4. Set all nails below wood surface.
5. Install backer rod and sealant at exterior jambs and head.
6. Apply backer rod and sealant on exterior below sill. Leave gaps for drainage.
7. Seal interior joints between rough opening and jambs with backer rod and sealant.

3.03 FIELD QUALITY CONTROL

A. Manufacturers' Field Services: Field inspections.

3.04 CLEANING AND PROTECTION

A. Clean the exterior surface and glass with mild soap and water.

B. Protect installed windows from damage.

C. Remove and dispose of protective film from glass; touch-up, repair or replace damaged components and assemblies before Substantial Completion.

3.05 SCHEDULES

A. Reference Construction Documents Window Schedules.

END OF SECTION

SECTION 08710

DOOR HARDWARE

THIS SECTION SHALL SERVE AS SUPPLEMENTARY TO
UNIVERSITY OF LOUISVILLE, SECTION : STANDARD FOR DOOR HARDWARE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Section Includes: All door hardware except as otherwise specified or specifically omitted herein.

1.02 RELATED SECTIONS

A. Section 08200 – Molded Wood Doors

1.03 REFERENCES

A. ANSI A115.1 - Specification for Standard Steel Door and Frame Preparation for Mortise Locks for 1 3/8" and 1 3/4" Doors.
B. ANSI A115.2 - Specification for Standard Steel Door and Frame Preparation for Bored or Cylindrical Locks for 1 3/8" and 1 3/4" Doors.
C. ANSI A117.1 - Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.
D. ANSI A156.1 - Butts and Hinges.
E. ANSI A156.3 - Exit Devices.
F. ANSI A156.4 - Door Controls Closers.
G. ANSI A156.5 - Auxiliary Locks and Associated Products.
H. ANSI A156.6 - Architectural Door Trim.
I. ANSI A156.8 - Door Controls Overhead Stops and Holders.
J. ANSI A156.13 - Mortise Locks and Latches.
K. ANSI A156.14 - Sliding and Folding Door Hardware.
L. ANSI A156.15 - Life Safety Closer/Holder/Release Devices.
M. ANSI A156.16 - Auxiliary Hardware.
N. ANSI A156.17 - Self-Closing Hinges and Pivots.
O. ANSI A156.18 - Materials and Finishes.
P. ANSI A156.19 - Power Assist and Low Energy Power Operated Doors.
Q. ANSI A156.21 - Thresholds.
R. ANSI A156.22 - Door Gasketing and Edge Seal Systems.
S. ANSI A156.23 - Electromagnetic Locks.
T. ANSI A156.24 - Delayed Egress Locking Systems.
U. ANSI A156.25 - Electrified Locking Devices.
V. ANSI A156.26 - Continuous Hinges.
W. ANSI A156.31 - Electric Strikes and Frame Mounted Actuators.
X. ANSI/UL 294 - Access Control System Units.
Y. NFPA 105 - Recommended Practice for Installation of Smoke Controlled Door Assemblies.
Z. NFPA 252 – Standard Methods of Fire Tests of Door Assemblies.
AA. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies.
AB. UL 305 – Standard for Panic Hardware.
AC. UL 437 - Standard for Safety (High Security Key Locks).
AD. ULC-S533 – Egress Door Securing and Releasing Devices.
AE. ADA - Americans with Disabilities Act - Accessibility Guidelines for Buildings and Facilities.

1.04 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Special Submittal Requirements: Combine submittals of this Section with Sections listed below to ensure the "design intent" of the system/assembly is understood and can be reviewed together.

C. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction

schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

D. Product Data: Manufacturer's specifications and technical data including the following:
   1. Detailed specification of construction and fabrication.
   2. Manufacturer's installation instructions.
   3. Wiring diagrams for each electric product specified. Coordinate voltage with electrical before submitting.
   4. Submit six copies of catalog cuts with hardware schedule.

E. Shop Drawings - Hardware Schedule: Submit six complete reproducible copies of detailed hardware schedule in a vertical format and organized into door hardware sets indicating complete designations of every item required for each door opening and intended operation:
   1. List groups and suffixes in proper sequence.
   2. Completely describe door and list architectural door number.
   3. Location of door hardware set cross-referenced to drawings, both on floor plans and in door/openings schedule.
   4. Manufacturer, product name, and catalog number.
   5. Function, type, handling, and style.
   6. Size and finish of each item.
   7. Mounting heights.
   8. Explanation of abbreviations and symbols used within schedule.
   9. Fastenings and other attachment methods.
   10. Detailed wiring diagrams, specially developed for each opening, indicating all electric hardware, security equipment and access control equipment, and door and frame rough-ins required for specific opening. Differentiate between manufacturer-installed and field-installed wiring.
      a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
      b. Complete (risers, point-to-point) access control system block wiring diagrams.
      c. Wiring instructions for each electronic component scheduled herein.
   11. Combined submittals are not acceptable. Do not combine hardware schedules with door and frame shop drawings.
   12. Schedules not adhering to these parameters will not be reviewed.

F. Templates: Submit templates and "reviewed Hardware Schedule" to door and frame supplier and others as applicable to enable proper and accurate sizing and locations of cutouts and reinforcing.
   1. Templates, wiring diagrams and "reviewed Hardware Schedule" of electrical terms to electrical for coordination and verification of voltages and locations.
   2. Templates: Furnish hardware templates to each fabricator of doors, frames, and other work to be factory prepared for the installation of hardware. Check shop drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements. If manufacturer requires physical hardware, ship the hardware to them via prepaid freight in sufficient time to prevent any delay in the execution of their work.

G. Samples:
   1. One sample of Lever and Rose/Escutcheon design, (pair).
   2. Three samples of metal finishes.

H. Contract Closeout Submittals: Comply with Section 01700, including all specific requirements indicated.
   1. Operating and Maintenance Manuals: Submit three sets containing the following:
      a. Complete information in care, maintenance, and adjustment, and data on repair and replacement parts, and information on preservation of finishes.
      b. Catalog pages for each product.
      c. Name, address, and phone number of local representative for each manufacturer.
      d. Parts list for each product.
   2. Copy of final "Hardware Schedule", edited to reflect "As Installed".
   3. Copy of final "Keying Schedule".
   4. As installed "Wiring Diagrams" for each piece of hardware connected to power, both low voltage and line voltage.
   5. One set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

I. Keying Schedule: Submit detailed keying schedule, indicating Owner's approved keying system, for Owner's review and approval. Include a schematic keying diagram and index identifying each key set to unique door designations.

1.05 OPERATION AND MAINTENANCE DATA

A. Submit under provisions of Section 01700.

B. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.

1.06 QUALITY ASSURANCE

A. Comply with Section 01400.
   1. Statement of qualification for distributor and installers.
   2. Statement of compliance with regulatory requirements and single source responsibility.
   3. Distributor's Qualifications: Firm with five (5) years experience in the distribution of commercial hardware.
   4. Architectural Hardware Consultant (AHC) to employ full time Architectural Hardware Consultants (AHC) for the purpose of scheduling and coordinating hardware and establishing keying schedule.
      a. Hardware Schedule shall be prepared and signed by an AHC.
      b. AHC shall be available at reasonable times during the Work for consultation with the Architect, Owner, and Contractor.
   5. Installer's Qualifications: Firm with five (5) years experienced in installation of similar hardware to that required for this Project, including specific requirements indicated.
   6. Regulatory Label Requirements: Provide testing agency label or stamp on hardware for labeled openings.
      a. Provide UL listed hardware for all fire-resistance rated openings in conformance with requirements for class of opening scheduled.
      b. Underwriters Laboratories requirements have precedence over this specification where conflict exists.
   7. Single-Source Responsibility: Except where specified in hardware schedule, furnish products of only one manufacturer for each type of hardware.

B. Review Project for extent of finish hardware required to complete the Work. Where there is a conflict between these Specifications and the existing hardware, notify the Architect in writing and furnish hardware in compliance with the Specification unless otherwise directed in writing by the Architect.

C. Exit Doors: Openable at all times from the inside without the use of a key or any special knowledge or effort.

D. Fire and Smoke Resistance Rated Openings: Provide hardware for fire and smoke resistance rated openings in compliance with NFPA 80. This requirement takes precedence over other requirements for such hardware. Provide only such hardware which has been tested and listed by UL for the type and size of door required, and complies with the requirements of the door and the door frame labels. Latching hardware, door closers, ball bearing hinges, and seals are required whether or not listed in the Hardware schedule.
   1. Where panic exit devices are required on fire-rated doors, provide supplementary marking on door UL label on exit device indicating "Fire Exit Hardware".

E. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.

1.07 REGULATORY REQUIREMENTS

A. Conform to applicable State Building Code, NFPA 80, NFPA 101, and UL10C for requirements applicable to fire and smoke resistance rated doors and frames. Obtain necessary approvals from such authorities.

B. Products Requiring Electrical Connection: Listed and classified by Underwriters' Laboratories, Inc., as suitable for the purpose specified and indicated.

C. ANSI/BHMA Standards: Provide products complying with the following standards and requirements specified elsewhere in this Section:
   1. Butts and Hinges: ANSI/BHMA A156.1.
   2. Exit Devices: ANSI/BHMA A156.3.
   3. Door Controls, Closers: ANSI/BHMA A156.4.
   4. Auxiliary Locks and Associated Products: ANSI/BHMA A156.5.
   5. Architectural Door Trim: ANSI/BHMA A156.6.
   6. Template Hinge Dimensions: ANSI/BHMA A156.7.
   7. Door Controls, Overhead Holders: ANSI/BHMA A156.8.

8. Mortise Locks and Latches: ANSI/BHMA A156.13.
9. Sliding and Folding Door Hardware: ANSI/BHMA A156.14.
10. Closer Holder Release Devices: ANSI/BHMA A156.15.
11. Auxiliary Hardware: ANSI/BHMA A156.16.
12. Materials and Finishes: ANSI/BHMA A156.18.
13. Continuous Hinges: ANSI/BHMA A156.26.

D. Accessibility for Disabled Persons: Provide special hardware requirements for knurling, slow acting closers or other barrier free opening requirements as indicated in the Hardware Set Schedule and as required to comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)".

E. Fire Rated Openings and Exit Doors: Provide door hardware for fire rated openings in compliance with NFPA 80. Provide only hardware which has been tested and listed by UL for the types and sizes of doors required, and complies with the requirements of the door and door frame labels. Provide door hardware for exit doors in compliance with NFPA 101. Hardware shall comply with applicable UL standards for the intended use specified, and be listed in UL, or be labeled and listed by another testing laboratory deemed acceptable by the Owner and Architect.
   1. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL10C or NFPA 252.
      a. Test Pressure: After five minutes into the test, the neutral pressure level in the furnace shall be established at 40-inches above the sill.
   2. Smoke-Rated Door Assemblies: Assemblies located in smoke partitions or smoke barriers shall comply with UL1784.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Acceptance at the Site: Individually package each unit of finish hardware complete with proper fastening and appurtenances, clearly marked on the outside to indicate contents and specific locations in the Work. Inventory door hardware on receipt and provide secure locked storage elevated off-ground.

B. Deliver packaged hardware items at the times and to the locations (shop or field) for installation, as directed by the Contractor.

C. Do not store secure locked electronic access control hardware, software, or accessories at project site without prior authorization from Owner.

D. Storage and Protection: Provide secure lock up for hardware. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses, either before or after installation.

1.09 COORDINATION

A. Coordination: Coordinate hardware with other work. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing security and similar requirements indicated, as necessary for the proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents.

B. Upon request, check the Shop Drawings for doors and entrances to confirm that adequate provisions will be made for the proper installation of hardware.

C. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

D. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.

E. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.10 PRE-SUBMITTAL CONFERENCE

A. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Schlage, Door Hardware Subcontractor, University property manager, University Chief Locksmith, University Physical Plant Representatives, and the Design Team to review proper methods and the procedures for receiving, handling, and installing door hardware.
   1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
   2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
   3. Review sequence of operation narratives for each unique access-controlled opening.
   4. Review and finalize construction schedule and verify availability of materials.
   5. Review the required inspecting, testing, commissioning, and demonstration procedures

1.11 ELECTRIC DOOR WIRE HARNESSES

A. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.

1.12 WARRANTY

A. Provide written guarantee from hardware supplier as follows:
   1. Seven years for heavy duty cylindrical (bored) locks and latches.
   2. Five years for exit hardware, devices, and locksets.
   3. Twenty-five years for manual overhead door closer bodies.
   4. Five years for motorized electric latch retraction exit devices.
   5. Two years for electromechanical door hardware.
   6. Three years all other hardware.

B. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

C. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
   1. Structural failures including excessive deflection, cracking, or breakage.
   2. Faulty operation of the hardware.
   3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
   4. Electrical component defects and failures within the systems operation.

1.13 OWNER'S INSTRUCTION

A. Instruct Owner's personnel in operation and maintenance of hardware units.

1.14 MAINTENANCE

A. Extra Materials: Deliver to Owner extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels.
   1. Quantity: Furnish quantity of full-size units equal to 5% of amount installed.
   2. Provide ten extra interchangeable cores for each master keyed group.
   3. Special Tools: Provide special wrenches and tools applicable to each different or special hardware component.
   4. Maintenance Tools: Provide maintenance tools and accessories supplied by hardware component manufacturer.

5. Delivery, Storage and Protection: Comply with Owner's requirements for delivery, storage and protection of extra materials.

B. Maintenance Service: Submit for Owner's consideration maintenance service agreement for electronic products installed.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.

B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
   1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.

C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

D. Approval of manufacturers other than those listed subject to compliance with the provisions of Section 01600.

Item Manufacturer	Approved
Hinges	Bommer
Continuous Hinges	Hager
Pivots	Dorma
Locksets and Latchsets	Schlage
Cylinders/Cores	Schlage
Bolts	Door Controls International
Closers	LCN
Overhead Stops	Dorma
Exit Devices	Von Duprin
Pushes/Pulls	Trimco
Electric Strike Systems	Schlage
Electromag Lock Systems	ABH Manufacturing Inc.
Power Transfer Devices	Dorma
Electric Door Harnesses	Dorma
Kick/Armor Plates/Guards	Hager
Stops	Hager
Seals/Sweeps	Hager
Thresholds	Hager
Foot Operated Door Pull	Rixson
Silencers	Glynn-Johnson
Wall Bumpers	Hager

E. Furnish all items of hardware required to complete the work in accordance with specifications and plans.

F. Carefully inspect Project for the extent of the finish hardware required to complete the Work. Where there is a conflict between these Specifications and the existing hardware furnish finish hardware to specification.

2.02 MATERIALS

When indicated in the associate door hardware schedule and drawings. The following products shall be utilized:

A. Fasteners: Where through bolts are specified for composite filled wood faced fire doors, furnish sex bolts sized to the thickness of the door so that when tightened, compression of the door will not occur. Wood screws shall be full threaded. Expansion screws shall be of the double cinch anchor type. All screw heads shall be countersunk oval or flat head as appropriate and, when necessary to accommodate the thickness of material, undercut. Material of fasteners shall be ferrous or non-ferrous compatible with the product being applied. Length of

fasteners shall be sufficient to afford adequate thread engagement. Finish of exposed fasteners shall match item being fastened.

1. Machine Screws: For metal doors and frames. Install into drilled and tapped holes.
2. Wood Screws: For wood doors and frames.
3. Threaded-to-the-Head Wood Screws: For fire-rated wood doors.
4. Screws: Phillips flat head. Finish screw heads to match surface of hinges.

B. Base Metals: Produce door hardware units of base metal, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18. Do not furnish manufacturer's standard materials or forming methods if different from specified standard.

C. Hinges:
   1. Template screw hole locations.
   2. Minimum of 2 permanently lubricated non-detachable bearings.
   3. Equip with easily seated, non-rising, non-removable pins.
   4. Sufficient size to allow 180-degree swing of door.
   5. Furnish hinges with five knuckles and flush bearings.
   6. Provide hinge type as listed in schedule.
   7. Furnish 3 hinges per leaf to 7 foot 6 inch height. Add one for each additional 30 inches in height or fraction thereof.
   8. Provide 4 1/2 inch x 4 1/2 inch size V.I.N. and provide 5 inch x 4 1/2 inch hinges on doors greater than 3'-0" width.
   9. Tested and approved by BHMA/ANSI A156.1 for all applicable ANSI Standards for type, size, function and finish.
   10. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.
   11. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 certified continuous geared hinge. with minimum 0.120-inch thick extruded 6060 T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.

D. Geared Continuous Hinges:
   1. Tested and approved by BHMA for ANSI A156.26-1996 Grade 1.
   2. Anti-spinning through fastener.
   3. Non-handed.
   4. Lifetime warranty.
   5. Provide Fire Pins for 3-hour fire ratings.
   6. Sufficient size to permit door to swing 180 degrees.

E. Cylindrical Type Locks, Latchsets, and Keying:
   1. Tested and approved by BHMA for ANSI A156.2, Series 4000, Operational Grade 1, Heavy Duty.
   2. Removable Cores: Provide removable cores as specified, core insert, removable by use of a special key, and for use with only the core manufacturer's cylinder and door hardware.
   3. Fit modified ANSI A115.2 door preparation.
   4. Extended Cycle Test: Locks to have been cycle tested per ANSI/BHMA A156.2 requirements to two-million cycles.
   5. Locksets and cores to be of the same manufacturer to maintain complete lockset warranty.
   6. Minimum ten (10) years experience designing secured master key systems and have on record a published security keying system policy.
   7. Locksets to have anti-rotational studs that are thru-bolted.
   8. Patented core and cylinders.
   9. Keyed lever shall not have exposed "keeper" hole.
   10. Each lever to have independent spring mechanism controlling it.
   11. 2-3/4 inch backset.
   12. 9/16 inch throw latchbolt.
   13. Outside lever sleeve to be seamless, of one-piece construction made of a hardened steel alloy.
   14. Keyed lever to be removable only after core is removed, by authorized control key.

15. Provide locksets with 7-pin removable and interchangeable cores compatible with scheduled lock and latches and with appropriate cam or tailpiece.
16. Hub, side plate, shrouded rose locking pin to be a one-piece casting with a shrouded locking lug.
    a. Solid Cast Levers
    b. Non-handed and fully field reversible.
17. Locksets outside locked lever must withstand a minimum 1400 inch pounds of torque. In excess of that, a replaceable part will shear. Key from outside and inside lever will still operate lockset.
18. Core face must be the same finish as the lockset.
19. Functions and design as indicated in the hardware groups.
20. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
    a. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
    b. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
    c. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
    d. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.
21. Standards: Comply with the following:
    a. Strikes for Mortise Locks and Latches: BHMA A156.13.
    b. Strikes for Bored Locks and Latches: BHMA A156.2.
    c. Strikes for Auxiliary Deadlocks: BHMA A156.36.
    d. Dustproof Strikes: BHMA A156.16.

F. Exit Devices:
1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer’s catalog and template book for specific requirements.
3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
5. Electromechanical Options: Subject to same compliance standards and requirements as mechanical exit devices, electrified devices to be of type and design as specified in hardware sets. Include any specific controllers when conventional power supplies are not sufficient to provide the proper inrush current.
6. Motorized Electric Latch Retraction: Devices with an electric latch retraction feature must use motors which have a maximum current draw of 600mA. Solenoid driven latch retraction is not acceptable.
7. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
    a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
    b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
8. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
9. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2” wide stiles.
10. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
11. Rail Sizing: Provide exit device rails factory sized for proper door width application.
12. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.
13. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory

G. Door Closers:
1. Tested and approved by BHMA for ANSI 156.4, Grade 1.
2. Closer shall have extra-duty arms and knuckles.
3. Conform to ANSI 117.1.
4. Maximum 2 7/16 inch case projection with non-ferrous cover.
5. Separate adjusting valves for closing and latching speed, and backcheck.
6. Provide adapter plates, shim spacers and blade stop spacers as required by frame and door conditions.
7. Full rack and pinion type closer with 1½" minimum bore.
8. Mount closers on non-public side of door, unless otherwise noted in specification.
9. Closers shall be non-handed, non-sized and multi-sized 1 through 6.
10. Provide closers without hold-open capability at all smoke/fire resistance rated doors.
11. Surface Closers: Provide cam and roller closers with adjustable spring power. Opening force shall comply with ADA and ANSI A117.1 where indicated with "Barrier Free" closers in the hardware sets. Closers must have separate adjustments for latch speed, sweep speed and backcheck. Closers to have track arms and square cornered metal covers. Provide built-in stops and hold opens where indicated in hardware sets Provide brackets, drop plates, spacer blocks and accessories to ensure proper installation. Closers, covers, brackets and other components shall not extend below bottom of top horizontal rail of door. Use manufacturer's chart for recommended sizes when adjusting closers. Provide one of the following heavy-duty closers:
    a. Dorma (DOR); TS9315 series
    b. SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT): 421-CT series.
    c. Corbin-Russwin, an ASSA ABLOY Group company : DC5200 series.
    d. LCN Closers; an Allegion Plc company (LCN): 4040XP series

H. Door Control Devices:
1. Coordinator: Provide integral device mounted at header, complete with closer brackets as required. Provide with filler brackets as required for full opening width.
    a. "3700 Series x Filler", ABH Manufacturing
    b. "2000 Series x Filler", Don-Jo Manufacturing.
    c. "600 Series x Filler", Door Controls International.
    d. "COR Series X Filler"; Ives; Division of Ingersoll-Rand
    e. "1600 Series x Filler"; Rockwood Mfg.; Division of Assa-Abloy
    f. "3094 Series x Filler"; Trimco

2. Wall Bumpers:
    a. Hager Companies (HAG).
    b. IVES Hardware, an Allegion Plc company (IVS)
    c. Hiawatha (HIW).
    d. Burns (BRN).
    e. Rockwood Manufacturing Company, an ASSA ABLOY Group company (RM).
    f. Trimco (TBM).

3. Door Stops:
    a. Low Dome Floor Stops:
        1) "1440", Don-Jo Manufacturing
        2) "241F"; Hager
        3) "FS436", Ives; Division of Ingersoll-Rand
        4) "441"; Rockwood Mfg.; Division of Assa-Abloy
        5) "1211"; Trimco
    b. High Dome Floor Stops:
        1) "1442", Don-Jo Manufacturing
        2) "243F"; Hager
        3) "FS438", Ives; Division of Ingersoll-Rand
        4) "443"; Rockwood Mfg.; Division of Assa-Abloy
        5) "1211 x Riser"; Trimco

4. Silencers:
   a. Glynn-Johnson; an Allegion Plc company (GJ).
   b. Hager Companies (HAG).
   c. IVES Hardware, an Allegion Plc company (IVS)
   d. McKinney Products Company; an ASSA ABLOY Group company (MCK).
   e. Rockwood Manufacturing Company, an ASSA ABLOY Group company (RM).
   f. Trimco (TBM).

I. Power Transfer Devices:
   1. Electrified Quick Connect Continuous Geared Transfer Hinges: Provide electrified transfer continuous geared hinges with a 12" removable service panel cutout accessible without de-mounting door from the frame. Furnish with Molex™ standardized plug connectors with sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.
   2. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.

J. Power-Assist Low Energy Operators: Provide low energy operators that operate manually unless power-assist is activated and when power is lost. Operators shall comply with ANSI A156.19. Activation of power-assist will open the door to 90 degrees. Provide actuators as specified in hardware sets. Coordinate electrical connection and installation with Division 26. Provide operators with the following:
   1. Heavy-duty commercial construction with electromechanical power-assist operation.
   2. Micro-processor controlled
   3. Adjustable opening speed, adjustable closing speed, and adjustable hold-open period.
   4. Safety-stop feature: If object or obstruction is encountered during opening and/or closing cycles, door operator stops and slowly returns to closed or open position respectively.
   5. Safety circuit: If actuator switch is activated when door is latched or locked, operator resets without damage to door or operator
   6. Full continuous cover for pair of operators on pair of doors, or for single operator and hydraulic closer on pair of doors.
   7. Detailed wiring diagrams including point-to-point hookup of all affected components.
   8. Provide one of the following operators:
      a. "ED900"; DORMA USA, Inc.
      b. "GT 500"; Gyro-Tech; Division of Nabco Entrances
      c. "Senior Swing"; LCN; Division of Ingersoll-Rand
      d. "D-4990"; Precision Hardware, Inc.; Division of Stanley Security Solutions

K. Electric Strikes:
   1. Standard Electric Strikes, Wood Doors / Hollow Metal Frame: Electric strikes tested to ANSI/BHMA A156.31, Grade 1, for use on non-rated or fire rated openings. Strikes shall be of stainless steel construction tested to a minimum of 1500 pounds of static strength and 70 foot-pounds of dynamic strength with a minimum endurance of 1 million operating cycles. Provide strikes with 12 or 24 VDC capability, fail-secure unless otherwise specified. Where specified provide latchbolt and latchbolt strike monitoring indicating both the position of the latchbolt and locked condition of the strike.

L. Kickplates:
   Provide with four beveled edges, full-width kickplates on both sides of entry doors. Kickplates to be minimum 6-inch-high stainless steel at aluminum entrance doors and 10-inch high elsewhere. Furnish pan-head countersunk screws to match finish. Do not remove protective film until after final cleaning is completed.

M. Seals:
   1. All seals shall be finished to match adjacent frame color.
   2. Seals shall be furnished as listed in schedule.
   3. Integral intumescent seals shall be provided in all fire and smoke resistance rated wood doors as required for UL10C compliance per Specification Section 08211 - Flush Wood Doors.
   4. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated based on testing according to ASTM E 1408.
   5. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

N. Silencers: Silencers for Metal Door Frames: BHMA A156.16, Grade 1; neoprene or rubber, minimum diameter 1/2 inch (13 mm); fabricated for drilled-in application to frame.

O. Door Protective Trim
   1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
   2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
   3. Where plates are applied to fire rated doors with the top of the plate more than 16" above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer's catalog and template book for specific requirements for size and applications.
   4. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:
      a. Stainless Steel: 300 grade, 050-inch thick.
   5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
   6. Door Closers for Means of Egress Doors: Comply with NFPA 101. Door closers shall not require more than 30 lbf (133 N) to set door in motion and not more than 15 lbf (67 N) to open door to minimum required width.

2.03 FINISH

A. Generally to be BHMA 626 Satin Chrome. (Protection plates, guards, pushes and pulls shall be BHMA 630).

B. Designations used in Schedule of Finish Hardware - 3.04, and elsewhere to indicate hardware finishes are those listed in ANSI/BHMA A156.18 including coordination with traditional U.S. finishes shown by certain manufacturers for their products

C. Powder coat door closers to match other hardware, unless otherwise noted.

D. Aluminum items shall be finished to match predominant adjacent material. Seals to coordinate with frame color.

2.04 KEYS AND KEYING:

A. Provide keyed construction cores and keys during the construction period. Construction control and operating keys and core shall not be part of the Owner's permanent keying system or furnished in the same keyway (or key section) as the Owner's permanent keying system. Permanent cores and keys (prepared according to the accepted keying schedule) shall be furnished by the Contractor to the Owner.

B. Cylinders, removable and interchangeable.

C. Permanent keys and cores: Owner supplied permanent keys and keying schedule.

D. Transmit Grand Master keys, Master keys and other Security keys to Owner by Registered Mail, return receipt requested. Supply construction master keys to Contractor when cylinders are delivered, for use during construction.
   a. Prior to the scheduled completion of the project, manufacturer shall ship all permanent keys, including grand master keys, master keys, change keys, control keys and blank keys directly to the Owner via registered mail or other pre-approved means. Under no circumstance shall any permanent keys be furnished direct to the Contractor.

E. Furnish keys in the following quantities:
   1. 5 each Great-Grandmaster Keys
   2. 6 each Grand Master Keys
   3. 6 each Master Keys - per master

4. 3 each Cylinder Change Keys - per each keyed core.
5. 2 each Control Keys.
6. 100 each - Blank Keys
7. 15 each Construction Master Keys. (For Use During Construction, provide Architect with 1 each)

F. The Owner, or the Owner's agent, will install permanent cores and return the construction cores to the Hardware Supplier. Construction cores and keys remain the property of the Hardware Supplier.

G. Keying Schedule: Arrange for a keying meeting, and programming meeting with Architect, Owner and hardware supplier, and other involved parties to ensure locksets and locking hardware, are functionally correct and keying and programming complies with project requirements. Furnish 3 typed copies of keying and programming schedule to Architect.

2.05 MAINTENANCE

A. Maintenance Tools and Instructions: Furnish a complete set of special tools and maintenance instructions as needed for the Owner's continued maintenance and adjustment of hardware.

B. Owner's Manual: Furnish one complete set of installation instructions, including special adjusting tools and maintenance instructions listing routine maintenance procedures, possible breakdown and repairs, and troubleshooting guides to the owner. Furnish information in compact disk form, one for each applicable manufacturer; include internet web links for each manufacturer.
   1. Furnish one complete three-ring binder catalog for each manufacturer listed in the approved hardware schedule.
   2. Furnish complete biting list indicating how each lock and cylinder on the project is keyed.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verification of conditions: Examine doors, frames, related items and conditions under which Work is to be performed and identify conditions detrimental to proper and or timely completion.
   1. Do not proceed until unsatisfactory conditions have been corrected.

B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.02 HARDWARE LOCATIONS

A. Mount hardware units at heights indicated in the following publications except as specifically indicated or required to comply with the governing regulations.
   1. Recommended Locations for Builder's Hardware for Standard Steel Doors and Frames, by the Door and Hardware Institute (DHI).
   2. NWWDA Industry Standard I.S.1.7, Hardware Locations for Wood Flush Doors.

3.03 INSTALLATION

A. Conform to local governing agency security ordinance.

B. Install each hardware item per manufacturer's instructions and recommendations. Do not install surface mounted items until finishes have been completed on the substrate. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

C. ADA Standard: Conform to ADA and ANSI A117.1 for positioning requirements for disabled.

D. Installed hardware using the manufacturers fasteners provided. Drill and tap all screw holes located in metallic materials. Do not use "Riv-Nuts" or similar products.

E. Protect adjacent surfaces with removable covering.

F. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
   1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.

G. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

3.04 FIELD QUALITY CONTROL AND FINAL ADJUSTMENT

A. Manufacturer/Distributor's Field Services: After installation is complete, AHC from hardware distributor shall inspect completed door openings on site to verify installation of hardware is complete and properly adjusted, in accordance with both the Contract Documents and final shop drawings.
   1. Check and adjust closers to ensure proper operation.
      a. Adjust closer to complete full closing cycle in less than 4 to 6 seconds without abrupt change of speed between "Sweep" and "Latch" speeds.
      b. Adjust "Backcheck" according to manufacturer's instructions.
      c. Set exterior doors closers to have 8.5 lbs maximum pressure to open, interior non-rated at 5 lbs, rated openings at 12lbs
   2. Check latchset, lockset, and exit devices are properly installed and adjusted to ensure proper operation.
      a. Verify levers are free from binding.
      b. Ensure latchbolts and dead bolts are engaged into strike and hardware is functioning.
   3. Report findings, in writing, outlining corrective actions and recommendations.

3.05 CLEANING AND PROTECTION

A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

B. Clean adjacent surfaces soiled by door hardware installation.

C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.06 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.07 SCHEDULE OF FINISH HARDWARE

A. General Notes:
   1. Provide permanent Schlage Small Format 7-Pin Interchangeable Cores (IC) typical at all locksets, panic exit devices, fire exit devices, etc. Coordinate exact keying requirements with Owner. Provide construction cores as required to secure building during construction.
   2. Provide UL Listed assemblies at all fire and smoke resistance rated openings (reference Opening Schedule and Construction Drawings for delineation of rated openings) as required for UL10C compliance, including but not limited to UL listed overlapping metal astragals at all smoke and fire double doors.
   3. Installation of all fire door assembly components shall comply with the requirements listed in NFPA 80.
   4. Provide consistent and exact 1/8" gap between all armor plates and door edging.
   5. Provide 5" high hinges for all doors 3'-6" in width and over unless otherwise noted.
   6. Coordinate installation of all Contractor Furnished and Owner Furnished electronic devices and provide all wiring, components, etc. as required for a complete and functioning installation.
   7. Contractor may combine power supplies for electronic devices where permitted by requirements of power supply and electronic device manufacturers provided adequate power is provided to all devices.
   8. Contractor shall be responsible for final selection/coordination and accessorizing of all power supply systems.
   9. Provide all accessories, brackets, etc. required for proper mounting and configuration of all electric strikes, electromagnetic locks, electrified panics, power supplies, etc.
   10. Power for all electronic security and locking devices shall be fed from emergency circuits - coordinate with Electrical Scope of Work.
   11. Provide glass lite shim kits if required at interface between panic devices and aluminum doors.
   12. Provide tactile handicapped warning for latchsets/locksets at all locations required by all applicable Codes.
   13. Provide training and initial programming of all Contractor Furnished electronic devices (coordinate programming req's with Owner).

14. All Proximity Sensors shall be computer networked and managed by facility managed computer system. System shall be capable of expanding by up to 25 openings without requiring an upgrade.
15. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
16. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.

B. Legend of Listed Manufacturers:
1. AA ASSA ABLOY (Phoenix, AZ)
2. AB Architectural Builders Hardware, Inc. (Elk Grove Village, IL).
3. AL Alarm Lock (Amityville, NY).
4. AR Adams RiteManufacturing Co. (Pomona, CA).
5. BE Best Access Systems (Indianapolis, IN)
6. BY By Others (Monroe, NC)
7. CKN K.N. Crowder (Lewiston, NY)
8. DJ Don-Jo (Sterling, MA)
9. DM Dorma Door Controls (Lexington, KY)
10. DO Dorma Architectural Hardware (Reamstown, PA).
11. HA Hager Companies (St. Louis, MO).
12. KA Kawneer NA (Norcross, GA).
13. LC LCN Closers (Princeton, IL).
14. NA National Guard (Memphis, TN)
15. PR Precision (Indianapolis, IN)
16. RC RCI (San Leandro, CA)
17. RI Rixson Specialty Door Controls (Monroe, NC).
18. SA Saflok Mfg. (Apopka, FL)
19. SC Schlage Lock Co., Division of IR Safety and Security (Colorado Springs, CO).
20. SE Securitron Magnalock Corporation (Sparks, NV).
21. SP StepNPull (Springfield, MO)
22. ST Stanley Door Systems (Chatsworth, CA).
23. TR Trimco (Oceanside, CA)
24. VO Von Duprin (Indianapolis, IN).
25. ZE Zero International, Inc. (Bronx, NY).

C. The items listed in the following "Schedule of Finish Hardware" shall conform throughout to the requirements of the foregoing specification.

D. Reference Opening Schedule on the Construction Drawings for additional information pertaining to individual door openings.

Schedule of Finish Hardware			
Number	**Description**	**Product Description**	**Product Number**

Hardware Set H-01 (EXTERIOR EGRESS – ELECTRIFIED SINGLE DOOR)				
Refer to Door schedule door numbers				
3	Hinges			
1	Egress Lockset			
1	Power Supply			
1	Closer			
1	Acoustic Gasketing			
1	Threshold	Flush		
1	Sweep			
1	Panic Exit Device	Installed in direction of egress		

Description of Operation – Electronic Door Hardware	
Type	Interior Door – positive latching required. Electric strike (C.F.C.I.) is fail secure.
Activation (Remote)	Remote deactivation controls for owner (O.F.O.I.) at all momentarily energizes and retracts electric strike (C.F.C.I.), allowing door to be pulled open.
Activation (Manual)	Key manually unlocks lockset from common side of door opening. Door always unlocked from interior side of door opening. By Key from common and by unrestricted lever/panic device from interior.
Fire Alarm	No interface required. (Fail Safe)

Remarks
Entry when locked by valid input at reader to retract latch or manual key. Free egress at all times. Push / Pull operation by exit device dogging with keyed lock cylinder. Door position switch to monitor opening status. Exit device has integral RX feature to signal egress. Coordinate with electrical and security contractors, and University of Louisville

END OF SECTION

SECTION 08870

ARCHITECTURAL PRIVACY FILMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes
   1. This Section specifies window films of the following types:
      a. Interior/Exterior Window Film
      b. Privacy Window Film

B. Related Sections
   1. Section 08511 – Aluminum Windows
   2. Section 12241 – Roller Window Shade

1.02 REFERENCES

A. ASTM International (ASTM)
   1. ASTM E 903 - Standard Methods of Test for Solar Absorbance, Reflectance and Transmittance of Materials Using Integrating Spheres
   2. ASTM E 308 - Standard Recommended Practice for Spectophotometry and Description of Color in CIE 1931 System.

1.03 ACTION SUBMITTALS

A. Manufacturer's Product Data for specified products.
B. Submit shop drawings showing layout, profiles, and product components, including dimensions, anchorage, and accessories.
C. Samples: 4 inch by 4 inch Samples of specified color and pattern for verification.
D. Submit operation and maintenance data for installed products, including precautions against harmful cleaning materials and methods.
E. Mock ups: as required.

1.04 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Obtain all products in this section from a single Manufacturer with a minimum of 10 years' experience.
B. Installer: Installation shall be performed by a trained and qualified installer, specialized and experienced in work required for this project. A list of experienced installation integrators is available at 3M.com/AMD or 3M Commercial Solutions Division at 1-888-650-3497.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact.
B. Store products protected from weather, temperature, and other harmful conditions as recommended by supplier.
C. Product must remain in original plastic bag and boxes and have storage conditions as follows:
   1. 40 °F – 90 °F (4 °C - 32 °C)
   2. Out of direct sunlight
   3. Clean dry area
   4. Original container
   5. Do not stack boxes over six (6) units high. Excessive weight can damage the film
   6. Products are not recommended for interior applications where condensation consistently occurs.
   7. Handle products in accordance with manufacturer's instructions.
   8. Shelf life: 2 years

1.06 PROJECT/SITE CONDITIONS

A. Apply materials when environmental conditions are within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits. Application temperature range is 60 °F – 100 °F (16 °C – 38 °C).
B. Environmental Limitations: Do not install 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.

1.07 WARRANTY

A. Manufacturer's Warranty: Submit manufacturer's standard warranty document by authorized manufacturer.

1.08 EXTRA MATERIALS

A. Furnish 2 percent extra material at time of installation. Deliver in protective packaging for storage and label contents appropriately.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Manufacturers: Basis of Design is as follows:
1. 3M Company – Commercial Solutions Division [CSD]
3M Center, Building 0220-12-E-04 St. Paul, MN 55144-1000, USA 1-888-650-3497

2.02 MATERIAL STANDARD

A. Design based upon 3M™ CRYSTAL Glass Finishes.

2.03 MATERIAL PROPERTIES

A. General: Glass finishes field-applied application to glass or plastic material as visual opaque or decorative film.
B. Film: Vinyl
C. Option to Electrocut (by other than Manufacturer)
D. Adhesive: Acrylic, Pressure Sensitive, Permanent
E. Liner: Silicone-coated Polyester
F. Thickness (Film and Adhesive without Liner):
1. Dusted - 3.2 mils (81 microns)
2. Frosted - 4.7 mils (120 microns)
G. Fire Performance: Surface burning characteristics when tested in accordance with ASTM E84, Class A: 1. Flame Spread: 25 maximum. 2. Smoke Developed: 450 maximum.

2.04 OPTICAL PERFORMANCE

A. CRYSTAL Dusted Decorative / Privacy Glazing Film:
1. Ultraviolet Transmittance (ASTM E 903): 27 percent.
2. Visible Light Transmittance (ASTM E 903, ASTM E308): 85 percent.
3. Visible Light Reflectance (ASTM E 903): 79 percent.
4. Solar Heat Transmittance: 76 percent.
5. Solar Heat Reflectance: 7 percent.
6. Shading Coefficient at 90 Degrees (Normal Incidence) (ASTM E 903): 0.93.
B. CRYSTAL Frosted Decorative / Privacy Glazing Film:
1. Ultraviolet Transmittance (ASTM E 903): 20 percent.
2. Visible Light Transmittance (ASTM E 903, ASTM E308): 72 percent.
3. Visible Light Reflectance (ASTM E 903): 12 percent.
4. Solar Heat Transmittance: 64 percent.
5. Solar Heat Reflectance: 10 percent.
6. Shading Coefficient at 90 Degrees (Normal Incidence) (ASTM E 903): 0.82.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrate(s) for compliance. Do not proceed with installation until unsatisfactory conditions have been

corrected.

B. Refer to the applicable 3M Technical Data Sheet to determine compatibility of finish to substrate.
C. Do not proceed with installation until unsatisfactory conditions have been corrected.
D. Responsibility for state of surfaces prior to installation to be pre-determined by installation specialist.
E. Scheduling of installation by Owner or its representative implies that substrate and conditions are prepared and ready for product installation per the recommendations of the installation specialist.
F. Proceeding with installation implies installer's acceptance of substrate and conditions.

3.02 SURFACE PREPARATION

A. Comply with all manufacturer's instructions for surface preparation.
B. Thoroughly clean substrate of substances that could impair the overlay's bond, including mold, mildew, oil, grease.
C. Re-clean surfaces with appropriate surface prep solvent and remove any haze or surface contamination.

3.03 APPLICATION

A. Application must be performed by qualified installer.
B. Do not proceed with installation until all finishing work has been completed in and around the work area.
C. Verify pattern prior to material acquisition.
D. Comply with manufacturer's installation instructions applicable to products and applications indicated, except where more stringent requirements apply.
E. Install substrates with no gaps or overlaps. Form smooth, wrinkle-free, bubble-free surface for finished installation.
F. Remove air bubbles, wrinkles, blisters and other defects. Use approved procedures to prevent the formation of air bubbles, wrinkles, blisters and other defects.
G. Refer to the applicable 3M Installation Guide for additional details.

3.04 CLEANING AND PROTECTION

A. Use cleaning methods recommended by architectural surfacing manufacturer for applicable environment.
B. Protect completed glass finish during remainder of construction period.
C. Consult with authorized installation specialist for project specifics.

END OF SECTION 08140

DIVISION 09

FINISHES

SECTION 09019

MAINTENANCE OF PAINTING AND COATING

PART 1 GENERAL

1.1 SUMMARY

A. Section includes historic treatment of painting as follows:
   1. Monochromatic painting of historic surfaces.
   2. Staining and varnishing of historic wood.

1.2 UNIT PRICES

A. Work of this Section is affected by unit prices specified in Section 012200 "Unit Prices."

1.3 DEFINITIONS

A. General: See Section 013591 "Historic Treatment Procedures" for other historic treatment definitions.

B. Modern Paint Materials: Paint materials not designed to match historic paint formulations but that may be required to match historic paint colors.

1.4 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified historic treatment specialist to perform preconstruction testing for each indicated type of historic painted surface.
   1. Select sizes and configurations of existing work to adequately demonstrate capability of products to comply with requirements.
   2. Test historic treatment methods for effectiveness and compliance with specified requirements.
   3. Notify Architect seven days in advance of the dates and times when testing will be performed.

1.5 ACTION SUBMITTALS

A. Product Data: For each paint system and type of product indicated.

B. Samples: For each type of paint system and each color and gloss.
   1. For each painted color being matched to a standardized color-coding system, include the color chips from the color-coding-system company with Samples.
   2. Label each Sample for location and application.

C. Product List: Printout of current "MPI Approved Products List" for each MPI-product category specified in paint systems, with the proposed product highlighted.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified historic treatment specialist.

B. Color Matching Certificate: For computer color matching of historic colors, by paint manufacturer.

C. Preconstruction Test Reports: For historic treatment of painting.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra paint materials from the same production runs that match products applied and that are packaged with protective covering for storage and identified with labels describing contents, including material, finish, source, and location on building.
   1. Quantity: Furnish Owner with an additional 3 percent, but not less than 1 gal. (3.8 L) or one case, as appropriate, of each material and color applied.

1.8 QUALITY ASSURANCE

A. Historic Treatment Specialist Qualifications: A qualified historic painting specialist.

B. Color Matching: Custom computer-match paint colors to colors indicated on Drawings.

C. Mockups: Provide mockups for each type of coating system and substrate indicated and each color and finish required to demonstrate aesthetic effects and set quality standards for materials and execution. Duplicate appearance of approved Sample submittals.
   1. Surface-Preparation Mockups: On existing surfaces using applicable specified methods of cleaning and another surface preparation, provide mockup sample of at least 100 sq. ft. (9 sq. m).

2. Coating Mockups: Architect will select two wall surfaces of at least 100 sq. ft. (9 sq. m) to represent surfaces and conditions for application of each type of coating system under same conditions as the completed Work.

D. Reinstallation Conference: Conduct conference at Project site.

1.9 SEQUENCING AND SCHEDULING

A. Perform historic treatment of painting in the following general sequence:
1. Dismantle existing surface-mounted objects and hardware except items indicated to remain in place. Tag items with location identification and protect.
2. Verify that temporary protections have been installed according to Section 013591 "Historic Treatment Procedures" and Section 015000 “Temporary Facilities and Controls." Install additional protections to suit Project conditions.
3. Examine condition of surfaces to be painted.
4. Remove existing paint to the degree required for each substrate and surface condition of existing paint.
5. Apply paint system.
6. Reinstall dismantled surface-mounted objects and hardware, except as otherwise indicated.

PART 2 PRODUCTS

2.1 CLEANING MATERIALS

A. Water: Potable.

B. Hot Water: Water heated to a temperature of 140 to 160 dig F (60 to 71 dig C).

C. Detergent Solution: Solution prepared by mixing 2 cups (0.5 L) of tetra sodium polyphosphate, 1/2 cup (125 mL) of laundry detergent that contains no ammonia, 5 quarts (5 L) of 5 percent sodium hypochlorite bleach, and 15 quarts (15 L) of warm water for each 5 gal. (20 L) of solution required.

D. Mildewcide: Commercial proprietary mildewcide or a job-mixed solution prepared by mixing 1/3 cup (80 mL) of household detergent that contains no ammonia, 1 quart (1 L) of 5 percent sodium hypochlorite bleach, and 3 quarts (3 L) of warm water.

E. Abrasives for Ferrous Metal Cleaning: Aluminum oxide paper, emery paper, fine steel wool, steel scrapers, and steel-wire brushes of various sizes.

F. Rust Remover: Manufacturer's standard phosphoric acid-based gel formulation, also called "naval jelly," for removing corrosion from iron and steel.

2.2 PAINT REMOVERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. ABR Products, Inc.
2. Back to Nature Products Company.
3. Cathedral Stone Products, Inc.
4. Dumond Chemicals, Inc.
5. Hydroclean; Hydrochemical Techniques, Inc.
6. PROSOCO, Inc.

B. Alkaline-Paste Paint Remover: Manufacturer’s standard alkaline-paste formulation for removing paint and coatings from masonry, stone, wood, plaster, and metal; and containing no methylene chloride.

C. Low-Odor, Solvent-Type Paint Remover: Manufacturer’s standard low-odor, water-rinseable solvent- type gel formulation for removing paint and coatings from masonry, stone, wood, plaster, and metal; and containing no methanol or methylene chloride.

2.3 MODERN PAINT MATERIALS

A. General: See Section 099113 “Exterior Painting,” Section 099123 “Interior Painting,” and Section 099300 "Staining and Transparent Finishing" for modern paint materials and application methods unless otherwise indicated in this Section. Furnish in historic colors as indicated.

B. VOC Content of Field-Applied Interior Paints and Coatings: For field applications that are inside the weatherproofing system, paints and coatings shall comply with the following VOC content limits when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
   1. Flat Paints and Coatings: VOC not more than 50 g/L.
   2. Nonflat Paints and Coatings: VOC not more than 150 g/L.
   3. Primers, Sealers, and Undercoaters: VOC not more than 200 g/L.
   4. Anticorrosive and Antirust 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.

C. Low-Emitting Paints and Coatings: Paints and coatings used inside the weatherproofing system 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."

D. Transition Coat: Paint manufacturer's recommended coating for use where a residual existing coating is not compatible with the paint system.

2.4 PATCHING MATERIALS

A. Wood Patching Compound: Two-part, epoxy-resin patching system; knife-grade formulation as recommended by manufacturer for type of wood repair indicated, tooling time required for the detail of work, and site conditions. Compound shall be designed for filling voids in damaged wood materials that have deteriorated due to weathering and decay. Compound shall be capable of filling deep holes and spreading to feather edge.

B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   1. Abatron, Inc.; LiquidWood with WoodEpox.
   2. Advanced Repair Technology, Inc.; Primatrate with Flex-Tec HV.
   3. ConServ Epoxy LLC; Flexible Epoxy Consolidant 100 with Flexible Epoxy Patch 200.
   4. Polymeric Systems, Inc.; QuickWood.
   5. West System Inc.; West System.
   6. Wood Care Systems; ROTFIX with SCULPWOOD.

C. Metal Patching Compound: Two-part, polyester-resin metal patching compound; knife-grade formulation as recommended by manufacturer for type of metal repair indicated, tooling time required for the detail of work, and site conditions. Compound shall be produced for filling metal that has deteriorated due to corrosion. Filler shall be capable of filling deep holes and spreading to feather edge.

D. Cementitious Patching Compounds: Cementitious patching compounds and repair materials specifically manufactured for surface preparation and sanding of cementitious substrates prior to repainting; formulation as recommended by manufacturer for type of cementitious substrate indicated, exposure to weather and traffic, detail of work, and site conditions.

E. Gypsum-Plaster Patching Compound: Finish coat plaster and bonding compound according to ASTM C 842 and manufacturer's written instructions.

PART 3 EXECUTION

3.1 HISTORIC TREATMENT PROCEDURES, GENERAL

A. General: Have historic treatment of painting directed by a qualified historic treatment specialist. Ensure that historic treatment specialist's field supervisors are present when painting begins and during its progress. In treating historic items, disturb them as minimally as possible and as follows:
   1. Apply each product according to manufacturer's written instructions unless otherwise indicated.
   2. Stop the progress of deterioration and corrosion by removing failed coatings and corrosion and repainting.
   3. Verify that substrate surface conditions are suitable for painting.
   4. Allow other trades to repair items in place and retain as much original material as possible before repainting.
   5. Make historic treatment of materials reversible whenever possible unless otherwise indicated.
   6. Install temporary protective measures to protect historic painted surfaces that are indicated to be treated later.

B. Mechanical Abrasion: Where mechanical abrasion is needed for the work, use only the gentlest mechanical methods, such as scraping and lightly hand sanding, that will not abrade softer substrates, reducing clarity of detail. Do not use abrasive methods such as rotary sanding, rotary wire brushing, or power tools except as approved by Architect.

C. Heat Processes: Do not use torches, heat guns, or heat plates.

3.2 EXAMINATION

A. Examine substrates and conditions, with historic treatment specialist present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the painting work. Comply with paint manufacturer's written instructions for inspection.

B. Maximum Moisture Content of Substrates: Do not begin application of coatings unless moisture content of exposed surface is below the maximum value recommended in writing by paint manufacturer and not greater than the following maximum values when measured with an electronic moisture meter appropriate to the substrate material:
1. Concrete: 12 percent.
2. Gypsum Board: 12 percent.
3. Gypsum Plaster: 12 percent.
4. Masonry (Clay and CMU): 12 percent.
5. Portland Cement Plaster: 12 percent.
6. Wood: 15 percent.

C. Alkalinity: Do not begin application of coatings unless surface alkalinity is within range recommended by paint manufacturer. Conduct alkali testing with litmus paper on exposed plaster, cementitious, and masonry surfaces.

D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
1. If existing surfaces cannot be prepared to an acceptable condition for proper finishing by using specified surface-preparation methods, notify Architect in writing.

E. 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.

3.3 CLEANING

A. General: Use only the gentlest, appropriate method necessary to clean surfaces in preparation for painting. Clean all surfaces, corners, contours, and interstices.

B. Detergent Cleaning: Wash surfaces by hand using clean rags, sponges, and bristle brushes. Scrub surface with detergent solution and bristle brush until soil is thoroughly dislodged and can be removed by rinsing. Use small brushes to remove soil from joints and crevices. Dip brush in solution often to ensure that adequate fresh detergent is used and that surface remains wet. Rinse with water applied by clean rags or sponges. painted or unpainted surfaces before other preparation work. Wipe surfaces with solvent using clean rags and sponges. If necessary, spot-solvent cleaning may be employed just prior to commencement of paint application, provided enough time is allowed for complete evaporation. Use clean solvent and clean rags for the final wash to ensure that all foreign materials have been removed. Do not use solvents, including primer thinner and turpentine, that leave residue.

D. Mildew: Clean off existing mildew, algae, moss, plant material, loose paint, grease, dirt, and other debris by scrubbing with bristle brush or sponge and detergent solution. Scrub mildewed areas with mildewcide. Rinse with water applied by clean rags or sponges.

E. Chemical Rust Removal:
1. Remove loose rust scale with approved abrasives for ferrous metal cleaning.
2. Apply rust remover with brushes or as recommended by manufacturer.
3. Allow rust remover to remain on surface for period recommended by manufacturer or as determined by preconstruction testing. Do not allow extended dwell time.
4. Wipe off residue with mineral spirits and either steel wool or soft rags, or clean with method recommended by manufacturer to remove residue.
5. Dry immediately with clean, soft cloths. Follow direction of grain in metal.
6. Prime immediately to prevent rust. Do not touch cleaned metal surface until primed.

F. Mechanical Rust Removal:
1. Remove rust with approved abrasives for ferrous metal cleaning. Clean to bright metal.

2. Wipe off residue with mineral spirits and either steel wool or soft rags.
3. Dry immediately with clean, soft cloths. Follow direction of grain in metal.
4. Prime immediately to prevent rust. Do not touch cleaned metal surface until primed.

3.4 PAINT REMOVAL

A. General: Remove paint where indicated. Where cleaning methods have been attempted and further removal of the paint is required because of incompatible or unsatisfactory surfaces for repainting, remove paint to extent required by conditions.
   1. Brushes: Use brushes that are resistant to chemicals being used.
   2. Spray Equipment: Use spray equipment that provides controlled application at volume and pressure indicated, measured at spray tip. Adjust pressure and volume to ensure that spray methods do not damage surfaces.
      a. Equip units with pressure gages.
      b. Unless otherwise indicated, hold spray tip at least 6 inches (150 mm) from surface and apply material in horizontal, back-and-forth sweeping motion, overlapping previous strokes to produce uniform coverage.
      c. For chemical spray application, use low-pressure tank or chemical pump suitable for chemical indicated, equipped with cone-shaped spray tip.
      d. For water-spray application, use fan-shaped spray tip that disperses water at an angle of 25 to 50 degrees. temperature between 140 and 160 dig F (60 and 71 dig C) at flow rates indicated.

B. Paint Removal with Hand Tools: Remove paint manually using hand-held scrapers, wire brushes, sandpaper, and steel wool. Do not use other methods except as approved by Architect.

C. Paint Removal with Alkaline-Paste Paint Remover:
   1. Remove loose and peeling paint using water, scrapers, stiff brushes, or a combination of these. Let surface dry thoroughly.
   2. Apply paint remover to dry, painted surface with brushes or as recommended by manufacturer.
   3. Allow paint remover to remain on surface for period recommended by manufacturer or as determined by preconstruction testing.
   4. Rinse with water applied by low-pressure spray to remove chemicals and paint residue.
   5. Use mechanical methods recommended by manufacturer to remove chemicals and paint residue.
   6. Repeat process if necessary to remove all paint.

D. Paint Removal with Low-Odor, Solvent-Type Paint Remover:
   1. Remove loose and peeling paint using water, scrapers, stiff brushes, or a combination of these. Let surface dry thoroughly.
   2. Apply thick coating of paint remover to dry, painted surface with natural-fiber cleaning brush, deep-nap roller, or large paintbrush.
   3. Allow paint remover to remain on surface for period recommended by manufacturer. Agitate periodically with stiff-fiber brush.
   4. Rinse with water applied by low-pressure spray to remove chemicals and paint residue.
   5. Use mechanical methods recommended by manufacturer to remove chemicals and paint residue.
   6. Repeat process if necessary to remove all paint.

3.5 SUBSTRATE REPAIR

A. General: Repair substrate surface defects that are inconsistent with the surface appearance of adjacent materials and finishes.

B. Wood Substrate:
   1. Repair wood defects including dents and gouges more than 1/8 inch (3 mm) in size and all holes and cracks by filling with wood patching compound and sanding smooth. Reset or remove protruding fasteners.
   2. Where existing paint is allowed to remain, sand irregular buildup of paint, runs, and sags to achieve a uniformly smooth surface.

C. Cementitious Material Substrate:
   1. General: Repair defects including dents and chips more than 1/4 inch (6 mm) in size and all holes and cracks by filling with cementitious patching compound and sanding smooth. Remove protruding fasteners.
   2. New and Bare Plaster: Neutralize surface of plaster with mild acid solution as recommended by paint manufacturer. In lieu of acid neutralization, follow manufacturer's written instruction for primer or transition coat over alkaline plaster surfaces.

3. Concrete, Cement Plaster, and Other Cementitious Products: Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. If surfaces are too alkaline to paint, correct this condition before painting.

D. Gypsum-Plaster and Gypsum-Board Substrates:
1. Repair defects including dents and chips more than 1/8 inch (3 mm) in size and all holes and cracks by filling with gypsum-plaster patching compound and sanding smooth. Remove protruding fasteners.
2. Rout out surface cracks to remove loose, unsound material; fill with patching compound and sand smooth.

E. Metal Substrate:
1. General: Repair defects including dents and gouges more than 1/16 inch (6 mm) deep or 1 inch (25 mm) across and all holes and cracks by filling with metal patching compound and sanding smooth. Remove burrs and protruding fasteners.
2. Prepare repair locations by wire-brushing and solvent cleaning. Use chemical or mechanical rust removal method to clean off rust.
3. Prime iron and steel surfaces immediately after repair to prevent flash rusting. Stripe paint corners, crevices, bolts, welds, and sharp edges. Apply two coats to surfaces that will be inaccessible after completion of the Work.

3.6 PAINT APPLICATION, GENERAL

A. Comply with manufacturers' written instructions for application methods and with Section 099113 “Exterior Painting,” Section 099123 “Interior Painting,” and Section 099300 "Staining and Transparent Finishing."

B. Prepare surfaces to be painted according to the Surface-Preparation Schedule and with manufacturer's written instructions for each substrate condition.

C. Apply a transition coat over incompatible existing coatings.

D. Blending Monochromatic Painted Surfaces: When painting new substrates patched into existing surfaces or touching up missing or damaged finishes, apply coating system specified for the specific substrate. Apply final finish coat over entire surface from edge to edge and corner to corner.

3.7 CLEANUP 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. 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.

3.8 SURFACE-PREPARATION SCHEDULE

A. General: Before painting, prepare surfaces for painting according to applicable requirements specified in this schedule.
1. Examine surfaces to evaluate each surface condition according to the paragraphs below.
2. Where existing degree of soiling prevents examination, preclean surface and allow it to dry before making an evaluation.
3. Repair substrate defects according to "Substrate Repair" Article.

B. Surface Preparation for MPI DSD 0 Degree of Surface Degradation:
1. Surface Condition: Existing paint film in good condition and tightly adhered.
2. Paint Removal: Not required.
3. Preparation for Painting: Wash surface by detergent cleaning; use solvent cleaning where needed. Roughen or degloss cleaned surfaces to ensure paint adhesion according to paint manufacturer's written instructions.

C. Surface Preparation for MPI DSD 1 Degree of Surface Degradation:
1. Surface Condition: Paint film cracked or broken but adhered.
2. Paint Removal: Scrape by hand-tool cleaning methods to remove loose paint until only tightly adhered paint remains.
3. Preparation for Painting: Wash surface by detergent cleaning; use other cleaning methods for small areas of bare substrate if required. Roughen, degloss, and sand the cleaned surfaces to ensure paint adhesion and a smooth finish according to paint manufacturer's written instructions.

D. Surface Preparation for MPI DSD 2 Degree of Surface Degradation:
   1. Surface Condition: Paint film loose, flaking, or peeling.
   2. Paint Removal: Remove loose, flaking, or peeling paint film by hand-tool or chemical paint- removal methods.
   3. Preparation for Painting: Wash surface by detergent cleaning; use solvent cleaning where needed. Use other cleaning methods for small areas of bare substrate if required. Sand surfaces to smooth remaining paint film edges. Prepare bare cleaned surface to be painted according to paint manufacturer's written instructions for substrate construction materials.

E. Surface Preparation for MPI DSD 3 Degree of Surface Degradation:
   1. Surface Condition: Paint film obscuring fine architectural detail work because of paint- layer buildup.
   2. Paint Removal: Completely remove paint film by hand-tool or chemical paint-removal methods. Remove rust.
   3. Preparation for Painting: Prepare bare cleaned surface according to paint manufacturer's written instructions for substrate construction materials.

F. Surface Preparation for MPI DSD 4 Degree of Surface Degradation:
   1. Surface Condition: Missing material, small holes and openings, and deteriorated or corroded substrate.
   2. Substrate Preparation: Repair, replace, and treat substrate according to "Substrate Repair" Article.
   3. Preparation for Painting: Sand substrate surfaces to smooth remaining paint film edges and prepare according to paint manufacturer's written instructions for substrate construction materials. Remove rust.
   4. Painting: Paint as required for MPI DSD 2 degree of surface degradation.

3.9 EXTERIOR HISTORIC PAINTING SCHEDULE

A. Wood Doors:
   1. Varnish System (Clear): MPI REX 6.3F.
      a. Prime Coat: Full prime coat with intermediate coat for MPI DSD 3.
      b. Intermediate Coats: Two coats of MPI 30, Varnish with UV Inhibitor, Exterior, Semi- Gloss (MPI Gloss Level 5).
      c. Topcoat: Match intermediate coat.

3.10 INTERIOR HISTORIC PAINTING SCHEDULE

A. Cast-Iron Grilles:
   1. Latex System: MPI RIN 5.1N system over a transition coat.
      a. Prime Coat: Full prime coat with MPI 23, Primer, Metal, Surface Tolerant, for MPI DSD 3.
      b. Intermediate Coat: MPI 52, Latex, Interior, (MPI Gloss Level 3).
      c. Topcoat: Match intermediate coat.
      d. Color: Match colors indicated on Historic Structure Report.

B. Plaster:
   1. Latex System over Alkyd Primer: MPI RIN 9.2K system.
      a. Prime Coat: Full prime coat with MPI 45, Primer Sealer, Alkyd, Interior, for MPI DSD 3.
      b. Intermediate Coat: MPI 53, Latex, Interior, Flat (MPI Gloss Level 1).
      c. Topcoat: Match intermediate coat.
      d. Color: Match As selected by architect.
   2. Low-Odor Latex System Over Latex Primer: MPI RIN 9.2M system.
      a. Prime Coat: Full prime coat with MPI 137, Primer, Stain Blocking, Water Based, for MPI DSD 3.
      b. Intermediate Coat: MPI 143, Latex, Interior, Institutional Low Odor/VOC, Flat (MPI Gloss Level 1).
      c. Topcoat: Match intermediate coat.
      d. Color: See Architect.

END OF SECTION 09019

SECTION 09900
PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Surface preparation and field application of paints and coatings.

1.02 RELATED SECTIONS
A. Section 08015 – Historic Treatment of Wood Windows

B. Section 08200 – Molded Wood Doors

1.03 REFERENCES
A. ASTM D16 Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.

B. ASTM D2016 Test Method for Moisture Content of Wood.

C. AWWA (American Water Works Association) - C204 - Chlorinated Rubber-Alkyd Paint Systems for the Exterior of Above Ground Steel Water Piping.

D. AWWA (American Water Works Association) - D102 - Painting Steel Water Storage Tanks.

E. NACE (National Association of Corrosion Engineers) - Industrial Maintenance Painting.

F. NPCA (National Paint and Coatings Association) - Guide to U.S. Government Paint Specifications.

G. PDCA (Painting and Decorating Contractors of America) - Painting - Architectural Specifications Manual.

H. SSPC (Steel Structures Painting Council) - Steel Structures Painting Manual.

1.04 DEFINITIONS
A. Conform to ASTM D16 for interpretation of terms used in this Section.

1.05 SUBMITTALS
A. Submit under provisions of Section 01300.

B. Product Data: Provide data on all finishing products.

C. Samples: Submit two samples, 2x2 inches in size illustrating range of colors and textures available for each surface finishing product scheduled.

D. Samples: Submit two samples, 12x12 inches in size illustrating selected colors and textures for each color selected.

E. Manufacturer's Instructions: Indicate special surface preparation procedures, substrate conditions requiring special attention, etc.

1.06 QUALIFICATIONS
A. Manufacturer: Company specializing in manufacturing the Products specified in this Section with minimum ten years documented experience.

B. Applicator: Company specializing in performing the Work of this Section with minimum 5 years documented experience approved by manufacturer.

1.07 REGULATORY REQUIREMENTS
A. Conform to applicable codes and referenced standards for flame and smoke rating requirements for finishes.

1.08 FIELD SAMPLES
A. Provide field sample of paint under provisions of Section 01400.

B. Provide field sample panel, 4 feet long by 4 feet wide, illustrating coating colors, textures, and finishes.

C. Locate where directed.

D. Accepted sample may remain as part of the Work.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01600.

B. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

C. Container label to include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

D. Store paint materials at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.10 ENVIROMENTAL REQUIREMENTS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

C. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.

D. Minimum Application Temperature for Varnish and Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.

E. Provide lighting level of 80 ft candles measured mid height at substrate surface.

1.11 EXTRA MATERIALS

A. Furnish under provisions of Section 01700.

B. Provide 4 gallons of each color, type, and surface texture to Owner.

C. Label each container with color, type, texture, room locations, and application instructions in addition to the manufacturer's label.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Reference Interior Design Construction Drawings and Finish Schedule for manufacturers, and colors.

B. Substitutions: Under provisions of Section 01600.

C. Acceptable manufacturers of other Paints, Transparent Finishes, Stains, Primer Sealers, Block Fillers, and Field Catalyzed Coatings required but not specifically identified in Interior Design Drawings, Finish Schedule or Architectural Construction Drawings:
   1. Porter.
   2. Devoe.
   3. Benjamin Moore.
   4. Sherwin-Williams.
   5. Substitutions: Under provisions of Section 01600.

2.02 MATERIALS

A. Reference Interior Design Construction Drawings and Finish Schedule for manufacturers, and colors.

B. Coatings: Ready mixed, except field catalyzed coatings. Process pigments to a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating; good flow and brushing properties; capable of drying or curing free of streaks or sags.

C. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.

D. Patching Materials: Latex filler.

E. Fastener Head Cover Materials: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify site conditions under provisions of Section 01039.

B. Verify that surfaces and substrate conditions are ready to receive Work as instructed by the product manufacturer.

C. Examine surfaces scheduled to be finished prior to commencement of Work. Report any condition that may potentially affect proper application.

D. Test shop applied primer for compatibility with subsequent cover materials.

E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Plaster and Gypsum Wallboard: 12 percent.
   2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
   3. Interior Wood: 15 percent, measured in accordance with ASTM D2016.
   4. Exterior Wood: 15 percent, measured in accordance with ASTM D2016.
   5. Concrete Floors: 8 percent.

3.02 PREPARATION

A. Remove or mask electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.

B. Correct defects and clean surfaces which affect Work of this Section. Remove existing coatings that exhibit loose surface defects.

C. Seal with shellac and seal marks which may bleed through surface finishes.

D. Impervious Surfaces: Remove mildew by scrubbing with solution of tri sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

E. Aluminum Surfaces Scheduled for Paint Finish: Remove surface contamination by steam or high pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.

F. Asphalt, Creosote, or Bituminous Surfaces Scheduled for Paint Finish: Remove foreign particles to permit adhesion of finishing materials. Apply latex based compatible sealer or primer.

G. Insulated Coverings: Remove dirt, grease, and oil from canvas and cotton.

H. Concrete Floors: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.

I. Copper Surfaces Scheduled for a Paint Finish: Remove contamination by steam, high pressure water, or solvent washing. Apply vinyl etch primer immediately following cleaning.

J. Copper Surfaces Scheduled for a Natural Oxidized Finish: Remove contamination by applying oxidizing solution of copper acetate and ammonium chloride in acetic acid. Rub on repeatedly for required effect. Once attained, rinse surfaces with clear water and allow to dry.

K. Gypsum Board Surfaces: Fill minor defects with filler compound. Spot prime defects after repair.

L. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.

M. Concrete and Unit Masonry Surfaces Scheduled to Receive Paint Finish: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.

N. Plaster Surfaces: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.

O. Uncoated Steel and Iron Surfaces: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand or power tool wire brushing or sandblasting; clean by washing with solvent. Apply

a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Spot prime paint after repairs.

P. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Prime metal items including shop primed items.

Q. Interior Wood Items Scheduled to Receive Paint Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats.

R. Interior Wood Items Scheduled to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats.

S. Exterior Wood Scheduled to Receive Paint Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior caulking compound after prime coat has been applied.

T. Exterior Wood Scheduled to Receive Transparent Finish: Remove dust, grit, and foreign matter; seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes with tinted exterior caulking compound after sealer has been applied.

U. Wood and Metal Doors Scheduled for Painting: Seal top and bottom edges with primer.

3.03 APPLICATION

A. Apply products in accordance with manufacturer's instructions.

B. Do not apply finishes to surfaces that are not dry.

C. Apply each coat to uniform finish.

D. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.

E. Sand wood and metal lightly between coats to achieve required finish.

F. Vacuum clean surfaces free of loose particles. Use tack cloth just prior to applying next coat.

G. Allow applied coat to dry before next coat is applied.

H. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

I. Prime concealed surfaces of interior and exterior woodwork with primer paint.

J. Prime concealed surfaces of interior woodwork scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with mineral spirits.

3.04 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

A. Refer to Mechanical and Electrical specifications for schedule of color coding and identification banding of equipment, duct work, piping, and conduit.

B. Paint shop primed equipment. Paint shop prefinished items occurring at interior areas.

C. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

D. Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, etc., except where items are prefinished.

E. Paint interior surfaces of air ducts, and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint, to visible surfaces. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.

F. Paint exposed conduit and electrical equipment occurring in finished areas.

G. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.

H. Color code equipment, piping, conduit, and exposed duct work in accordance with requirements indicated. Color band and identify with flow arrows, names, and numbering.

I. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.05 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Section 01400.

B. Test questionable coated areas in accordance with manufacturer's recommendations.

3.06 CLEANING

A. Clean Work under provisions of Section 01700.

B. Collect waste material which may constitute a fire hazard, place in closed metal containers and remove daily from site.

3.07 SCHEDULE – REFER TO INTERIOR DESIGN DRAWINGS FOR PAINT MANUFACTURERS AND COLOR DESIGNATIONS.

A. Steel Unprimed:
   1. One coat of alkyd primer.
   2. Two coats of latex enamel, semi-gloss.

B. Steel / Stainless Steel – Primed
   1. Touch up with zinc rich primer.
   2. Two coats of alkyd enamel, semi-gloss.

C. Steel Galvanized:
   1. One coat galvanize primer.
   2. Two coats of latex enamel, semi-gloss.

D. Aluminum Mill Finish:
   1. One coat etching primer.
   2. Two coats of alkyd enamel, gloss.

E. Interior Concrete, Concrete Block:
   1. One coat of block primer sealer latex.
   2. Two coats of latex, semi-gloss enamel.

F. Wood Painted:
   1. One coat of alkyd prime sealer.
   2. Two coats of latex enamel, semi gloss.

G. Wood Transparent:
   1 Filler coat (for open grained wood only).
   2. Two coats of stain.
   3. One coat sealer.
   4. Two coats of varnish, satin.

H. Gypsum Board in Non-Wet Areas
   1. One coat of alkyd primer sealer.
   2. Two coats of latex eggshell.

I. Gypsum Board in Wet Areas
   1. One coat of alkyd primer sealer.
   2. Two coats of low gloss water epoxy.

J. Gypsum Board in sterile areas as indicated on drawings
   1. One coat of alkyd primer sealer.
   2. Two coats of low gloss water epoxy.

END OF SECTION