Project Manual

St. Edward's University
Main Building - Exterior Restoration

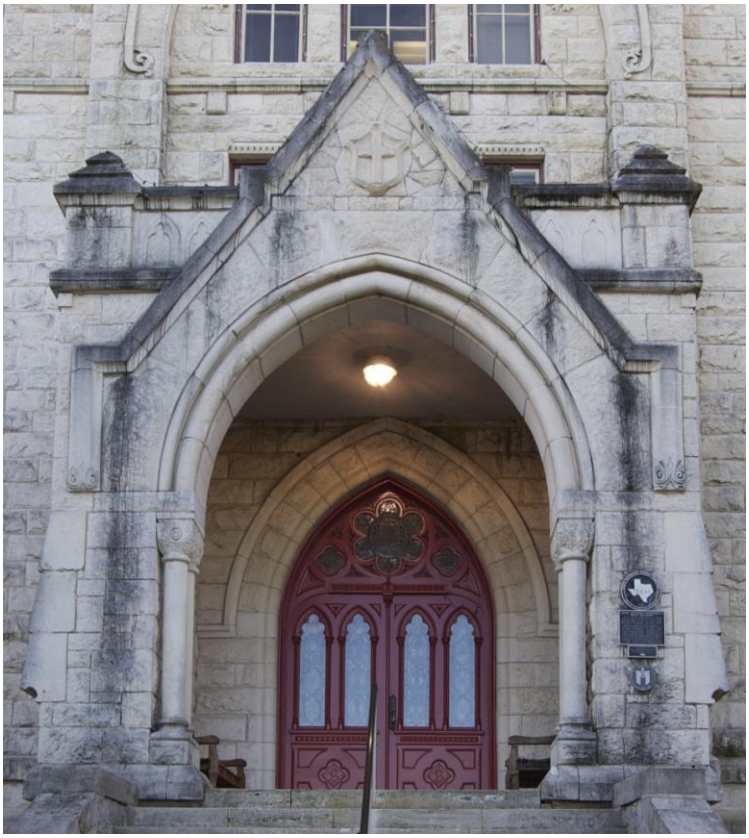

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TABLE OF CONTENTS

END OF TABLE OF CONTENTS

SECTION 01110

SUMMARY OF WORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Project description.
2. Work by Others.
3. Contractor use of site and premises.

1.2 PROJECT DESCRIPTION

A. Work of this Project is described as the Exterior Restoration of the Main Building at St. Edwards University.

A. Work includes masonry cleaning, masonry restoration, mortar repointing, window frame repairs and sash replacement, roof system replacement, ornamental sheet metal repairs, joint sealers, and painting.

B. The Project will be constructed under a single prime contract with the Owner.

1.3 WORK BY OTHERS

A. Separate Contracts:

1. The Owner may execute contracts for additional work at the site that is excluded from the work of this Contract.
2. Work under separate contract may be executed concurrent with Work of this Contract.
3. Cooperate with the Owner and separate contractors to accommodate this requirement.

1.4 CONTRACTOR'S USE OF SITE AND PREMISES

A. Limit use of site and premises to allow for:

1. Work by separate contractors.
2. Work by Owner.

B. Coordinate use of site and premises with the Owner.

C. Move any stored products under Contractor's control that interfere with the operations of the Owner or separate contractors.

D. Assume full responsibility for protection and safekeeping of products under this Contract stored on site.

E. Obtain and pay for use of any additional storage or work areas needed for operations.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01226

UNIT PRICES

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SUMMARY

A. This section specifies administrative and procedural requirements for unit prices.

1. A unit price is an amount proposed by Bidders and stated on the Bid Form as a price per unit of measurement for materials or services that will be added to or deducted from the Contract Sum by Change Order in the event the estimated quantities of Work required by the Contract Documents are increased or decreased.

B. Unit prices include all necessary equipment, materials, overhead, and profit and applicable taxes.

C. The Owner reserves the right to reject the Contractors measurement of work-in-place that involves use of established unit prices, and to have this Work measured by an independent surveyor acceptable to the Contractor at the Owner's expense.

PART 2 - PRODUCTS

2.1 Not used.

PART 3 - EXECUTION

3.1 UNIT PRICE SCHEDULE

A. Unit Price No. 1 – Single-Face Stone Dutchman Repair

1. Unit of Measurement: Per location (4 inch deep).

B. Unit Price No. 2 – Multi-Face Stone Dutchman Repair

1. Unit of Measurement: Per location (4 inch deep ea. side).

C. Unit Price No. 3 – Masonry patch

1. Unit of Measurement: Per location

D. Unit Price No. 4 – Wood Window Brick Moulding Replacement

1. Unit of Measurement: Per location

E. Unit Price No. 5 – Wood Window Brick Mould Plinth Block Replacement

1. Unit of Measurement: Per location

F. Unit Price No. 6 – Wood Window Sill Replacement
1.Unit of Measurement: Per location

G. Unit Price No. 7 – Wood Window Wood Dutchman Repair at Frame or Blind Stop
1.Unit of Measurement: Per location

H. Unit Price No. 8 – Wood Window Blind Stop or Frame replacement in lieu of dutchman repair.
1.Unit of Measurement: Per location

I. Unit Price No. 9 – Wood Frame Epoxy repair
1.Unit of Measurement: Per location

J. Unit Price No. 10 – Wood Window Interior stone epoxy repair
1.Unit of Measurement: Per location

K. Unit Price No. 11 – Limestone Crack
1.Unit of Measurement: Per location

L. Unit Price No. 12 – Limestone existing patches to be replaced
1.Unit of Measurement: Per location

M. Unit Price No. 13 – Limestone existing crack to be replaced
1.Unit of Measurement: Per location

N. Unit Price No. 14 – Existing Brick Replacement
1.Unit of Measurement: Per location

END OF SECTION

SECTION 01310

PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Project coordination.
2. Project meetings.

1.2 PROJECT COORDINATION

A. Coordinate scheduling, submittals, and work of various Sections of specifications to assure efficient and orderly sequence of installation of interdependent construction elements.

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 items that are indicated diagrammatically on Drawings. Follow routing shown as closely as practical; place runs parallel with building lines. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

D. In finished areas, conceal pipes, ducts, and wiring within 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, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents to minimize disruption of Owner's activities.

1.3 PROJECT MEETINGS

A. Schedule and administer preconstruction conference and progress meetings.

B. Make physical arrangements for meetings; notify involved parties at least four days in advance.

C. Record significant proceedings and decisions at each meeting; reproduce and distribute copies to:

1. Parties in attendance.
2. Others affected by proceedings and decisions made.

1.4 PRECONSTRUCTION CONFERENCE

A. Schedule within 15 days after date of Notice to Proceed at project field office or other central site, convenient to all parties.

B. Attendance:

1. Architect.
2. Contractor.
3. Major subcontractors and suppliers as Contractor deems appropriate.
4. Representative of Testing Laboratory.

C. Review and Discuss:

1. Relation and coordination of various parties, and responsible personnel for each party.
2. Use of premises, including office and storage areas, temporary controls, and security procedures.
3. Construction schedule and critical work sequencing.
4. Processing of:
   a. Contract modifications.
   b. Shop Drawings, Product Data, and Samples.
   c. Applications for Payment.
   d. Substitutions.
   e. Other required submittals.
5. Adequacy of distribution of Contract Documents.
6. Procedures for maintaining contract closeout submittals.
7. Installation and removal of temporary facilities.
8. Notification procedures and extent of testing and inspection services.

1.5 PROGRESS MEETINGS

A. Schedule periodic progress meetings as required by the progress of the Work.

B. Location: Contractor's project field office.

C. Attendance:

1. Architect and consultants as appropriate to agenda.
2. Contractor.
3. Subcontractors and suppliers as appropriate to agenda.
4. Others as appropriate to agenda.

D. Review and Discuss:

1. Work progress since previous meeting, including:
   a. Field observations, deficiencies, conflicts, and problems.
   b. Progress and completion date.
   c. Corrective measures needed to maintain quality standards, progress, and completion date.
2. Status of:
   a. Requests for Information (RFIs).
   b. Contract Modifications.
3. Coordination between various elements of Work.
4. Maintenance of Project Record Documents.

PART 2- PRODUCTS

2.1 Not used.

PART 3 EXECUTION

3.1 Not used.

END OF SECTION

SECTION 01330

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Submittal procedures.
2. Submittal schedule.
3. Proposed Products list.
4. Shop Drawings.
5. Product Data.
6. Samples.
7. Quality control submittals.

B. Related Sections:

1. Section 01400 - Quality Requirements.

1.2 SUBMITTAL PROCEDURES

A. Transmit each submittal along with form approved by Architect.

B. Number each submittal with Project Manual section number and a sequential number within each section. Number resubmittals with original number and an alphabetic suffix.

C. Identify Project Contractor, Subcontractor or supplier, pertinent Drawing sheet and detail numbers, and specification Section number, as appropriate.

D. Apply Contractor's stamp, signed or initialed certifying that:

1. Submittal was reviewed.
2. Products, field dimensions, and adjacent construction have been verified.
3. Information has been coordinated with requirements of Work and Contract Documents.

E. Schedule submittals to expedite the Project, and deliver to Architect when applicable. Coordinate submittal of related items.

F. For each submittal, allow for 10 working days for Architect’s review, excluding delivery time to and from Contractor.

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

H. Provide space for Contractor and Architect review stamps.

I. Revise and resubmit submittals when required; identify all changes made since previous submittal.

J. Distribute copies of reviewed submittals to concerned parties and to Project Record Documents file. Instruct parties to promptly report any inability to comply with provisions.

1.3 SUBMITTAL SCHEDULE

A. For each submittal, indicate on schedule:

1. Applicable specification section number.
2. Type of submittal, e.g. Shop Drawing, Product Data, Sample, Certificate, etc.
3. Indication of whether submittal is for review or for information purposes only.
4. Anticipated date of submittal to Architect.
5. Date reviewed copies must be returned to Contractor.

B. Architect will review Submittal Schedule for conformance to requirements of Contract Documents and will return one copy to Contractor with comments as applicable.

1.4 PROPOSED PRODUCTS LIST

A. Within 15 days after date of Notice to Proceed, submit to the Architect a 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.

1.5 SHOP DRAWINGS

A. Shop Drawings are drawings, diagrams, schedules, and other data specifically prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

B. Present information in clear and thorough manner.

C. Identify details by reference to sheet and detail numbers or room number shown on Drawings.

D. Maximum Sheet Size: 30 x 42 inches.

E. Submit electronic copies.

F. Architect will return reproducible copies to Contractor for printing and distribution.

1.6 PRODUCT DATA

A. Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

B. Mark each copy to identify applicable products, models, options, and other data.

C. Supplement manufacturers' standard data to provide information unique to this Project.

D. Submit electronic copy.

E. Architect will return one copy to Contractor for printing and distribution.

1.7 SAMPLES

A. Samples are physical examples, which illustrate materials, equipment, or workmanship and establish standards for which the Work will be judged.

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

C. Where so indicated, submit samples of finishes from the full range of manufacturers' standard colors, textures, and patterns for Architect's selection.

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

E. Unless otherwise specified in individual specifications, submit two of each sample.

F. Architect will notify Contractor of approval or rejection of samples, or of selection of color, texture, or pattern if full range is submitted.

1.8 QUALITY CONTROL SUBMITTALS

A. Quality control submittals specified in Section 01400 are for information and do not require Architect’s responsive action except to require resubmission of incomplete or incorrect information.

PART 2 - PRODUCTS

2.1 Not used.

PART 3 - EXECUTION

3.1 Not used.

END OF SECTION

SECTION 01356

RESTORATION PROJECT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Definitions.
2. Historic significance.
3. Restoration procedures.
4. Historic artifacts.
5. Alterations.
6. Hazardous material procedures.

1.2 DEFINITIONS

A. Match Existing: Provide new materials to match the existing, in place material in all aspects as closely as possible. Existing materials are those, which are visible in whole or in part in the building.

B. Match Original: Provide new materials to match the original material in all aspects as closely as possible. Original materials are those which were originally installed in the building at the time of its completion, prior to previous alterations, and which may predate existing materials.

C. Preservation: The act or process of applying measures necessary to sustain the existing form, integrity, and materials of an historic property.

D. Reconstruction: The act or process of reproducing, by means of new construction, the form, features, and detailing of a non-surviving building, structure, or object for the purpose of replicating its appearance at a specific period of time and in its historic location.

E. Restoration: The act or process of accurately depicting the form, features, and character as it appeared at a particular time by means of the removal of features from other periods in its history and reconstruction of missing features from the restoration period.

1.3 QUALITY ASSURANCE

A. Historic Significance:

7. The existing building is a Recorded Texas Historic Landmark (RTHL) and is a Local City of Austin Landmark.
8. Due to its unique historical significance, special procedures and precautions must be used in selective demolition and restoration.

B. Restoration Procedures:

9. Preserve existing materials, finishes, and profiles.
10. Blend new and existing work to provide smooth transitions and uniform appearance.
11. Cease work, notify Contractor, and await instructions if materials or conditions encountered at the site are not as indicated by the Contract Documents or if structure is in danger of movement or collapse.

C. Historic Artifacts: If artifacts of a historic nature are encountered during the Work:

1. Cease work in the affected area immediately.
2. Protect artifacts from damage.
3. Notify Architect and Owner and await instructions.

PART 2 - PRODUCTS

2.1 MATERIALS

A. New Materials:

1. Provide new materials to match existing adjacent materials or original materials for closing of openings, repairs, and reconstructions where suitable salvaged materials do not exist, are insufficient in quantity, or where reuse is not permitted.
2. Retain samples of existing and original materials on site for comparison purposes.
3. Match existing materials in material, type, size, quality, color, finish, and other attributes.

B. Reused Materials:

1. Clean and prepare salvaged materials for reuse.
2. Do not use materials with objectionable chips, cracks, splits, dents, scratches, or other defects.
3. Repair operable items to function properly.

PART 3 - EXECUTION

3.1 PREPARATION

A. Test materials to be used in repairs for compatibility with existing materials; do not use incompatible materials.

B. Cut, move, or remove items to provide access for alterations and restoration work. Replace and restore upon completion.

C. Protect existing materials and surfaces from damage by construction operations.

3.2 ALTERATIONS

A. Coordinate alterations and renovations to expedite completion.

B. Minimize damage to existing materials and surfaces; provide means for restoring products and finishes to their original or specified new condition.

C. Remove unsuitable materials not marked for salvage.

D. Remove debris and abandoned items from areas of work and from concealed spaces.

E. Refinish visible surfaces to specified condition, with neat transition to adjacent surfaces.

F. Install products and finish surfaces as specified in individual sections, or where no specification section exists, to match existing original.

G. Finish patches to provide uniform color and texture over entire surface, with repairs not discernible from normal viewing distance. If finish cannot be matched, refinish entire surface to nearest intersections.

END OF SECTION

SECTION 01400

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. References.
2. Quality assurance and control of installation.
3. Manufacturer's field services and reports.
4. Test reports and certifications.
5. Manufacturer's installation instructions.

1.2 REFERENCES

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

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

C. Conform to edition of reference standard in effect as of date of Project Manual.

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.

1.3 QUALITY ASSURANCE AND 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 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.

1.4 MANUFACTURERS' FIELD SERVICES AND REPORTS

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

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

C. Submit report to Architect for review in duplicate within 10 days of observation.

1.5 TEST REPORTS AND CERTIFICATIONS

A. When specified in individual specification Sections, require material or Product suppliers or manufacturers to provide test reports and manufacturers' certifications.

B. Indicate that material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Submittals may be recent or previous test results on material or Product, but must be acceptable to Architect.

D. Submit two copies of each report.

1.6 MANUFACTURER'S INSTALLATION INSTRUCTIONS

A. When Contract Documents require that Products be installed in accordance with manufacturer's instructions:

1. Submit manufacturer's most recent printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, as applicable.
    a. Submit in quantities specified for Product Data.
    b. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
    c. Identify conflicts between manufacturers' instructions and requirements of Contract Documents.
2. Perform installation of Products to comply with requirements of manufacturer's instructions.
3. If installation cannot be performed in accordance with manufacturer's instructions, notify Architect and await instructions.

PART 2 - PRODUCTS

2.1 Not used.

PART 3 - EXECUTION

3.1 Not used.

END OF SECTION

SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Temporary utilities.
2. Field offices and sheds.
3. Temporary controls.
4. Protection of installed Work.
5. Progress cleaning.
6. Dust control.
7. Removal.

1.2 TEMPORARY ELECTRICITY

A. Connect to existing electrical system for electricity required during construction.

B. The Owner will pay cost of electricity used from existing electric service.

C. Provide and pay for required service of capacity or characteristics other than that currently available.

D. Provide power outlets for construction operations, with branch wiring and distribution boxes located as required. Provide flexible power cords as required.

E. Maintain distribution system and provide routine repairs.

1.3 TEMPORARY LIGHTING

A. Provide temporary lighting for construction and security purposes if needed.

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

C. Maintain lamps and provide routine repairs.

1.4 TEMPORARY TELEPHONE AND FACSIMILE SERVICES

A. Contractor must be available via mobile phone during construction.

B. Provide the Owner and Architect with an office telephone number, fax number, and email address.

C. Maintain digital camera at site with capability to transmit photographs via e-mail.

D. Provide computer with printer and e-mail connection.

1.5 TEMPORARY WATER

A. Connect to existing water source for water required for construction.

B. The Owner will costs of water used from existing water service.

C. Extend branch piping and provide temporary hoses so that water is available at locations needed for work.

D. Protect from freezing.

E. Maintain distribution system and provide routine repairs.

1.6 TEMPORARY SANITARY FACILITIES

A. Provide chemical toilets for use during construction.

B. Permanent toilets may not be used during construction.

C. Maintain facilities in clean and sanitary condition.

1.7 FIELD SHEDS

A. Provide temporary field storage shed required for construction.

B. Do not unreasonably encumber site or premises with excess materials or equipment.

1.8 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from construction operations, if determined to be necessary.

B. Fencing:

1. If fencing is determined to be necessary, provide temporary fencing for construction operations.
2. Construction: Commercial grade chain link.
3. Height: 6 feet.
4. Locate to protect stored materials and equipment.

C. Tree and Plant Protection:

1. Protect existing trees and plants at site that are designated to remain.
2. Provide temporary barriers around individual or groups of trees and plants.
3. Do not permit vehicular traffic, parking, storing of materials, dumping of harmful chemicals or liquids, or standing or continuously running water within root zones.
4. Replace trees and plants that are damaged or destroyed due to construction operations.

D. Covered Walkways:

1. Egress must be maintained at all times from the paired entry doors at the Basement Level and First Floor Level of the building.
2. Covered walkways and a clear means of pedestrian egress must be maintained during construction work.
3. Covered walkways are to protect pedestrians from construction operations and from falling objects.
4. Contractor is responsible for design of covered walkways and determination of walkway limits. Submit a proposed design and limits of work to the Owner and Architect for review, prior to construction.
5. Work on the steps must be performed in phases so that at least one side of the steps is protected and useable for egress from the building. Work at the basement level must be sequenced to allow for egress in one direction at all times.

1.9 PROTECTION OF INSTALLED WORK

A. Protect installed work from construction operations; provide special protection when required in individual specification sections.

B. Minimize traffic, storage, and construction activities on roof surfaces. If traffic, storage, or activity is necessary, obtain recommendations for protection from roofing manufacturer.

C. Prohibit traffic from landscaped areas.

1.10 PROGRESS CLEANING

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

B. Provide containers for collection of waste materials, debris, and rubbish; remove and dispose of off site as required by construction activities.

C. Periodically clean interior areas to provide suitable conditions for finish work.

1.11 TEMPORARY CONTROLS

A. Dust Control:

1. Provide dust control materials and methods to minimize dust from construction operations.
2. Prevent dust from dispersing into occupied spaces.

1.12 REMOVAL

A. Remove temporary utilities, equipment, facilities, and services when construction needs can be met by use of permanent construction or upon completion of Project.

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

C. Restore existing and permanent facilities used during construction to original or to specified condition.

PART 2 - PRODUCTS

2.1 Not used.

PART 3 - EXECUTION

3.1 Not used.

END OF SECTION

SECTION 01730

SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Selective demolition includes, but is not necessary limited to the following:

1. Removal and disposal of existing items as indicated on the drawings.
2. Removal and disposal of debris.

1.2 REGULATORY REQUIREMENTS

A. Conform to applicable code for demolition work, safety of structure, and dust control.

B. Obtain required permits from authorities.

C. Notify affected utility companies before starting work and comply with their requirements.

D. Conform to applicable codes when hazardous or contaminated materials are discovered.

E. Coordinate closure and obstruction of exits with Owner to minimize number of exits closed at one time.

1.3 PROJECT CONDITIONS

A. Minimize interference with streets, walks, other public right-of-ways, and adjacent facilities.

B. If hazardous materials are discovered, notify the Owner's Project Manager and Architect, and await instructions.

C. If any of the following conditions are encountered, cease work immediately, notify the Owner's Project Manager and Architect, and await instructions:

1. Structure is in danger of movement or collapse.
2. Materials or conditions encountered differ from those designated in the Contract Documents.

PART 2 - PRODUCTS

2.1 Not used.

PART 3 - EXECUTION

3.1 PREPARATION

A. Erect temporary, barricades, warning devices, and controls.

B. Provide protective coverings, for construction designated to remain.

3.2 DEMOLITION

A. Remove existing construction to extent indicated and as necessary to join new work to existing. Do not remove more than is necessary to allow for new construction.

B. Do not damage work designated to remain.

C. Minimize noise and spread of dirt and dust.

D. Assign work to trades skilled in procedures involved.

E. Remove and dispose of waste materials off site.

END OF SECTION

SECTION 01732

CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Requirements and limitations for cutting and patching of new work.

B. Execute cutting to include excavating, fitting, and patching of Work required to:

1. Make several parts fit properly.
2. Uncover work to provide for installation of ill timed work.
3. Remove and replace defective work.
4. Remove and replace work not conforming to requirements of Contract Documents.
5. Interface new and existing work.

1.2 SUBMITTALS

A. Submit written request in advance of executing cutting or alteration that affects:

1. Work of Owner or separate contractor.
2. Structural integrity of project.
3. Integrity or effectiveness of weather exposed or moisture resistant elements or systems.
4. Efficiency, operational life, maintenance, or safety of operational elements.
5. Visual qualities of sight exposed elements.

B. Include in Request:

1. Identification of project.
2. Description of work affected.
3. Necessity for cutting or patching.
4. Effect of cutting or patching on work of Owner or separate contractor, or on structural, weatherproof, or visual integrity of project.
5. Description of proposed work:
    a. Scope of cutting and patching.
    b. Contractor and trades to execute work.
    c. Products proposed to be used.
    d. Extent of refinishing.
6. Alternate to cutting and patching.
7. Cost proposal, if applicable.
8. Written permission of any separate contractor whose work will be affected.

C. If conditions of work or schedule necessitate a change of material from that originally installed, submit written request in accordance with Article 8.

D. Submit written notice to Architect designating time work will be uncovered, to allow for observation.

1.3 PREPARATION

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

B. After uncovering work, examine conditions affecting installation of new products or performance of work.

C. Provide protection for other portions of project.

D. Provide protection from elements.

1.4 CUTTING AND PATCHING

A. Execute fitting and adjustment of products to provide finished installation to comply with specified tolerances, and finishes.

B. Execute cutting and demolition by methods that will prevent damage to other work, and will provide proper surfaces to receive installation of repairs and new work.

C. Execute excavating and backfilling by methods that will prevent damage to other Work, and will prevent settlement.

D. Employ original installer or fabricator to perform cutting and patching for:

1. Weather exposed or moisture resistant elements.
2. Sight exposed finished surfaces.

E. Restore work that has been cut or removed; install new products to provide completed Work in accordance with requirements of Contract Documents.

F. Refinish entire surfaces as necessary to provide an even finish:

1. Continuous surfaces: To nearest intersections.
2. Assembly: Refinish entirely.

PART 2 - PRODUCTS

2.1 Not used.

PART 3 - EXECUTION

3.1 Not used.

END OF SECTION

SECTION 01770

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Closeout procedures.
2. Final cleaning.
3. Adjusting.
4. Project record documents.
5. Operation and maintenance data.
6. Warranties.
7. Spare parts and maintenance materials.
8. Demonstration and instructions.

B. Related Sections:

1. Section 01500 - Construction Facilities and Temporary Controls: Progress cleaning.

1.2 CLOSEOUT PROCEDURES

A. Final Inspection:

1. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with the Contract Documents and ready for inspection by the Architect and Owner Representative.
2. If Architect performs reinspection due to failure of Work to comply with claims of status of completion made by Contractor, the Contractor will compensate Architect for such additional services and will deduct the amount of such compensation from final payment to the Contractor.

B. Submit final Application for Payment showing original Contract Sum, adjustments, previous payments, retainage withheld from previous payments, and sum remaining due.

C. Closeout Submittals:

1. Evidence of compliance with requirements of governing authorities.
2. Construction photographs.
3. List of subcontractors and suppliers, indicating firm name, area of responsibility or specialty, address, and telephone number.
4. Certificate of Occupancy.
5. Project Record Documents.
6. Operation and Maintenance Data.
7. Warranties.
8. Spare parts and maintenance materials.
9. Evidence of payment to Subcontractors and suppliers.
10. Final lien waiver.
11. Certificate of insurance for products and completed operations.
12. Consent of Surety to final payment.

1.3 FINAL CLEANING

A. Execute final cleaning prior to final inspection.

B. Clean surfaces exposed to view:

1. Clean glass.
2. Remove temporary labels, stains and foreign substances.

C. Clean equipment and fixtures to a sanitary condition.

D. Clean debris from roofs and drainage systems

E. Clean site; sweep paved areas, rake clean landscaped surfaces.

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

1.4 ADJUSTING

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

1.5 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:

1. Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other Modifications to the Contract.
5. Reviewed Shop Drawings, Product Data, and Samples.
6. Material Safety Data Sheets.

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 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. Material Safety Data Sheets:

1. Maintain copies of manufacturer's Material Safety Data Sheets for each Product incorporated into the Work.

2. Indicate manufacturer name, product name, chemical composition, hazards, and safety and health procedures.
3. Assemble in three ring binder with durable plastic cover.
    a. Prepare binder covers with printed title "MATERIAL SAFETY DATA SHEETS" and title of project.
    b. Organize contents according to Project Manual table of Contents.
    c. Provide typed table of contents.

G. Prior to Substantial Completion transfer marks made during construction to one set of reproducible transparency prints.

H. Submit one copy of Project Record Documents to Architect for review, along with final Application for Payment.

I. After Architect has approved Project Record Documents, submit following copies:
1. Owner:
    a. Drawings: One full size set of Construction Document blackline prints and one half size set of blackline prints.
    b. Specifications: One 8-1/2 x 11 inch set.

1.6 OPERATION AND MAINTENANCE DATA

A. Provide two copies, 8-1/2 x 11 inches text pages, bound in three ring binders with durable plastic covers.

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

D. Contents:
1. Directory: List names, addresses, and telephone numbers of Architect, Contractor, Subcontractors, and major equipment suppliers.
2. Operation and maintenance instructions: Arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
    a. Significant design criteria.
    b. List of equipment.
    c. Parts list for each component.
    d. Operating instructions.
    e. Maintenance instructions for equipment and systems.
    f. Maintenance instructions for special finishes, including recommended cleaning methods and materials and special precautions identifying detrimental agents.
3. Project documents and certificates including:
    a. Shop drawings and product data.
    b. Air and water balance reports.
    c. Certificates.
    d. Photocopies of warranties and bonds.

E. Submittal:
1. Submit one copy of completed volumes in final form 15 days prior to final inspection.

2. Architect will notify Contractor of any required revisions after final inspection.
3. Revise content of documents as required prior to final submittal.
4. Submit revised volumes within 10 days after final inspection.

1.7 WARRANTIES

A. Provide two copies of each warranty.

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

C. Provide Table of Contents and assemble in three ring binder with durable plastic cover.

D. Submit prior to final Application for Payment.

E. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within 10 days after acceptance, listing date of acceptance as start of warranty period.

1.8 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 in location as directed; obtain receipt prior to final payment.

PART 2 – PRODUCTS

2.1 Not used.

PART 3 - EXECUTION

3.1 Not used.

END OF SECTION

SECTION 04069

RESTORATION MORTAR

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Analysis of existing mortar.
2. Mortar materials.
3. Mortar mixes.

B. Related Sections:

1. Division 1: Administrative, procedural, and temporary work requirements.
2. Section 04905 - Masonry Restoration.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM)

1. C 144 - Aggregate for Masonry Mortar.
2. C 150 - Portland Cement.
3. C 207 - Hydrated Lime for Masonry Purposes.
4. C 270 - Mortar for Unit Masonry.
5. C 1324 - Examination and Analysis of Hardened Masonry Mortar.

1.3 SUBMITTALS

A. Samples:

1. Submit two cured mortar samples for each mortar color required, 6 x 1/2 x 1/2 inches in size.
2. Samples will be compared to original unweathered samples to determine acceptability of match.

B. Test Reports: Original mortar analysis for each type of masonry material.

1.4 QUALITY ASSURANCE

A. Preconstruction Testing Laboratory Services:

1. Remove minimum of three unweathered, undisturbed, full depth mortar samples from different locations; Two from each masonry material type.
2. Retain one sample from each original mortar system for later comparison with proposed mortar mixes.
3. Test mortar in accordance with ASTM C 1324; report the following:
    a. Volumetric proportions of aggregate, cement, lime, and other ingredients.
    b. Type, composition, color, and gradation of aggregate.
    c. Presence of pigments or additives.
4. Based on test results, provide recommended mortar mix for each masonry system in accordance with ASTM C 270, compatible with physical and mechanical properties of original masonry materials.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect materials from moisture absorption and damage; reject damaged containers.

B. Store sand to prevent inclusion of foreign matter.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Portland Cement:

1. Type: ASTM C 150, Type II, containing maximum 0.60 percent alkali (sodium oxide) and maximum 0.15 percent water soluble alkali by weight.
2. Color: To match original mortar. Allow for two mortar colors.

B. Lime: ASTM C 207, Type S, hydrated masonry type.

C. Sand: ASTM C 144; color, size, and type to match original mortar.

D. Water: Potable, clean, and free of oils, acids, alkalis, salts and organic matter.

E. Other Components: As determined by original mortar analysis to produce visual and performance characteristics to match original mortar.

F. Air Entraining, Antifreeze, Bonding, and Other Additives: Not permitted.

G. Premixed Mortar: Not permitted.

2.2 MIXES FOR POINTING MORTAR

A. Proportions: As determined by original mortar analysis.

B. Ultimate Compressive Strength: Not to exceed that of original mortar or masonry.

2.3 MIXES FOR SETTING MORTAR

A. Setting mortar shall be ASTM C-270 Type N composed of one part Portland cement, one part lime, and six parts sand mixed with water.

2.4 MIXING MORTAR

A. Thoroughly mix ingredients in quantities needed for immediate use.

B. Mix dry ingredients mechanically until uniformly distributed; add water to achieve workable consistency.

C. Discard lumpy, caked, frozen, and hardened mixes, and mixes not used within 2 hours after initial mixing.

D. Use mortar within 2-1/2 hours after initial mixing at ambient temperatures below 80 degrees F and within 1-1/2 hours after initial mixing at ambient temperatures over 80 degrees F.

E. Do not add antifreeze compounds to lower freezing temperature of mortar.

F. Provide consistent color for exposed mortar.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install mortar per Section 04905 – Masonry Restoration.

END OF SECTION

SECTION 04905

MASONRY RESTORATION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Relocate displaced masonry into original position.
2. Replacement of damaged stone
3. Retooling of stone to match original profile
4. Cutting reglets in masonry for installation of metal counterflashing or flashing membrane.
5. Stone repair including full crack and injection grouting repairs, masonry patching, and stone Dutchman repairs.
6. Re-pointing exterior stone joints.
7. Providing OSHA – compliant access for work of this Section.
8. Providing temporary shoring and bracing required to complete work of this Section.

B. Related Sections include the following:

1. Section 01226 – Unit Prices.
2. Section 04069 - Restoration Mortar.
3. Section 04931 - Masonry Cleaning.
4. Section 07140 – Cold Fluid-Applied Waterproofing for flashing membrane installation.
5. Section 07920 - Joint Sealers for sealing joints between masonry and non-masonry materials.

1.2 REFERENCES

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

1. C 97 - Absorption and Bulk Specific Gravity of Dimension Stone.
2. C 99 – Test Method for Modulus of Rupture of Building Stone.
3. C 170 - Compressive Strength of Natural Building Stone.
4. C 295 - Petrographic Examination of Aggregates for Concrete.
5. ASTM C91-01: Standard ASTM C144-03: Standard Specification for Aggregate for Masonry.
6. ASTM C150-02ae1: Standard Specification for Portland Cement.
7. ASTM C207-97: Standard Specification for Hydrated Lime for Masonry Purposes.
8. ASTM C270-03: Standard Specification for Mortar for Unit Masonry.
9. IMIAC (International Masonry Industry All-Weather Council) - Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.

B. Preservation Brief 2: Re-pointing Mortar Joints in Historic Brick Buildings, Robert C. Mack, FAIA, National Park Service, revised October, 1998.

1.3 DEFINITIONS AND GOALS

A. Defective/Deteriorated Joint: Joints in which mortar is missing, loose, eroded, cracked, powdered, unsound, or weathered more than 1/8 inch from original plane.

B. Dutchman: The removal of areas of unsound stone from a single unit and the installation of a piece of the same stone, cut, carved and tooled to match.

C. Patching: The goal of patching is to remove areas of deteriorated stone from individual units and recreate missing lines, forms and shapes with a compatible material that has the color and texture of the original stone.

D. Re-pointing: The process of raking out (removing) mortar and replacing it with new mortar.

E. Masonry Replacement: The process of removing masonry unit(s) and replacement with new unit(s) to match original in color, texture, finish, strength, etc.

F. Re-tooling: The process of tooling the existing stone surface to create a finished surface that more closely resembles the existing original stone profiles and forms.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each product indicated including recommendations for their application and use. Include test reports and certifications substantiating that products comply with specified requirements. Submit Material Safety Data Sheets for each product proposed for use.

B. Samples: Submit, for verification purposes, prior to mock-up erection, samples each of the following:

1. For patching material, submit 6"x6"x1" samples of the mixed and cured material, showing the full range of expected color variations, and finish quality for each type of stone patching required. Document each sample with manufacturer and stock number or other information necessary to order additional material.
2. Stone samples for each type of limestone finish in sufficient quantity to show full color and texture range, minimum 12 inch x12 inch samples.
3. Stone anchors for Dutchman repairs.

C. Shop Drawings:

1. The stone fabricator shall prepare and submit for approval complete cutting and setting drawings for all of the cut stonework. Drawings shall show in detail the sizes, sections and dimensions of stone, the arrangement of joints, anchoring, setting marks, location of existing anchors and kerfs to remain, and other necessary details. The dimension on the shop drawings shall represent field conditions and field measurements.
    a. Submit for approval shop drawings showing the location, size and anchoring detail of each stone Dutchman.

D. Qualification Statement: Restorer qualifications, including previous projects.

1.5 QUALITY ASSURANCE

A. Restoration Specialist: Work of this Section must be performed by an experienced masonry restoration firm that has completed work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance, having not less than 5 years comparable experience.

1. Field Supervision: Restoration specialist firm shall maintain an experienced full-time supervisor on the Project site during times that masonry restoration work is in progress.
2. Installer Certification: Repairs should be performed by trained installers holding a Training Workshop Certificate from the masonry repair system manufacturer. Contractor shall maintain proof of this credential for each installer at the site at all times.

B. Source of Materials: Obtain each type of material for masonry restoration (Stone, cement, sand, etc) from one source with resources to provide material of consistent quality in appearance and physical properties.

C. Field-Constructed Mock-ups: Contractor shall prepare the following sample panels on the building where directed by the Architect. Obtain Architect's acceptance of visual qualities before proceeding with the work. Retain accepted panels in undisturbed condition as a standard for judging completed work.

1. Dutchman repair of veneer stone; Demonstrate removal of deteriorated stone and installation of stone Dutchman, including installation of anchors and seaming grout to match adjacent stone. Determine with Architect present extent of stone removal prior to cutting stone.
2. Three patching samples for each type of masonry material demonstrating removal of damaged masonry and/or incompatible prior patches and installation and curing of specified patching mortar. Demonstrate ability to match color and surface qualities of adjacent masonry. Sample required shall be a minimum of 3" x3" x depth of repair.
3. Injection grouting sample demonstrating cleaning and preparing a typical crack for injection grouting and installation and curing of grouting material. Sample required shall be a minimum of 24 linear inches.
4. Re-pointing: Prepare two separate samples in-situ of approximately 3 feet high by 4 feet wide for each type of re-pointing required. One for demonstrating methods and quality of workmanship expected in removal of mortar from joints and the other for demonstrating visual qualities of pointing mortar and workmanship expected in pointing mortar joints.
5. Re-tooling: Demonstrate re-tooling technique for each stone profile or texture that is required to be performed to match original.

D. Pre-construction Testing Laboratory Services:

1. Architect and Contractor will jointly select minimum two samples of each type of original limestone.
2. Test samples in accordance with ASTM C 97, ASTM C 170, and ASTM C 295.
3. Report compressive strength, absorption, and initial rate of absorption.
4. Identify physical and mechanical characteristics.

1.6 PROJECT CONDITIONS

A. Environmental Requirements:

1. Hot weather requirements: If ambient temperature is over 95 degrees F or relative humidity is less than 50 percent, protect from direct sun and wind exposure for minimum 48 hours after installation.
2. Cold weather requirements:
   a. In accordance with IMIAC requirements.
   b. Do not use frozen materials or build upon frozen work.

1.7 RESTORATION PROGRAM, SEQUENCING, AND SCHEDULING

A. Restoration Program: For each phase of restoration process, provide detailed description of materials, method, equipment, and sequence of operations to be used for each phase of restoration work including protection of surrounding materials on building and Project site.

1. Include methods for keeping pointing and repair mortars damp during curing period.
2. If materials and methods other than those indicated are proposed for any phase of restoration work, provide a written description, including evidence of successful use on comparable projects, and a testing program to demonstrate their effectiveness for this Project.

B. Sequencing/Scheduling: Perform masonry restoration work in a logical sequence. Submit a sequencing plan with a schedule including but not limited to the following items of work:

1. Providing access to Architect, where indicated on drawings, for completion of exterior masonry survey.
2. Masonry cleaning, specified under Section 04931.
3. Removal of deteriorated portions of existing masonry for the following repairs: stone Dutchman, cementitious patching, and injection grouting.
4. Reconstructing and re-tooling stone masonry elements; Breakdown specific items of work.
5. Re-pointing defective and or deteriorated stone, terra cotta and brick masonry joints.
6. Installation of joint sealants, specified under Section 07920.

1.8 DELIVERY, STORAGE AND HANDLING

A. Deliver masonry restoration materials to site in manufacturer's original and unopened containers and packaging, bearing labels as to type and names of products and manufacturer's.

B. Protect masonry restoration materials during storage and construction from wetting by rain, snow or ground water, and from staining or intermixture with earth or other types of materials.

C. Comply with manufacturer's recommendations for minimum and maximum temperature requirements for storage.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers - Patching Compound:

1. Cathedral Stone Products.
2. Edison Coatings.

B. Acceptable Manufacturers - Injection Grout:

1. Cathedral Stone Products.
2. Edison Coatings.

2.2 REPLACEMENT STONE AND STONE DUTCHMAN

A. Limestone to match original in color, graining, surface texture, face pattern, and shell content if applicable.

B. For stone Dutchman Select pieces closest in color, graining, and face patterning to match stone where Dutchman is to be installed.

C. Grout for Dutchman Seams: Jahn M-40 Crack and Void Injection Grout, as manufactured by Cathedral Stone Products., Inc., Hanover MD, (800) 684-0901.

D. Anchor Setting Mortar: Single component, cementitious, non-shrink mortar for securing anchors in new or existing masonry structures.

1. Product: Jahn M-80 Anchor Setting Mortar, as manufactured by Cathedral Stone Products Inc., Hanover, MD, (800) 684-0901.

2.3 STONE PATCHING MATERIALS

A. Cementitious Patching Materials: Premixed cementitious patching material formulated to match the color and texture of the existing masonry. One-component, non-sag, mineral-based mortar,

containing no synthetic polymers or additives for repair and reconstruction of natural stone surfaces. The mortar must be vapor permeable, frost and salt resistant, shrink resistant, and be physically compatible with the substrate, including, but not limited to porosity, tensile and compressive strength.

1. Product: Jahn M70 Stone Patching Mortar, as manufactured by Cathedral Stone Products, Inc., Jessup, Maryland, or approved substitute.

B. Stain for patching mortar:

1. General: Inorganic, breathable, color fast, mineral stain compatible with cementitious patching material specified.
   a. Silin Lasur Mineral Stain for Masonry, as manufactured by Cathedral Stone Products, Inc., Hanover, MD, (800) 684-0901.
   b. Epochrome S water-borne chemical toners for tinting unmatched mortar repairs, as manufactured by Cathedral Stone Products, Inc., Hanover, MD, (800) 684-0901.

2.4 INJECTION GROUT FOR STONE REPAIRS INSITU

A. Description: Single-component cementitious injection grout to be used in the stabilization and/or rehabilitation of cracked masonry.

1. Products:
   a. Jahn M31 Micro Injection Adhesive for hairline cracks up to 3/16” in width, using gravity feed or pressure injection for use on both non-structural void applications and structural load bearing situations.
   b. Jahn M40 Crack Injection Grout for cracks ranging from approximately 3/16” to 9/16” in width using low pressure mechanical or gravity feed equipment for use in repairing voids in non structural situations.
   c. Do not add any bonding agents, accelerators, or retarders to the grout.

2.5 EPOXY FOR STONE CRACKS AND FULL STONE BREAK REPAIRS

A. Description: 2-component, moisture insensitive, high strength, 100% solids epoxy adhesive.

1. Product: 520-T, as manufactured by Edison Coatings, Plainville, CT, (800) 697-8055.

2.6 SETTING AND POINTING MORTAR MATERIAL

A. Refer to Section 04069 – Restoration Mortar.

PART 3 - EXECUTION

3.1 PROTECTION

A. Protect persons, motor vehicles, surrounding surfaces of building being restored, building site, plants, and surrounding buildings from harm resulting from masonry restoration work.

B. Erect temporary protective covers over walkways and at point of pedestrian and vehicular entrance and exit that must remain in service during course of restoration work.

C. Prevent mortar from staining face of surrounding masonry and other surfaces.

1. Cover sills, ledges, and projections to protect from mortar droppings.
2. Keep wall area wet below rebuilding and pointing work to discourage mortar from adhering.
3. Immediately remove mortar in contact with exposed masonry and other surfaces.
4. Clean mortar splatters from scaffolding at end of each day.

3.2 SURFACE CONDITIONS

A. Inspection

1. Prior to work of this Section, carefully inspect the work of all other trades and verify that all such work is completed to the point where this installation may properly commence.
2. Verify that masonry may be completed in accordance with all pertinent codes and regulations, the referenced standards, and the original design.
3. Do not start work until mock-ups are accepted by the Architect.

B. In the event of discrepancy, immediately notify the Architect. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.3 STONE REMOVAL AND REPLACEMENT

A. At locations indicated, remove stone that has deteriorated or is damaged beyond repair. Carefully demolish or remove entire unit from joint to joint, without damaging surrounding stone, in a manner that permits replacement with full-size unit.

B. Support and protect remaining stonework that surrounds removal area. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition.

C. Notify Architect of unforeseen detrimental conditions including voids, cracks, bulges, and loose masonry units in existing masonry backup, rotted wood, rusted metal, and other deteriorated items.

D. Remove in an undamaged condition as many whole stone units as possible.

1. Remove mortar, loose particles, and soil from stone by cleaning with hand chisels, brushes, and water.
2. Remove sealants by cutting close to stone with utility knife and cleaning with solvents.
3. Store stone for reuse, as indicated.

E. Clean stone surrounding removal areas by removing mortar, dust, and loose particles in preparation for replacement.

F. Replace removed stone with new stone matching existing stone, including size. Butter vertical joints for full width before setting and set units in full bed of mortar, unless otherwise indicated. Replace existing anchors with new anchors of size and type indicated.

1. Tool exposed mortar joints in repaired areas to match joints of surrounding existing stonework.
2. Rake out mortar used for laying stone before mortar sets and point new mortar joints in repaired area to comply with requirements for repointing existing stone, and at same time as repointing of surrounding area where deteriorated.

G. Contractor is responsible for repair or replacement of stone that is damaged during removal where the stone is indicated to be salvaged for re-use.

3.4 DUTCHMAN REPAIR

A. Inspection: Prior to cutting out for the installation of new stone Dutchman, the Contractor shall verify all locations and dimensions of stone to be removed by inspecting and sounding those areas indicated on the Contract Documents as requiring Dutchmen. The Contractor shall submit shop drawings indicating the location, sizes, and anchoring detail of each Dutchman unit. Obtain Architect's approval for locations, sizes and anchor details prior to cutting out stone. The Contractor shall notify the Architect in writing if conditions in the field differ from those indicated on the Contract Documents or stone shop drawings.

B. Carefully cut out by hand, for installation of Dutchman stone scheduled for removal. Cutting out of stone shall be in the locations indicated on the approved shop drawings. Cut out without damaging

surrounding masonry to remain. Obtain approval for cutting masonry anchors encountered at cut outs for Dutchman. Cut sides and backs of stone reveals flat with 90 degree corners.

C. Remove mortar, loose particles, old patches and debris from existing surrounding masonry in preparation for replacement. Clean with stiff brushes or by flushing with water.

D. Stone Installation:

1. General: Dutchmen shall be installed level, plumb, square and true within the allowable tolerances. The units are to be positioned in such a manner that no dimensional error is allowed to occur. Horizontal and vertical seams shall be correctly aligned and of uniform width. Complete surface tooling, honing or dimensioning after stone Dutchman units have been installed. Blend all finishes on Dutchman units with finishes on adjacent stone.
2. Set Dutchman with specified adhesive in the position to which it is assigned in accordance with the approved setting drawings.
3. Drill new holes into the new stone and into the existing masonry back-up. The drilled holes shall be cleaned with stiff nylon or natural bristle brushes or by flushing with water.
4. The stainless steel threaded rod shall be cleaned and degreased as necessary to remove all contaminants, which may hinder the adhesive bond.
5. All surfaces that are in contact with adhesive must be free of dirt, dust, paint, glaze, grease, oil, rust, or other contaminant. Surface may be dry or damp (no free water). The adhesive shall come in contact with clean sound surfaces.
6. Grout face of Dutchman seams with specified grout tinted to match the adjacent stone.

3.5 STONE REPAIR (STONE CRACKS AND FULL STONE BREAKS)

A. Remove soil, loose stone particles, mortar, and other debris or foreign materials from stone surfaces to be bonded by cleaning with stiff fiber brush.

B. Anchor stone pieces with threaded stainless steel rods. Insert rods minimum 2 inch depth into each piece of stone and set with anchor setting mortar following manufacturer's written instructions.

1. The stainless steel threaded rod shall be cleaned and degreased as necessary to remove all contaminants, which may hinder the adhesive bond.

C. Apply stone-to-stone adhesive to comply with adhesive manufacturer's written instructions. Coat bonding surfaces of stone pieces, completely filling all crevices and voids.

D. Fit stone pieces together for tight fit, hold securely in place until adhesive has cured.

E. Clean residual adhesive from exposed surfaces and patch chipped areas following procedures outlined under item 3.7.

3.6 STONE PATCHING

A. Surface Preparation for Installation of Repair Mortar:

1. Using methods approved via submittals, remove loose mortar, patches, and damaged unsound masonry to sound and solid substrate. Remove sealant residue.
2. Anchors that are free of rust, solidly embedded, and do not project beyond the surface of the masonry unit may remain. All others should be removed.
3. Cut the edges of the repair area to provide a minimum depth of ¼". The edges of the repair should be square cut. Do not allow any feathered edged in the repair area.

B. Mixing, Application, and Curing of Repair Mortar:

1. Mixing:

a. General: Mix patching mortar in accordance with manufacturer's printed instructions.

b. Do not mix more material than can be used within 30 minutes. Discard any material that has been mixed for 30 minutes or more.

c. Mixing ratios:

1). Granite: Jahn M160; Approximately 5 parts dry material to 1 part water.

a. Add water to dry ingredients and mix well. Adjust amount of water according to the weather and the porosity of the substrate.

2. Application:

a. Apply the mortar mix using a trowel in a series of 1-inch lifts allowing mortar to dry approximately 10-20 minutes between lifts. If applied in layers, scrape off any cement skin that has formed and continue application. Dampen the surface before applying the next layer. Work mortar firmly into the surface of the masonry, including the corners, and under and around all mechanical anchors.

b. Build up patching material so that it is slightly above adjacent masonry surface. Allow 15 to 30 minutes to set slightly (Wait time will vary with temperature and humidity-longer in cool weather), then scrape off excess material using a brush until the desired profile is reached. Do not press down or "float" the repair. Where patches occur at panel edges or corners, form mortar to match the profile of the surrounding masonry. In all cases, finish so that it is as indistinguishable as possible from the adjacent masonry.

3. Curing:

a. Lightly mist patch with water to wet the entire surface of the finished patch approximately 30 minutes to 1 hour after completion on hot sunny days and approximately 2 hours or longer, on cool or cloudy days. Time will vary with temperature and humidity. Mist several times a day on the three days following the repair installation.

B. Finishing:

1. Upon initial cure, and in accordance with the manufacturer's printed instructions, patch shall be finished to match the existing adjacent masonry.

2. Clean any mortar residue form area surrounding the patch by sponging as many times as necessary with clean water. This should be done before patching material sets.

3. After the repair has been cured and allowed to dry for at least one week, if the appearance of a repair does not meet the specifications of the job, the surface color of the repair is to be enhanced by applying a vapor permeable, mineral based pigmented stain.

a. Remove dust and loose particulate matter from surfaces to receive coatings immediately prior to coating application.

b. Protect all non-masonry surfaces such as glass, wood, metal, etc .

c. Cracks and spalls must be repaired and cured prior to coating application.

d. Apply specified coating to vertical surfaces only.

e. Substrate must be completely dry before coating. Do not work when precipitation is expected within 48 hours of installation. The coating needs adequate time to bond to the substrate; Moisture disrupts the curing process.

C. Mixing Coating System:

1. It is recommended that proper eye protection be worn during mixing in case of accidental splashing. Mix component A (colored paint) with component B (Silin AZ Fixative) in the desired proportions (see chart below) before installation.

2. Mixing ratios will depend on the desired coating effect and the substrate surface.

a. Transparent finish:

(1) Parts of colored coating: 1

(2) Parts of Silin AZ Fixative: 3-100+

b. Refer to manufacturers data sheets for more detail on transparent finishes.

D. Adjustment and Cleaning:

1. Remove and replace all unsatisfactory patches, at no additional cost to the Owner. Conditions deemed unacceptable include, but are not limited to:
   a. Separation or shrinkage at the edge of a patch,
   b. Separation of the patch from the substrate,
   c. Surface crazing or cracking,
   d. “Burned” surfaces (from overly quick drying),
   e. Discoloration, or mis-matched color (compared to existing adjacent stone), and
   f. Mis-matched surface quality and finish (compared to existing adjacent stone).
2. Repair adjacent surfaces or other elements that have been marred or otherwise damaged during the work of this Section.
3. Remove uncured mortar from the perimeter of the repair before it dries using clean water and a rubber sponge. Repeat several times with clean water to prevent a halo effect. Cured mortar may only be removed chemically or mechanically.
   a. Should removal of cured mortar be necessary, Contractor shall submit proposed method of removal and obtain Architect’s approval prior to removal.
4. Once masonry patching work is complete, remove all unused materials, containers and equipment from the site, and dispose of all related debris.

1.2 INJECTION GROUTING

A. General: Strictly adhere to manufacturer’s written instructions and recommendations regarding preparation, installation, finishing, and curing.

B. Surface Preparation:

1. Remove any existing patching material or unsound stone from crack to be injection grouted.
2. Transverse Cracks (perpendicular to the face of the wall): Drill a series of injection ports 1/8” in diameter and spaced 2 inches apart, into the heart of the transverse crack and throughout its length. Holes shall be angled slightly down. Seal crack between drill holes with non-staining clay, to prevent leaking of the injection mortar.
3. Lateral Cracks / Delamination (parallel to the face of the wall): Drill a series of injection ports 1/8” in diameter and spaced 2 inches apart, in a square configuration (90°) on the face of the substrate to create a “drill frame”. Ports should be drilled in a downward direction.
4. Wash the surface and interior of the crack using clean water to remove all dust, loose or deleterious material, which could prevent proper flow/or adhesion, thereby compromising the integrity of the cured injection grout.

C. Mixing:

1. It is recommended that safety goggles, gloves, and a dust mask be worn for protection. Do not mix more material than can be used within approximately 30 minutes. Discard any mixed material that has been unused for 30 minutes or more.
2. Mixing Ratio:
   a. Jahn M30: The mixing ratio is approximately 2 to 5 parts powder to 1 part water by volume.
   b. Jahn M40: The mixing ratio is approximately 2 to 2-1/2 parts powder to 1 part water by volume.
3. Mixing:
   a. For Jahn M30: Mix mechanically using, a high-speed drill (3,000 RPM or higher) equipped with a Jiffler type-mixing paddle. After mixing, the mortar should be poured into another

clean container using a sieve. Continued agitation is necessary if the mortar is allowed to sit prior to use.

b. For Jahn M40: Mix manually or mechanically using a slow speed drill (400-600 RPM) equipped with a Jiffler type-mixing paddle. The material should be mixed for a minimum of three minutes with continued agitation should the product be allowed to sit prior to use.

4. The percentage of water content varies depending on the width of the crack, the amount of moisture present within the crack, and the structural characteristics to be attained. Contractor shall determine the appropriate water content, as submitted for approval, and ensure consistency of the mix.

D. Application and Curing:

1. Substrate Preparation: Moisten the interior of the crack immediately before injection by flushing with clean water. If the surface is allowed to dry out before grout is injected, this step must be repeated.
2. Treatment of Transverse Cracks: Inject grout into lowest port and continue until it flows freely from this port and other ports at the same level. Seal ports using non-staining clay and proceed in identical fashion until the crack is filled. Clean up overflow immediately.
3. Treatment of Lateral (delamination) Cracks: Inject grout into lower left port and proceed until it flows freely from this port and other ports at the same level. Where necessary, insert threaded stainless steel dowels after some grout has been injected, agitate or tap several times to remove any voids or air pockets and inject remainder of the grout until port is full and grout flows freely from other ports at the same level. Seal ports using non-staining clay. Inject grout into lower right port and proceed in identical fashion. The order of injection is lower left, lower right, upper left, then upper right. Clean up overflow immediately.
4. Once the mortar has sufficiently set, the clay may be removed from the crack and the drill holes.

E. Finishing: Remove plugs after 24 to 48 hours and repair the ports and the crack surface with patching mortar in accordance with Section 04 01 41 - Masonry Patching.

F. Adjustment and Curing:

1. Remove and replace all installations that exhibit:
   a. Discoloration, or mis-matched color (compared to existing adjacent stone); or
   b. Mis-matched surface quality and finish (compared to existing adjacent stone).
2. Repair adjacent surfaces or other elements that have been marred or otherwise damaged during the work of this Section.
3. Remove uncured mortar from substrate before it dries using clean water and a rubber sponge. Cured mortar may only be removed chemically or mechanically.
4. Should removal of cured mortar be necessary, Contractor shall submit proposed method of removal and obtain Architect's approval prior to removal.
5. Once injection grouting work is complete, remove all unused materials, containers and equipment from the site, and dispose of all related debris.

1.3 ROUTING AND REPOINTING MORTAR JOINTS

A. Rake out and repoint mortar joints to the following extent:

1. All joints in areas indicated.

B. Do not rake out and repoint joints where not required.

C. Rake out joints as follows:

1. Remove mortar from joints to depth equal to 2-1/2 times joint width, but not less than 1/2 inch or depth at which sound mortar is reached.

2. Remove mortar from masonry surfaces within raked-out joints to provide reveals with square backs and to exposed masonry for contact with pointing mortar. Brush, vacuum, or flush joints to remove dirt and loose debris.
3. Do not spall edges of masonry units or widen joints. Replace or patch damaged masonry units as directed by Architect.
    a. Cut out mortar by hand with chisel and mallet. Do not use power-operated grinders without Architect's written approval based on submission by Contractor of a satisfactory quality-control program and demonstrated ability of operators to use tools without damaging masonry units. Quality-control program shall include provisions for supervising performance and preventing damage due to worker fatigue.
    b. Cut out center of mortar joints using angle grinders with diamond-impregnated metal blades. Remove remaining mortar by hand with chisel and mallet. Strictly adhere to written quality-control program. Quality-control program shall include provisions for demonstrating ability of operators to use tools without damaging masonry, supervising performance, and preventing damage due to worker fatigue.

D. Notify Architect of unforeseen detrimental conditions including voids in mortar joints, cracks, loose masonry units, rotted wood, rusted metal, and other deteriorated items.

E. Point joints as follows:

1. Rinse masonry-joint surfaces with water to remove dust and mortar particles. Time rinsing application so, at time of pointing, joint surfaces are damp but free of standing water. If rinse water dries, dampen masonry-joint surfaces before pointing.
2. Apply pointing mortar first to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8 inch until a uniform depth is formed. Fully compact layer thoroughly and allow it to become thumbprint hard before applying next layer.
3. After low areas have been filled to same depth as remaining joints, point all joints by placing mortar in layers not greater than 3/8 inch. Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing masonry has worn or rounded edges, slightly recess finished mortar surface below face of masonry to avoid widened joint faces. Take care not to spread mortar over edges onto exposed masonry surfaces or to featheredge mortar.
4. When mortar is thumbprint hard, tool joints to match original appearance of joints. Remove excess mortar from edge of joint by brushing.
    a. Historic brick mortar joints: "V" profile to match original, typical.
    b. Below grade masonry or masonry not exposed to view and joints between two adjacent smooth surface cut stones: Flush joint.

F. Cure mortar by maintaining in thoroughly damp condition for at least 72 hours, including weekends and holidays.

1. Acceptable curing methods include covering with wet burlap and plastic sheeting, periodic hand misting, and periodic mist spraying using system of pipes, mist heads, and timers.
2. Adjust curing methods to ensure that pointing mortar is damp throughout its depth without eroding surface mortar.
3. Where repointing work precedes cleaning of existing masonry, allow mortar to harden at least 30 days before beginning cleaning work.

1.4 ADJUST AND CLEAN

A. After mortar has hardened but before it has fully cured, thoroughly clean masonry surfaces of excess mortar using stiff nylon or natural bristle brushes and clean water; do not use metal brushes or scrapers.

B. Any masonry work that does not result in a consistent appearance with adjacent brickwork and stonework shall be considered defective and shall be corrected by the Contractor at no additional cost to the Owner.

1.5 FIELD QUALITY CONTROL

A. Architect's Project Representatives: Architect will assign Project representatives to help carry out Architect's responsibilities at the site, including observing progress and quality of portion of the Work completed. Allow Architect's Project representatives use of scaffolding, as needed, to observe progress and quality of portion of the Work completed.

B. Notify Architect's Project representatives two weeks in advance of times when lift devices and scaffolding are scheduled to be relocated. Do not relocate lift devices and scaffolding until Architect's Project representatives have had reasonable opportunity to make inspections and observations of work areas at lift device or scaffold location and only when the completed work is accepted in writing by the Architect.

END OF SECTION

SECTION 04931

CHEMICAL CLEANING OF MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Chemical cleaning of the north entry exterior stone masonry surfaces.

B. Related Sections:

1. Division 1: Administrative, procedural, and temporary work requirements.
2. Section 07920 – Joint Sealers

1.2 DESCRIPTION OF WORK

A. Masonry cleaning shall be completed prior to sealant work.

B. The goal of the work of this Section is to remove stains (Including but not limited to tar, biological, growth and water staining) atmospheric dirt, calcium deposits, and other residue from exposed masonry surfaces of the building to provide a clean, uniform appearance without blotches, streaks, runs or other kinds of spotty appearance. Any work that does not achieve this goal will be considered unsuccessful and will have to be re-cleaned until this goal is achieved, at no additional cost to the Owner.

1.3 REFERENCES

A. Preservation Brief 1: Assessing Cleaning and Water-Repellent Treatments for Historic Masonry Buildings, Robert C. Mack, FAIA, and Anne E. Grimmer. National Park Service, revised November, 2000.

1.4 DEFINITIONS

A. Etch: Action or effect of an acid-based compound on a surface.

B. Hone: Removal of scratches by “wet” grinding with diamond pads. (A satin finish with little or not gloss).

C. Poultice: A unique mixture, which when applied extricates a stain from natural stone.

D. Pressure Spray:

1. Low-Pressure Spray: 100 to 400 psi; 4 to 6 gpm.
2. Medium-Pressure Spray: 400 to 800 psi; 4 to 6 gpm.
3. High-Pressure Spray: 800 to 1200 psi; 4 to 6 gpm.

E. Restoration: Process of bringing material back to its original appearance.

1.5 SUBMITTALS

A. Product Data: Submit manufacturer’s specifications, Material Safety Data Sheets (MSDS), and other data for each manufactured product, including certification that each product complies with specified requirements. Include written instructions for handling, storage, protection and use.

B. Environmental Regulations:

1. Contractor is responsible for proper disposal of all waste and cleaning materials.
2. Submit, for Owner review, a letter of acceptance from local regulatory entities (such as Storm or Sanitary Sewer Departments) indicating that procedure for disposal of cleaning effluent is compliant with relevant rules and regulations.

1.6 QUALITY ASSURANCE

A. Applicator:

1. Minimum 3 years documented experience in work of this Section.
2. Successful completion of at least 3 projects of similar scope and complexity within past 5 years.

B. Mockups:

1. Control Test Sample: Upon approval of product data and methods, prepare cleaning sample(s) approximately 10 square feet for each type of masonry and surface condition and for each type of cleaning product and stain removal technique proposed in locations approved by the Architect.
   a. Allow cleaning solutions to remain on surface for varying time periods in several locations to determine optimum time required.
   b. Perform multiple applications of varying concentrations of cleaning solutions to determine optimum concentration.
   c. Ensure that materials and procedures will not discolor or damage existing surfaces.
2. Allow a waiting period of not less than 7 days after completion of sample cleaning to permit a study of sample panels for negative reactions.

C. Miscellaneous

1. Methods of Application: Submit a written description of the full range of methods and procedures proposed for cleaning and stain removal including but not limited to: method of application, dilution of application, temperature of application, length of time of surface contact, method of rinsing surface (temperature, pressure, and duration), repetition of procedure, etc.
2. Methods of Protection: Submit a written description of proposed materials and methods of protection for preventing damage to any non-masonry surfaces in proximity to this work, including glass and metals. These methods and materials may include, but are not limited to, spray-on, peel-off type liquid materials and masking tape. Outline methods proposed to keep water from reaching the interior of the building.
3. If materials and methods other than those indicated are proposed for cleaning work, provide a written description, including evidence of successful use on other comparable projects, and a testing program to demonstrate their effectiveness for this Project.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in manufacturer’s original sealed and labeled containers.

B. Store all materials in accordance with manufacturer’s recommendations and free from extremes of temperature.

1.8 PROJECT CONDITIONS

A. Clean stone surfaces only when air temperature is 50 deg F (10 deg C) and above and will remain so for at least 7 days after completion of cleaning.

B. Do not perform work when wind could carry materials to adjacent or underlying materials, or to adjacent property.

C. Perform all work of this Section in accordance with all Federal, State and local regulations regarding the transportation, storing, handling, application, removal and disposal of the products involved.

D. Protect workers and public from injury during this work. Provide all required temporary partitions, closures, guards, notices, and the like.

E. Protect the site and adjoining property, including vehicles, from damage that may result from this work. Trees and plants around the building shall be protected from contamination.

F. Take all measures required to ensure that the building remains completely watertight throughout the course of this work.

G. Repair damage to the building caused by penetration of water, or other factors resulting from failure to properly protect the building during work of this Section. Repairs shall be completed at no additional cost to the Owner, in a manner that fully restores all affected elements to their condition prior to damage.

PART 2 - PRODUCTS

2.1 GENERAL

A. Masonry cleaning materials used in this work shall be part of a system of products produced by one manufacturer, where possible, to ensure compatibility.

B. All materials shall be manufactured for the purpose in which they are proposed for use unless otherwise recommended by cleaning product manufacturer in writing, tested as indicated under Section 1.6.B Mock-ups, and approved by the Architect.

C. All chemical materials, compounds, liquids, etc. shall be safe and shall not violate state or federal environmental or safety regulations.

D. Injurious substances or any ingredients that independently or in combination with other compounds, fluids or solutions will damage masonry shall not be used. Methods or products causing abrasion or similar damage to the surface finish of the masonry shall not be used.

E. No sand, silica flour, or any other grit shall be used either singly or in combination with pressurized air, water or any other liquid.

2.2 CHEMICAL CLEANING SYSTEM FOR CLEANING LIMESTONE

A. Liquid Cleaner: Revive Cleaner, as manufactured by PROSOCO, Inc., 3741 Greenway Circle, Lawrence, KS 66046. Phone: (800) 255-4255; Fax: (785) 830-9797.

B. Water: Clean, potable, free of oils, acids, alkalis, salts, and organic matter.

1. Warm Water: Heat water to a temperature of 140 to 160 deg. F (60 to 71 deg. C).

2.3 ALTERNATE CLEMICAL CLEANING SYSTEM FOR CLEANING LIMESTONE

A. If areas of masonry still require cleaning after using the Revive Cleaner, use Liquid Cleaner - Light Duty Restoration Cleaner, as manufactured by PROSOCO, Inc., 3741 Greenway Circle, Lawrence, KS 66046. Phone: (800) 255-4255; Fax: (785) 830-9797.

B. SAFE n' EASY Efflorescence Remover, as manufactured by Dumond Chemicals, Inc., 1501 Broadway, New York, NY 10036. Phone: (212) 869-6350; Fax: (212) 764-5762.

C. Neutralizer: SAFE n' EASY Architectural Cleaner / Restorer, as manufactured by Dumond Chemicals, Inc., 1501 Broadway, New York, NY 10036. Phone: (212) 869-6350; Fax: (212) 764-5762.

2.4 CLEANING MATERIALS AND EQUIPMENT

A. Spray Equipment:

1. Provide equipment for controlled spray application of water and chemical cleaners, at rates indicated for pressure, measured at spray tip, and for volume. Adjust pressure and volume, as required, to ensure that damage to masonry does not result from cleaning methods.
   a. Pressure not to exceed 700 psi for limestone.
   b. For water spray application, provide a fan-shaped spray tip that disperses water at an angle of not less than 15 degrees.
   c. For heated water spray application, provide equipment capable of maintaining a temperature at flow rates indicated between 140 and 160 deg F (60 and 71 deg. C)
   d. For chemical cleaner spray application, provide low-pressure tank or chemical pump suitable for chemical cleaner indicated, equipped with a con-shaped spray tip.

B. Brushes: Natural fiber bristle brushes (Nonmetallic).

C. Liquid Strippable Masking Agent: Manufacturer's standard liquid, film-forming, strippable masking material for protecting glass and metal surfaces from damaging affects of acidic and alkaline cleaners.

1. Product: Sure Klean Acid Stop, as manufactured by PROSOCO, Inc., 3741 Greenway Circle, Lawrence, KS 66046. Phone: (800) 255-4255; Fax: (785) 830-9797.

PART 3 - EXECUTION

3.1 PREPARATION

A. General: Comply with chemical cleaner manufacturer's written instructions for protecting building surfaces against damage from exposure to their products.

B. Protect persons, motor vehicles, surrounding surfaces of building being restored, building site, plants, and surrounding buildings from injury from masonry cleaning work.

1. Do not clean stone during winds of sufficient force to spread cleaning solutions to unprotected surfaces.
2. Neutralize and collect alkaline and acid wastes. Dispose of runoff from cleaning operations by legal means and in a manner that prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.

3.2 SEQUENCING OF WORK

A. Stain Removal: Remove stains and encrustations including, biological, tar, asphalt, metal, calcium deposits and water prior to chemical cleaning.

B. Clean existing masonry surfaces using specified chemical cleaners to remove biological and atmospheric dirt.

C. Re-Clean difficult areas using specified chemical cleaners to remove staining if goal of cleaning work is not considered successful as determine by the Architect.

D. Remove and replace existing sealant as specified in Section 07920.

3.3 CLEANING STONE, GENERAL

A. Proceed with cleaning in an orderly manner, work from bottom to top of the building.

B. Use only those cleaning methods indicated for each masonry material and location.

1. Use natural-fiber brushes only.
2. Use spray equipment that provides controlled application at volume and pressure indicated, measured at spray tip. Adjust pressure and volume to ensure that cleaning methods do not damage stonework.
    a. Equip units with pressure gages.

C. Perform each cleaning method indicated in a manner that results in uniform coverage of all surfaces, including corners, moldings, and interstices, and that produces an even effect without streaking or damaging stone surfaces.

D. Chemical Cleaner Application Methods: Apply chemical cleaners to stone surfaces to comply with chemical cleaner manufacturer's written instructions.

1. Reapplying Chemical Cleaners: Do not apply chemical cleaners to same stone surfaces more than twice, unless otherwise approved by Architect.

E. Rinse off chemical residue and soil by working upward from bottom to top of each treated area at each stage or scaffold setting.

3.4 CHEMICAL CLEANING OF MASONRY

A. Remove dirt, hydrocarbons, grease, oil, environmental pollutants, biological growth, and residues.

B. Sandblasting and the use of non-proprietary acids are prohibited.

C. Follow manufacturer's instructions and procedures established during preparation of mockups.

D. Working from bottom to top, prewet the surface with clean water.

E. Apply cleaner using a bruch or roller. Gently scrub to improve results.

F. Let dwell for 5 to 15 minutes. Gently scrub heavily soiled areas. Do not let product dry no the surface. If drying occurs, lightly wet treated surfaces with fresh water. Reapply the cleaner in a gentle scrubbing manner.

G. Working from bottom to the top, rinse thoroughly with clean water.

3.5 CHEMICAL CLEANING OF MASONRY WITH ALTERNATE CLEANING PRODUCT

A. Follow manufacturer's instructions and procedures established during preparation of mockups.

B. Apply using a densely-filled masonry washing (Tampico) brush, roller or low pressure (50 psi maximum) spray. Do not apply with high pressure spray equipment. This drives the cleaner deep into the surface, making complete rinse difficult. Discoloration may result.

C. Working from bottom to the top, prewet the surface with clean water.

D. Apply the diluted cleaner liberally to the masonry surface using low pressure spray (50 psi max), roller or brush.

E. Let the cleaning solution dwell 3-5 minutes. Reapply. Light agitation improves cleaning results.

F. Working from bottom to the top, rinse the treated area thoroughly. If pressure water equipment is not available, use a garden hose with nozzle adjusted to a tight stream.

G. Rinse with enough water and pressure to flush spent cleaner and dissolved soiling from the masonry surface and surface pores without damage. Inadequate rinsing leaves residues which may stain the cleaned surface.

3.6 FINAL CLEANING

A. Contractor shall repeat the processes of the work of this Section until the goal of a clean, uniform surface is achieved.

B. Do not use acidic or alkaline cleaners for final cleaning.

END OF SECTION

SECTION 06100

ROUGH CARPENTRY

PART I - GENERAL

1.1 SECTION INCLUDES

A. All materials and labor for replacement of deteriorated wood framing elements, and work requiring new lumber for:

1. Framing with dimension lumber.
2. Wood blocking, bridging, and furring.
3. Connecting hardware, fasteners, and accessories

B. RELATED SECTIONS

1. General: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
2. Refer to Allowances for replacement of framing beyond base work.
3. Section 06 46 00 – Exterior Architectural Woodwork.
4. Section 07 61 00 – Sheet Metal Roofing.
5. Section 07 62 00 – Sheet Metal Flashing.
6. Section 08 55 00 – Wood Windows.

1.2 QUALITY ASSURANCE

A. All dimension lumber and engineered wood products shall bear a legible grade stamp of a certified lumber grading agency.

B. Each piece or bundle of treated wood products shall bear a legible third-party quality mark or tag indicating the name of the treater, date of treatment or lot number and the American Wood Preservers' Association (AWPA) Specification symbol to which the treatment conforms.

C. Provide Underwriters' Laboratories (UL) approved identification for fire resistant treated materials.

D. Unless noted otherwise, all rough carpentry work shall conform to the conventional framing rules of the applicable building code.

1.3 SUBMITTALS

A. Submit shop drawings and product data, describe materials, fasteners, fastening methods, accessories, and locations.

B. Submit documentation of wood treatment facility's qualifications and compliance with American Wood Preserver's Association (AWPA) standards.

1.4 STORAGE AND HANDLING

A. All wood products shall be placed on blocking so that the material does not sag and is completely out of ground-contact.

B. All wood products shall be protected from rain and direct sunlight.

C. Materials shall be stored on site no more than 30 days prior to use. Once un-bundled, materials must be installed immediately unless stickered and protected in a manner approved by the Architect.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Dimension lumber: No. 2 Grade Southern Pine, visually graded according to the published grading rules of the Southern Pine Inspection Bureau. Unless otherwise noted, dimension lumber shall be kiln dried to 15 percent moisture content, surfaced S4S.

B. Timbers: No. 1 Grade Southern Pine, visually graded according to the published grading rules of the Southern Pine Inspection Bureau, dimensions as shown on plans or to match existing. End grain of all timbers shall be coated with paraffin wax or approved sealer at the mill or immediately after treatments, prior to shipping.

C. Blocking and bridging shall be No. 2 Grade Southern Pine, nominal thickness, unless otherwise noted.

D. Shims shall be taper-sawn western red cedar or approved substitute.

2.2 PLYWOOD PANELS

A. Construction Panel Standards: Comply with PS 1 “U.S. Product Standard for Construction and Industrial Plywood” for plywood construction panels and for products not manufactured under PS 1 provisions with APA PRP-108.

B. Plywood: Exterior grade plywood sheathing.

1. Exposure Durability Classifications: Exposure 1.
2. Thickness: ¾”.

2.3 PRESERVATIVE TREATMENT

A. Preservative Treatment: Comply with applicable requirements of AWPA C2 (Lumber) and AWPA C9 (plywood). Provide treatment after members are shaped with waterborne chromated copper arsenate (CCA) preservative by vacuum pressure full-cell process in accordance with AWPA Standard Specification P-5 and as follows:

1. Above Ground Use Waterborne CCA Dry Salt Retention: 0.25 lb./cu. ft.
2. Ground Contact Use Waterborne CCA Dry Salt Retention: 0.40 lb./cu. ft.
3. In Ground Use Waterborne CCA Dry Salt Retention: 0.60 lb./cu. ft.
4. Above Ground Use Oil Borne Penta Preservative Retention: 0.40 lb./cu. ft.
5. Kiln dry members after treatment to 15% MC. Mark each treated item with the Quality Mark Requirements of an inspection agency approved by ALSC’s Board of Review.
6. complying with AWPA M4.
    a. Re-grade and re-stamp lumber after kiln drying in accordance with lumber producer's grading rules.
    b. Apply preservative field treatment to cut and bored surfaces in accordance with AWPA M4.

2.4 FIRE RETARDANT TREATMENT

A. Comply with AWPA Standards C20 (Lumber) and C27 (Plywood). Provide materials with a flame spread not exceeding 25 (ASTM E 84). Identify “fire retardant treated wood” with appropriate UL classification marking or other testing and inspection agency marking acceptable to authorities having jurisdiction. Provide materials as follows:

1. Exterior Exposure Treatment Process: Hickson Corporation "NCX" or Hoover Treated Wood Products "Exterior Fire-X".
2. Interior Exposure Treatment Process: Hickson Corporation "Dricon", Osmose "Flameproof LHC-HTT".
3. Kiln dry after treatment to maximum moisture content of 15% for plywood, 19% for lumber.
4. Do not use twisted, warped, bowed or otherwise defective wood.

2.5 FASTENERS, ADHESIVES & ACCESSORY MATERIALS

A. All fasteners in exterior or treated wood shall be stainless steel, or shall have an approved corrosion resistant coating.

B. Nails: common wire nails of the size shown on the plans.

C. Bolts: ASTM A 307, Grade A, unless otherwise noted.

D. Concrete or masonry substrate: galvanized anchor with expansion shank, or threaded concrete screw anchor, length as shown on the plans or as recommended by manufacturer for minimum 1,000 pound pull-out resistance. Approved manufacturers:

1.Tapcon
2.Hilti
3.Rawl

E. Connector hardware: approved manufacturers:

1. Cleveland Steel Specialty Co. (Cleveland, Teco)
2. United Steel Products Co. (Kant-Sag - Silver)
3. Simpson Strong-Tie

F. Construction Adhesive: ASTM D 3498-99 Standard Specification for Adhesives for Field-Gluing Plywood to Lumber Framing for Floor Systems.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify all dimensions and existing conditions in the field.

B. Verify that surfaces are ready to receive work.

C. Verify mechanical, electrical, and building items affecting work of this Section are ready to receive this work. Notify the engineer of any such items requiring adjustment.

D. Beginning of installation means acceptance of existing conditions.

3.2 INSTALLATION

A. Remove existing materials to be replaced.

B. Accurately measure or scribe members before cutting. Make all cuts clean and true to mating surfaces. All lumber and timber shall be accurately cut and framed to a close fit so that the joints will have even bearing over the entire contact surface.

C. Treat all field-cuts of existing and new treated material with an approved water repellent preservative.

D. Firestop concealed spaces of wood framed walls, furring, and partitions at each floor level and at the ceiling line of the top story. Use closely-fitted wood blocks of nominal 2" thick lumber of the same width as framing members.

E. Set and secure materials and components in place, plumb, and level.

F. Discard units of material with defects, which might impair quality of work, and units that are too small to use in fabricating work with minimum joints or optimum joint arrangement.

G. Set carpentry work accurately to required levels and lines, with members plumb and true and accurately cut and fitted.

H. Securely attach carpentry work to substrate by anchoring and fastening as shown and as required by recognized standards. Countersink nail heads on exposed carpentry work and fill holes.

I. Bridging and blocking shall be provided where shown on the plans or as required to prevent warping or twisting of installed materials. Bridging and blocking shall be framed neatly and accurately, and securely toenailed with at least two nails in each end.

J. Connecting hardware shall be installed in accordance with the manufacturer’s recommendations.

END OF SECTION

SECTION 07620

SHEET METAL FLASHING, TRIM, AND ORNAMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Alternate Reconstruction of ornamental sheet metal finials and other roof elements
2. Repair of sheet metal; Metal patch repairs; Adjusting misaligned, deformed or dented elements; Re-securing dislodged elements and; Closing open seams and joints.
3. Replacement of applied sheet metal ornament
4. Restoration of sheet metal cornice, including underlayment.
5. Replacement of sheet metal counter flashing
6. Restoration of existing ornamental sheet metal finials and roof elements
7. Attachment devices and fasteners.

B. Related Sections:

1. Division 1: Administrative, procedural, and temporary work requirements.
2. Section 04905 – Masonry Restoration for cutting reglets in masonry for installation of counter flashing.
3. Section 06100 – Rough Carpentry for fabrication of statues bases and wood blocking and furring and other carpentry not exposed to view.
4. Section 07920 – Joint Sealers for sealing joints between metal and dissimilar materials.
5. Section 09910 – Painting and Finishing for painting sheet metal elements.

1.2 REFERENCES

A. ASTM International (ASTM):

1. A653 – Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by Hot-Dip Process.
2. B 32 - Solder Metal.
3. B 69-09 - Zinc Sheet.

B. Sheet Metal and Air Conditioning Contractors National Association (SMACNA) - Architectural Sheet Metal Manual.

1.3 DEFINITIONS

A. Solder: Metal or metallic alloy of tin and lead used when melted to join metallic surfaces.

1.4 SUBMITTALS

A. Submit manufacturer’s technical information and installation instructions for:

1. Each specified sheet metal material and fabricated product, indicating that materials meet standards specified herein including:
   a. Zinc sheet metal
   b. Galvanized steel sheet metal
   c. Solder and flux
   d. Fastener, each type
   e. Sealants, each type

f. Paint stripper

B. Shop Drawings for ornamental sheet metal fabrications showing elevations, plans, dimensions, material gauges, fastening methods, and installation details for actual project conditions. Where appropriate provide perspective sketches or photographs to illustrate design.

C. Samples:

1. Each type of sheet metal material proposed for use.

D. Restoration Program: Submit a written description of the methods and procedures proposed for restoring the decorative sheet metal zinc elements including but not limited to paint removal, removal of prior patching materials, and repair of holes, crack, and splits. Include list of materials and tools proposed for use.

E. Mock-ups:

1. Min. 4-foot length mock-up of cornice and dentil replication and restoration.
2. Restoration and installation of ornament sheet metal element.
3. Metal patch repair.
4. Gutter liner, include wood framing, underlayment, and adjacent sheet metal stepped flashing at masonry wall
5. Locate mock-ups where directed by Architect.
6. Accepted mock-ups, if undamaged through Substantial Completion may be incorporated into the work.

1.5 QUALITY ASSURANCE

A. Roofing Contractor Qualifications:

1. 3 projects of similar scope and complexity in the last 5 years.

1.6 PROJECT CONDITIONS

A. Coordinate work of this Section with interfacing and adjoining work for proper sequencing of each installation. Ensure best possible weather resistance and durability of work and protection of materials and finishes.

B. Do not form sheet metal at ambient temperatures less than 50 degrees F.

C. Do not apply moisture barrier at ambient or surface temperatures less than 40 degrees F.

1.7 WARRANTY

A. Installer Warranty: Sheet metal installer warranty in which sheet metal installer agrees to repair or replace components of sheet metal flashing, trim, or ornament that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Structural failures
   b. Loose parts
   c. Wrinkling or buckling
   d. Failure to remain weathertight, including uncontrolled water leakage
   e. Deterioration of metals, metal finishes, and other materials beyond normal weathering, including non-uniformity of color or finish
2. Warranty Period: Five years from date of Substantial Completion.

PART 2- PRODUCTS

2.1 SHEET METAL MATERIALS

A. Zinc Sheet for Applied Ornament and Repair Material for Statues: Electrolytic, 99 percent pure zinc alloyed with 1 percent titanium and copper.

1. Available Manufacturers:
   a. Rheinzink Canada Ltd.
   b. VM Zinc North America – Sogem USA.
2. Finish: Preweathered.
3. Thickness: Match existing where replacement is required.

B. Zinc-Coated (Galvanized) Steel Sheet for Cornices, Cladding, Flashings, and Pier Caps: ASTM A 653/A 653M, G90 (Z275) coating designation; structural quality.

1. Thickness: Match existing where replacement is required.
2. Texture: Ribbed and smooth texture to match texture of replaced or repaired element.

2.2 COUNTER FLASHING AT BASE OF DOME

A. Description: Two piece springlok flashing system, 24 ga. Galvanized steel with factory applied Kynar 500/Hylar 500 finish.

B. Product: MA Masonry Reglet for 1 ½" top flanges as manufactured by Fry Reglet in standard color to closely match Sherwin Williams #2822 Downing Sand.

2.3 MISCELLANEOUS SHEET METAL MATERIALS

A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing, trim, and ornamental work. Provide miscellaneous metal accessories in sizes and gauges as required for proper performance of the work.

B. Fasteners: 1/8"-3/16" diameter high strength stainless-steel rivets.

C. Solder for Zinc: ASTM B 32, 50-50 tin/lead or 60-40 tin/lead (antimony free), as recommended by manufacturer.

D. Flux: Hydrochloric acid flux.

1. Note, flux can dissolve zinc. Excess flux must be rinsed immediately after soldering.

E. Adhesive Type Elastomeric Sealant for re-attachment of ornamental sheet metal or filling small holes where not possible with solder: ASTM C 920, elastomeric polyether sealant; of Type S, Grade NS, Class 25.

1. Product: SoudaSeal FC as manufactured by Soudal, Inc.

2.4 PAINT STRIPPER

A. Description: Paste type paint remover designed for removal of multiple layers of paint from metal substrates that does not contain methylene cloride.

B. Product: Piranha 4 Solvent Gel, as manufactured by Fiberlock Technologies.

2.5 UNDERLAYMENT MATERIAL

A. Waterproofing Membrane:

1. Description: Self-Adhering, Polyethylene-Faced Sheet: ASTM D 1970, 40 mils thick minimum, consisting of slip-resisting polyethylene-film reinforcing and top surfaced laminated to SBS-modified asphalt adhesive, with release-paper backing; cold applied.
2. Tensile Strength: Minimum 250 PSI
3. Product: Tamko TW Metal and Tile Underlayment or approved equal.

B. Slip Sheet: Minimum 4 to 6 ob. Rosin sized building paper.

2.6 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing, trim and ornamental metal to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Shop fabricate items where practicable. Obtain field measurements for accurate fit before shop fabrication.

B. Fabricate sheet metal flashing, trim and ornament in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.

C. Fabricate sheet metal flashing, trim and ornament without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.

1. Seams: Fabricate nonmoving seams in accessories with flat lock seams. Tin edges to be seamed, form seams, and solder.

D. Sealed Joints: Form non-expansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA recommendations.

E. Expansion Provisions: Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.

F. Conceal fasteners and expansion provisions where possible on exposed –to-view sheet metal flashing, trim, and ornament, unless otherwise indicated.

G. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

1. Thickness: As recommended by SMACNA's "Architectural Sheet Metal Manual" for application but not less than thickness of metal being secured.

2.7 FINISHING

A. Refer to Section 09910 – Painting and Finishing.

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine the substrate and the conditions under which work is to be performed, and do not proceed until unsatisfactory conditions have been corrected. Surfaces are to be clean, even, smooth, dry and free from defects and projections which may adversely affect the installation.

3.2 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashings, trim, & ornament securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings,

separators, sealant, and other miscellaneous items as required to complete sheet metal flashing and trim system.

B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by fabricator or manufacturers of dissimilar metals.

1. Where installing metal flashing directly on wood substrate, install a course of waterproofing membrane and cover with slip sheet.

C. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.

D. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and elastomeric sealant.

E. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

1. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.

F. Fasteners: Use fasteners of sizes that will penetrate substrate no less than 1-1/4 inches for nails and not less than ¾ inch for wood screws.

1. Galvanized or Pre-painted, Metallic-Coated Steel or Zinc: Use stainless-steel fasteners.

G. Seal joints with elastomeric sealant as required for watertight construction.

1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F, set joint members for 50 percent movement either way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
2. Prepare joints and apply sealant per sealant manufacturer’s written instructions.

H. Soldered Joints: Clean surfaces to be soldered, removing paint coatings, oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches except where pre-tinned surface would show in finished work.

1. Do not use open-flame torches for soldering. Heat surfaces to receive solder and flow solder into joints. Fill joints completely. Completely remove flux and spatter from exposed surfaces.

3.3 ORNAMENTAL SHEET METAL RESTORATION

A. Remove paint coatings as required to evaluate condition of sheet metal material, to expose previous repairs, and as required to properly repair damaged areas.

1. Comply with manufacturer’s written specifications for use of paint removal product.

B. Remove previous repair materials.

C. Replace missing or severely damaged elements beyond repair. New elements shall match replacement elements exactly including type of sheet metal material, gauge, dimensions, and profile unless otherwise noted.

D. Repair of holes, cracks, and splits: Provide reinforcing backing plate of same material being repaired. Overlap plate minimum 2 inches, on back side of statue, past area of opening. Attach backing plate with solder. Repair openings with solder. Heat surfaces to receive solder and flow solder into openings flush with adjacent surfaces. Finish repair area so that it is indistinguishable from existing adjacent surfaces.

3.4 INSTALLATION OF WATERPROOFING MEMBRANE

A. Starting at low edge, apply one ply moisture barrier over substrate.

B. Apply moisture barrier horizontally, starting at low point.

C. Weatherlap each sheet 4 inches over preceding sheet. Lap ends 6 inches minimum.

D. Press to full bond with substrate without voids, wrinkles, bridging, or fishmouths. Seal ends and edges.

E. Extend minimum 4-inches up abutting vertical surfaces.

3.5 INSTALLATION OF SLIP SHEET

A. Starting at low edge, apply one layer slip sheet over moisture barrier.

B. Weather lap sheets 4-inches minimum. Lap ends 6-inches minimum.

C. Do not adhere or attach to substrate.

3.6 CLEANING

A. Clean sheet metal; remove slag, flux, stains, spots, and minor abrasions without etching surfaces.

B. Replace sheet metal flashing, trim, and ornament that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07920

JOINT SEALERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Replacement of expansion joint sealant at the base of the steps between the existing stone step base tread and the existing concrete sidewalk.

B. Related Sections:

1. Section 04069 – Restoration Mortar
2. Section 04905 – Masonry Restoration.
3. Section 04931 – Chemical Cleaning of Masonry.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's technical information, including Material Safety Data Sheets (MSDS), and handling/installation/curing instructions, where applicable, for each sealant system and component proposed for use, including. sealers, primers, backup materials, bond breakers and lead weathercaps.

B. Samples:

1. Sealer samples showing available colors.
2. Sealant bond breaker and joint backing, one (1) of each type, min. 6-inch length.
3. Lead weathercap, one (1) of each profile and size proposed for use, min. 6-inch length.

C. Test Data: Submit laboratory tests or data indicating product(s) comply with performance criteria specified.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: The Contractor performing the Work of this Section must have a minimum experience of three (3) consecutive years and have successfully completed within those three (3) years at least five (5) projects of similar type and scope to the Work required by this Section.

B. Mock-Ups: Prior to the start of the sealant work, perform mock-up(s) using the proposed sealant(s) for each combination of substrates to be sealed. In each, demonstrate all aspects of old sealant removal, joint preparation, installation of backup materials, and installation of sealant and lead weathercap, where applicable.

1. Install minimum 24” long sealant mock-ups and test in presence of sealant manufacturer’s authorized representative and the Architect to assure installation procedures are consistent with warranty requirements.
   a. After sealant has achieved sufficient cure as coordinated with manufacturer’s representative, conduct adhesion pull-tests; Conduct tests per ASTM C1521.
   b. Confirm results of adhesion test as acceptable by Architect and Owner prior to proceeding with Work.
2. Retain approved mock-ups in place to establish standards and guidelines for acceptable installation of sealant work.
3. Locate mock-ups as directed by the Architect.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in original factory packaging indicating identification of product, manufacturer, color, expiration date, and batch number.

B. Store products off the ground and protect from rain, freezing or excessive heat until ready for use.

C. Condition products per manufacturer's recommendations.

1.5 PROJECT CONDITIONS

A. Environmental Conditions:

1. Do not apply material if it is raining or snowing or if such conditions appear to be imminent.
2. Do not apply sealers at temperatures below 40º F (5º C) and rising, unless approved by sealer manufacturer.
3. Do not apply work of this Section on surfaces which are wet, damp, or have frost.

1.6 WARRANTY

A. Manufacturer's Warranty: Provide a written warranty from the sealant manufacturer against defects of material for a period of ten (10) years from date of substantial completion.

1. Include coverage for replacement of sealant materials which fail to achieve water tight seal, exhibit loss of adhesion or cohesion, or do not cure, provided sealant has been installed per manufacturer's recommendations.

B. Installer's Warranty: Provide a written warranty, signed by Installer agreeing to repair and replace joint sealants, at contactor's expense, that have failed due to improper installation.

1. Warranty period: Two (2) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SEALANT MANUFACTURERS

A. Acceptable Manufacturers:

1. BASF Construction Chemicals (www.basf-cc.com)
2. Sika Corp. (www.sikausa.com)

2.2 SEALANT AT STONE TO CONCRETE JOINTS

A. Description: One-component, gun grade, non-staining, low modulus, high movement, non-sag, fast curing, elastomeric, silyl-terminated polyether sealant complying with ASTM C-920, Type S, Grade NS, Class 50. The sealant shall be capable of +100% / -50% joint movement. It shall be applicable in vertical, overhead, and recess horizontal joints.

B. Product: Sonolastic 150 with VLM Technology as manufactured by BASF Construction Chemicals or approved equal

1. Color: Manufacturers standard or custom color as required to match adjacent surfaces.

2.3 ACCESSORIES

A. Primers, Bondbreakers, and Solvents: As recommended by sealer manufacturer and field tested to confirm no adverse affects to substrate (i.e. staining).

B. Backer Rod:

1. ASTM C 1330, closed cell polyethylene foam, preformed round joint filler, non absorbing, non staining, resilient, compatible with sealer and primer, recommended by sealer manufacturer for each sealer type.
2. Size: Minimum 1.25 times joint width.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure.

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

E. Masking Tape: Non-staining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine the areas and conditions where joint sealers are to be installed and notify the Architect of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

B. The joint and adjacent substrate must be clean, dry, sound, and free of surface contaminants that could impair or adversely affect the adhesion and/or quality of the sealant installation.

C. Provide additional joint preparation, beyond that outlined in Specifications, as required by sealant manufacturer and Architect's recommendations based on mock-ups and field adhesion tests.

3.2 PREPARATION

A. Using approved methods, remove all existing sealants and related back-up materials from joints. Remove dirt, residual compounds, moisture and other substances that could interfere with bond of the new sealant.

3.3 SEALANT INSTALLATION AT STONE

A. General: Comply with manufacturers written instructions except where more stringent requirements are shown or specified, and except where manufacturer's technical representative directs otherwise.

B. To protect adjacent surfaces, tape shoulders of joints during installation and tooling of sealant.

C. Install backer rod packed into joint to provide sealant depth recommended by sealant manufacturer.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and back of joints.

E. Employ only proven installation techniques that ensure sealants are deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting of joint bond surfaces equally on opposite

sides. Except as otherwise indicated, fill sealant rabbet to a slightly concave surface, slightly below adjoining surfaces. Sealant profile is to match the existing adjacent sealant that is to remain. It is to be indistinguishable where existing and new sealant meet. Where horizontal joints are between a horizontal surface and a vertical surface, fill joint to form a slight cove matching existing joint profile and so that joint will not trap moisture and dirt.

F. Install sealant to depths indicated and recommended by sealant manufacturer within the following general limitations:

1. Depth of sealant to be ½ width of joint.
   a. Maximum Depth: ½-inch.
   b. Minimum Depth: ¼-inch.

G. Tool immediately after application to ensure firm, full contact with the inner surfaces of joint. Finish bead shall be smooth, continuous, and slightly concave, and shall not protrude from joints.

H. Spillage: Do not allow sealants or compounds to overflow from confines of joint, or to spill onto adjoining work, or to migrate into voids of exposed finishes. Clean adjoining surfaces, as recommended by sealant manufacturer as necessary to eliminate evidence of spillage without damage to surface.

I. Adhere to limitations and cautions for sealant as indicated in manufacturers printed literature.

3.4 INSPECTIONS

A. During execution of Work, inspect work to assure compliance with manufacturer's guidelines and specifications herein.

B. Allow inspections of work and assist in testing requested by manufacturer's representative and Architect.

C. Non-Compliant Work: If inspections reveal non-compliant work or work that was not installed per the specifications and/or manufacturer requirements, remove non-compliant work to a location where installation was performed properly. Assist in spot-checking remainder of work.

3.5 CLEANING

A. Remove masking tape and protective coverings after sealer has cured.

B. Spillage: Do not allow sealant to overflow confines of joint, or onto adjoining work, or to migrate into voids of exposed finishes. Clean adjoining surfaces completely and safely of all excess sealant, without damaging the surface.

END OF SECTION

SECTION 08592

WOOD WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Reconstruction of missing or severely damaged window assemblies to match historic.
2. Restoration of existing deteriorated wood window elements and trim, including replacement of severely deteriorated wood window frame components.
3. Replacement of perimeter sealants.
4. Replacement of missing hardware.
5. Fixing sashes in place.

B. Related Sections:

1. Division 1: Administrative, procedural, and temporary work requirements.
2. Section 07920 - Joint Sealants
3. Section 08800 - Glazing.
4. Section 09910 – Painting and Finishing.

C. Related Documents:

1. Lead-Based Paint abatement specifications provided by others

1.2 REFERENCES

A. AWI – Architectural Woodwork Institute.

B. WDMA – Window and Door Manufacturers Association: I.S. 6A-01 Industry Standard for Architectural Stile and Rail Doors.

1.3 SUBMITTALS

A. Shop drawings:

1. Provide plans and elevations indicate materials, surface grain direction, profiles, assembly methods, joint details, fastening methods, accessories, hardware, and finishes.
   a. Field Measurements: Obtain field measurements of each type of original window and sash to be replicated and indicate on shop drawings.
   b. Where windows or sashes are scheduled to be replicated from existing similar assemblies, match exactly the dimensions, profiles, construction details, materials, and finish of original windows unless noted otherwise.

1.4 QUALITY REQUIREMENTS

A. Quality Standard: Comply with the following standard:

1. AWI Quality Standard: “Architectural Woodwork Quality Standards” of the Architectural Woodwork Institute, Section 1000 for Premium Grade.

B. Fabricator/Installer Qualifications:

1. Minimum 5 years documented experience in work of this Section.
2. Successful completion of at least 3 projects of similar scope and complexity within past 5 years.

B. Mockups:

1. Provide mockup of one completely restored window with new sashes and one fully reconstructed window.
2. Show frame, sash, trim, paint, and hardware.
3. Locate where directed.
4. Approved mockups may remain as part of the Work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Lumber for opaque finish:

1. Species: Genuine Mahogany.
2. Cut: Plain sawn.
3. Maximum moisture content: 12 percent on 90 percent of pieces; 15 percent on remaining pieces.

B. Hardware:

1. Existing original sash locks and lifts in good condition are to remain and be restored/refinished to match original condition. Loose hardware that is not original is to be bagged and labeled by window number and given to the Contractor for the Owner. Where sash locks are missing, provide new locks as noted below
2. The Contractor will install restored and replica sash locks. Install original hardware in their existing location
3. New sash locks:
   a. Sash Lock: # 4 solid brass lock as manufactured by The Architectural Resource Center, (800) 370-8808.
   b. Obtain hardware in unlacquered brass, typical for all window hardware.

C. Window Weights: Remove paint and provide wax finish

D. Sash Cord: Provide cloth lower sash cords 100% to match existing diameter. Provide #SR1 or #SR2 sash rope.

E. Glass and Glazing Accessories: Specified in Section 08800.

F. Paints and Coatings: Specified in Section 09910.

G. Consolidant: Low viscosity penetrating consolidant, 8 hour minimum cure time; LiquidWood by Abatron, Inc. Or approved substitute.

H. Epoxy Fill Patching Compound:

1. Exterior surfaces: Epoxy based, multiple component; WoodEpox by Abatron, Inc. Or approved substitute.
2. Interior surfaces: Minwax Wood Putty by Minwax Company or approved substitute, color matched to wood.

2.2 FABRICATION OF NEW COMPONENTS

A. Comply with AWI Section 1000.

B. Fabricate new windows and sashes with profiles to match existing.

C. Fabricate mullions and sash members with mortised and tenoned joints. Fit to hairline joint, glue and nail. Stapling not permitted.

D. Narrow muntins are to be applied over insulated glass units and are to match the original wood muntins profiles. Provide inner insulated glass frame behind muntins.

E. Exterior wood simulated glazing stops are designed to be removeable.

F. Finger joints not permitted.

G. Form glass stops of solid wood, sloped for water wash.

H. Install hardware centered.

I. Seal and secure fixed sash with conceled fasteners. Fix in place with two screws fastened diagonally from the sash into the frame. Screws should be able to be removed in the future. Coordinate placement of screws with the Contractor

J. Form sills in one piece. Slope sills for water wash.

K. Size units to allow for tolerances of rough openings and shim space around perimeter.

PART 3 – EXECUTION

3.1 REPLACEMENT OF DETERIORATED AND MISSING WOOD

A. Replace deteriorated wood sash and trim members with new wood.

B. Match new wood to profile and grain of existing wood.

C. Fabricate frame and sash members with mortised and tenoned joints. Fit to hairline joint, glue and nail. Stapling not permitted.

D. If sashes are removed, provide temporary plywood infill that provides weather tight protection over opening. Coordinate installation procedures with Contractor.

3.2 EPOXY PATCHING OF EXISTING WOOD

A. Mix and apply epoxy in accordance with manufacturer's instructions

B. Apply epoxy putty to fill voids after consolidant has cured.

C. Embed wood in center of large patches to reduce amount of filler.

D. After filler has cured, sand, chisel or plane off to smooth surface, flush with adjacent surfaces.

3.3 CONSOLIDATION OF EXISTING WOOD

A. Apply consolidant in accordance with manufacturer's instruction

B. Completely saturate damaged wood with consolidant; allow to cure 8 hours minimum.

C. Apply to end grain where exposed. Where end grain is not exposed, drill 1/8 inch holes staggered and at angles to side grain to expose as much end grain as possible.

D Prevent leakage with wax or clay plugs. Clean leakage before it cures.

E. Apply second coat if first coat does not completely saturate and harden wood.

3.4 FIXING OPERABLE SASH IN PLACE

A. Fix upper sash of double hung window in place by securing sash with countersunk or concealed fasteners. Coordinate placement of fasteners with Contractor.

B. Apply joint sealer to sash-to-frame joints at fixed window sashes.

3.5 REFINISHING WOOD

A. Refinish wood under provisions of Section 09910

B. Paint exposed exterior and interior wood frames, sash, trim, sills, and stools.

C. Avoid damage to interior painted surfaces. Properly protect interior surfaces from damage.

D. Replacement members and existing adjacent interior members are to be primed on all surfaces.

3.6 PREPARATION

A. Prior to installation, condition windows to average humidity that will prevail after installation.

3.7 INSTALLATION OF NEW WINDOWS

A. Install windows plumb and level.

B. Maintain alignment with adjacent construction.

C. Set units plumb, level, and square; shim as required.

D. Secure windows to adjacent construction without distortion or stress.

3.8 ADJUSTING

A. Adjust operable sashes to operate freely, without binding or sticking.

END OF SECTION

SECTION 08800

GLAZING

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes Glazing for the following elements:

1. Exterior windows.

B. Related Sections:

1. Section 01230 – Alternates for Low E glazing at new wood windows.
2. Section 07920 - Joint Sealers
3. Section 08550 – Wood Windows

1.2 REFERENCES

A. ASTM International (ASTM):

1. C 864 - Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.
2. C 920 - Elastomeric Joint Sealants.
3. C 1036 - Flat Glass.
4. C 1376-03 Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass.

B. Glass Association of North America (GANA):

1. Sealant Manual
2. Glazing Manual

1.3 SUBMITTALS

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

1. Manufacturer's product literature and applicable technical bulletins.

B. Samples: 12 inch x 12 inch sample of each type of glass indicated.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements: Provide tempered safety glass where required by regulatory agencies or Code.

B. Perform Work in accordance with GANA Glazing Manual and GANA Sealant Manual for glazing installation methods.

C. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in glass installations with a record of successful in-service performance.

1.5 PROJECT CONDITIONS

A. Perform glazing when ambient temperature is above 40 degrees F.

B. Perform glazing on dry surfaces.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.7 WARRANTY

A. Manufacturer's Special Warranty on insulated Glass: Written warranty, made out to Owner and signed by insulated-glass manufacturer agreeing to furnish replacements for insulated-glass units that deteriorate, are defective, lose their seal, or fail.

1. Warranty period: Twenty years from date of Substantial Completion.

PART 2 – PRODUCTS

2.1 GLASS

A. Laminated Low E Glass [ALTERNATE NO. 3]:

1. Provide clear insulated Low E glass at exterior windows.
2. Description:
   a. Inner lite (Exposed to finished space): ASTM C 1036, Type I transparent flat, Class 1 clear, Quality q3 glazing select.
   b. Outer lite: ASTM C 1036, Type I transparent flat, Class 1 clear, Quality q3 glazing select with Low E coating complying with ASTM C 1376-03.
   c. Thickness: Overall 7/16" maximum
3. Product: LoE²-270 by Cardinal Glass Industries.

2.2 ACCESSORIES

A. Glazing Clips: Manufacturer's standard.

B. Glazing Compound: Modified oil type, non hardening, knife grade consistency, color to be selected from manufacturer's full color range. This compound will only be used at transom windows above exterior doors.

PART 3 – EXECUTION

3.1 EXAMINATION AND PREPARATION

A. General contractor and glazing contractor shall examine all areas, substrates and conditions where glass assemblies are to be installed. Do not proceed with any work until satisfactory conditions exist for proper installation of all materials.

B. Protect sashes and stained surfaces from damage during storage, transporting, restoration and re-installation.

C. Contractor must clean glazing framing members receiving glass immediately before glazing.

D. Seal porous rabbet surfaces with primer or sealer.

E. Maintain manufacturer's recommended edge and face clearances between glass and frame members.

3.2 GLAZING

A. General: Comply with written instructions of manufacturers of glass, sealant, gasket, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

1. Protect glass edges from damage during handling and installation. Remove existing glass from project site and legally dispose of off project site. Discard damaged glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance.
2. Glazing must be installed so that the internal insulated glass unit does not have the internal frame visible beyond the edge of the sash frame.
3. Install glazing with minimum edge and face clearance, adequate sealant thicknesses, and with reasonable tolerances.

B. Follow industry best practices, published guidelines of the Glass Association of North America, and applicable manufacturer's recommendations for proper tape, gasket, sealant, and lock-strip glazing.

3.3 PROTECTION AND CLEANING

A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove non-permanent labels, and clean surface.

B. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come in contact with glass, remove them immediately as recommended by the glass manufacturer.

C. Examine glass surface adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for build-up of dirt, scum, alkaline deposits, or stain: remove as recommended by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way, including natural causes, accidents, and vandalism, during construction period.

E. Wash glass on both exposed surfaces in each area of project not more than four days before date scheduled for inspections that establish date of substantial completion. Wash glass as recommended by glass manufacturer.

END OF SECTION

SECTION 09910

PAINTING AND FINISHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Surface preparation and field application of paint on existing steel components of the handrail.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM) D 4442 - Direct Moisture Content Measurement of Wood and Wood-Base Materials.

B. Steel Structures Painting Council (SSPC) - Steel Structures Painting Manual.

1.3 SUBMITTALS

A. Product Data: Manufacturer's data on materials proposed for use. Include:

1. Product designation and grade of each coating type.
2. Surface preparation materials and procedures.
3. Product analysis and performance characteristics for each coating type.

B. Samples:

1. 3 x 6 inch samples of each type coating showing color and luster, on representative substrate. Apply each coat stepped back 1 inch so that all coats remain exposed. Indicate type of material used for each coat.

1.4 QUALITY ASSURANCE

A. Restorer Qualifications:

1. Minimum 5 years experience in work of this Section.
2. Successful completion of at least two projects of similar size and complexity within past 3 years.

1.5 DELIVERY, STORAGE AND HANDLING

A. Container Label: 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.

B. Paint Materials: Store at minimum ambient temperature of 45 degrees F and maximum of 90 degrees F, in ventilated area, or as required by manufacturer's instructions.

1.6 PROJECT CONDITIONS

A. Environmental Requirements:

1. Do not apply materials when surface and ambient temperatures or relative humidity are outside ranges required by manufacturer.
2. Provide lighting level of 80 footcandles measured mid-height at substrate surface.

1.7 MAINTENANCE

A. Extra Stock: 1 gallon containers of each color finish coat.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Contract Documents are based on products by Sherwin Williams Co.

B. Equivalent products by the following manufacturers are acceptable:

1. Benjamin Moore and Co.
2. Devoe Paints.
3. Fuller O'Brien Paints.
4. I.C.I. Dulux Paints.
5. Kelly-Moore Paint Co.
6. PPG Industries.
7. Pratt and Lambert.

C. Substitutions: Under provisions of Division 1.

2.2 MATERIALS

A. Coatings:

1. Ready mixed.
2. Types: Scheduled at end of Section.
3. Furnish all coatings by same manufacturer unless otherwise specified.

2.3 ACCESSORIES

A. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve finishes specified; commercial quality.

B. Patching Materials: Latex filler.

C. Fastener Head Cover Materials: Latex filler.

2.4 MIXING

A. Colors: Architect will furnish color schedule prior to commencement of painting.

B. Uniformly mix to thoroughly disperse pigments.

C. Do not thin in excess of manufacturer's recommendations.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Test shop applied primer for compatibility with subsequent coatings.

3.2 PREPARATION

A. General:

1. Protect adjacent and underlying surfaces.
2. Remove or mask electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.
3. Correct defects and clean surfaces capable of affecting work of this section.
4. Seal marks that may bleed through surface finishes with shellac.

B. Impervious Surfaces: Remove mildew by scrubbing with solution of trisodium phosphate and bleach. Rinse with clean water and allow to dry.

C. Existing Surfaces to Receive Painted Finish:

1. Remove loose, flaking, powdery, and peeling paints.
2. Lightly sand glossy painted surfaces.
3. Fill holes, cracks, depressions and other imperfections with patching compound; sand flush with surface.
4. Remove oil, grease, and wax by scraping; solvent wash and thoroughly rinse.
5. Remove rust by wire brushing to expose base metal.

D. New Galvanized Sheet Metals:

1. Abrasive blast uniformly and thoroughly as per ASTM D 6386 to provide tooth and anchor. Anchor profile shall be angular with a minimum 2.0 mil profile. Clean all rusted or bare metal areas as per SSPC-SP6. Commercial Blast Cleaning provide a minimum 2.0 mil angular anchor profile.

E. Wood:

1. In addition to item “C.” above, sand surfaces smooth, or to finish molded profile, provide Abatron consolidant and epoxy patching material at damaged and depressed areas. Reconstruct to original profile where loss of shape occurs.

3.3 APPLICATION OF PAINTS

A. Apply primer or first coat immediately after surface preparation is complete to prevent recontamination.

B. Do not apply finishes to surfaces that are not dry.

C. Apply coatings to minimum dry film thickness recommended by manufacturer.

D. Apply each coat of paint slightly darker than preceding coat unless specified otherwise.

E. Apply coatings to uniform appearance without laps, sags, curtains, holidays, and brush marks.

F. Allow applied coats to dry before next coat is applied.

G. Sand between coats on interior wood and metal surfaces.

H. Match final coat to approved color samples.

I. Where clear finishes are specified, tint fillers to match wood. Work fillers into grain before set. Wipe excess from surface.

J. Prime concealed surfaces of interior wood in contact with masonry or cementitious materials with one coat primer paint.

K. Mechanical and Electrical Components:

1. Paint factory primed equipment.
2. Remove unfinished and primed louvers, grilles, covers, and access panels; paint separately.
3. Paint exposed and insulated pipes, conduit, boxes, ducts, hangers, brackets, collars, and supports unless factory finished.
4. Do not paint name tags or identifying markings.
5. Paint exposed conduit and electrical equipment in finished areas.

L. Do not Paint:

1. Bronze handrail

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Services: Ensure that materials are being applied properly.

3.5 ADJUSTING

A. Make detailed inspection of paint work; touch up abraded, stained, and otherwise disfigured surfaces or refinish as required.

3.6 CLEANING

A. Remove paint from adjacent surfaces.

3.7 PAINT SCHEDULE

A. Types of paint listed herein are set forth as standard of quality and type of coating required for each type of surface.

1. Exposed surfaces of type listed in following schedule are to be painted.
2. Other exposed surfaces not specifically listed shall receive not less than two coats of appropriate type of coating.

B. Prime coat shall consist of touch up only on shop primed and existing surfaces.

SUBSTRATE	PRIMER	TOP COATS
Exterior Surfaces:		
Existing and New Galv. Sheet Metals, and Ferrous Metals	One Coat Tnemec Series 115 Uni-Bond DF applied at 2.0-4.0 dry mils	1st coat: Tnemic Series Enviro-Crete applied at 4.0-6.0 mils. 2nd coat: Tnemec Series 1070 Fluoronar applied at 3.0-3.0 dry mils.
Wood	Sherwin Williams PrepRite Pro Block exterior odorless quick drying alkyd primer sealer	Two coats: Sherwin Williams Duration exterior latex semi-gloss coating
Metal Shingles	Pre-finished Kynar 500, standard color to match existing original red finish	

END OF SECTION