RESTORE EXTERIOR WINDOWS & DOORS, USS CONSTITUTION MUSEUM (BUILDINGS 22 AND 28)

CHARLESTOWN NAVY YARD
BOSTON NATIONAL HISTORICAL PARK

PMIS # 246267

PROJECT SPECIFICATIONS

PMIS 246267 – RESTORE WINDOWS & DOORS,
USS CONSITUTION MUSEUM, CHARLESTOWN NAVY YARD
CONSTRUCTION DOCUMENTS SPECIFICATIONS
02/10/2025

OWNER
NPS, Boston NHP
Charlestown Navy Yard
Building I-1
Boston, MA 02129

ARCHITECT
Schwartz/Silver Architects
75 Kneeland Street
Boston, MA 02111
(617) 542-6650

HISTORIC PRESERVATION
Building Conservation Associates
10 Langley Road, Suite 202
Newton Center, MA 02459
(617) 916-5661

COST ESTIMATOR
Rider Levett Bucknall
Two Financial Center, Suite 810
60 South St.
Boston, MA 02111
(617)737-9339

ENVIRONMENTAL HEALTH
Environmental Health & Engineering
180 Wells Ave, 200
Newton, MA 02459
(781) 247-4300

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SECTION 011100 - SUMMARY OF WORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes the following:

1. Work Covered by Contract Documents
2. Work Phases
3. Construction Contractor Use of Site
4. Public Use of Site
5. Occupancy Requirements for Buildings
6. Conduct of Operations
7. Work Restrictions
8. Special Construction Requirements
9. Additional Reports

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Location: Charlestown Navy Yard, 1st Ave &, 3rd St, Charlestown, MA 02129

B. The Work consists of:

1. Hazardous materials remediation.
2. Selective demolition, cutting and patching as required for installation of new doors and windows.
3. Granite, cast stone and brick masonry restoration.
4. Restoration or replacement of flashings. Installation of sealants.
5. Restoration and replacement of exterior doors and windows.
6. Painting and sealants at areas affected by the work.

C. Project will be constructed under a single prime contract.

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1.3 HISTORIC NATURE OF THE WORK

A. The USS Constitution Museum and the Charlestown Navy Yard are National Historic Landmarks. Contractor shall take all necessary precautions to protect the elements of the buildings not scheduled to receive work. Any damage to such elements shall be repaired by the Contractor at no expense to the Government.

1.4 WORK PHASES

A. The Work shall be conducted in a single phase.

1.5 TESTING AGENCY:

A. Provide independent testing agencies as required by the state building code and local authorities.

1.6 CODES

A. Perform all Construction in conformance with the building and design codes referenced in these documents. The project documents refer to the following codes and standards:

1. International Building Code, 2024 Edition

1.7 CONSTRUCTION CONTRACTOR USE OF SITE

A. General: Contractor shall have partial use of the site for construction operations during the construction period. Contractor's use of the site is limited as indicated on the Drawings and by the Government's right to perform work or to retain other contractors on portions of Project.

B. Storage of Materials: Confine storage of materials to locations designated by park staff. Confine storage of materials, field offices, equipment storage, trailer storage and parking to areas approved by Contracting Officer. Use temporary chain link fence with a lockable gate to define staging areas and at open storage areas containing equipment and supplies. The Government assumes no responsibility for the security of any Contractor equipment, materials, or supplies and such responsibility remains that of the Contractor. Contractor is advised of the spatial limitations of the contractor-use areas and that additional off-site vehicular parking may be required. Storage will not be permitted in existing structures.

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C. Parking: Confine parking to locations as directed. Except for Contractor's vehicles actively employed in the accomplishment of the work, the NPS cannot guarantee the Contractor's employee vehicles can be accommodated within the Charlestown Navy Yard and in no case will overnight parking be permitted. Contractor is urged to encourage workers to carpool or to provide other environmentally responsible modes of transportation to bring workers to the site. Parked vehicles shall not be left running.

D. Driveways and Entrances: Keep driveways and entrances serving premises clear and available to public, Government employees, and emergency vehicles at all times. Do not use for parking or storage of materials.

1. Schedule deliveries to minimize use of driveways and entrances.
2. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

1.8 SECURITY

A. The Charlestown Navy Yard is a secure facility. All persons and vehicles entering the yard are subject to search by the National Park Service law enforcement personnel. The General Contractor shall furnish a list of all personnel and vehicles (including license plate numbers) anticipated to be on site prior to the start of work and shall update such list as appropriate during the duration of the work.

B. All contractor personnel shall have appropriate identification and shall furnish such identification to authorized National Park Service law enforcement personnel upon request. A current driver's license is required to operate a motor vehicle in the Charlestown Navy Yard.

C. The National Park Service reserves the right to suspend access to the Charlestown Navy Yard in response to changing security levels and conditions.

1.9 PUBLIC USE OF SITE

A. The building will be open to the public during construction.

B. Construction Contractor shall conduct his operations to ensure the least inconvenience to public.

1.10 OCCUPANCY REQUIREMENTS FOR BUILIDINGS

A. Existing Buildings

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1. Partial Occupancy: Public will occupy premises during entire construction period, with exception of areas under construction. Cooperate with Government during construction operations to minimize conflicts and facilitate public and Government usage. Perform Work so as not to interfere with operations. Maintain existing exits, unless otherwise indicated.

    a. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Contracting Officer.

1.11 CONDUCT OF OPERATIONS

A. Construction Contractor shall conduct his operations in conformance with rules and regulations promulgated by the Secretary of the Interior for the National Park Service, and applicable park rules and regulations prescribed by Park Superintendent.

B. Work on Saturdays, Sundays, Federal holidays or at night may not be performed unless stated in the Work Restrictions below or without prior consent from the Contracting Officer. Submit requests 2 business/calendar days in advance of the work to the Contracting Officer for approval.

C. No signs or advertisements (except those specified herein) shall be displayed on the construction site or within the park unless approved by the Contracting Officer.

1.12 WORK RESTRICTIONS

A. On-Site Work Hours: Work shall be generally performed during normal business working hours except when otherwise indicated. Normal business working hours are 8:00AM to 4:30PM.

B. Existing Utilities

1. Construction Contractor shall be responsible for locating and preventing damage to known utilities. If damage occurs, repair utility at no additional expense to the Government.
2. If damage occurs to an unknown utility, repair utility. An equitable adjustment will be made in accordance with the Changes clause of the contract.

C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Government or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

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1. Notify Contracting Officer not less than two business days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Contracting Officer's written permission.

D. Nonsmoking Building/Tobacco Use/Vaping: Smoking is not permitted within building or within 25 feet of entrances, operable windows, or outdoor air intakes.,

1.13 SPECIAL CONSTRUCTION REQUIREMENTS

A. Project Management and Communication Software: Software administered by NPS shall be used to manage communication and document sharing during construction.

1. See Section 01 31 00 "Project Management and Coordination" for requirements on using NPS project management and communication software.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 012601 – CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section consists of administrative and procedural requirements for contract modifications.

1.2 DEFINITIONS AND ALLOWANCES

A. Home Office Overhead: Costs incurred in support of all of a contractor's projects and not attributable to a specific job. The cost for home office overhead is only allowed as a percentage of all direct work excluding profit. The following items represent allowable home office overhead costs identified in Part 31 of the Federal Acquisition Regulation (FAR):

1. Rent
2. Utilities
3. Furnishings
4. Office equipment
5. Executive and management staff not exclusively assigned to the project
6. Support, accounting, and administrative staff
7. Preparation of cost proposals, estimating, and schedule analyses connected with Modifications
8. Estimating and preconstruction services
9. Mortgage costs
10. Real estate and corporate taxes
11. Automobile maintenance and travel costs for home office personnel
12. Home office insurances i.e. structure, automotive, umbrella, flood, etc.
13. Depreciation of equipment and other assets
14. Home office supplies (paper, staples, etc.)
15. Legal services
16. Accounting and data processing
17. Professional fees/registration

B. General Conditions (Field Office Overhead): Management and administrative costs incurred on site for the designated project. Costs associated with preparation of modifications will not be allowed. Costs for these items are to be included only in the general conditions of the modification estimate. Only in the case of a contract time extension are additional general

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conditions included in modifications. The following items, if applicable, are considered allowable costs for calculating General Conditions:

1. Project Manager (PM), Assistant Project Manager
2. Superintendent, Assistant Superintendent
3. Quality Control, Safety Officer, Environmental Manager, etc.
4. Engineers
5. Travel, lodging, and per diem (as established by Federal Travel Regulations)
6. Scheduling
7. Field Office Trailers and associated temporary utilities
8. Field office supplies
    a. Mailing and couriers
    b. Reproduction costs
    c. Storage
    d. Phones
    e. Computers
    f. Copiers
9. Personal vehicles i.e. Superintendent Pickup trucks

C. General Requirements: Costs directly associated with the project and are necessary to perform the actual work of the modification. These costs shall be shown as direct costs in the estimate. The following items, if applicable, are considered allowable costs for calculating General Requirements:

1. Hoisting
2. Material handling
3. Temporary fencing
4. Port-a-lets
5. Trash removal, dumpsters
6. Barricades
7. Small tools
8. Safety supplies
9. Scaffolding
10. Daily cleaning
11. Traffic control
12. Temporary signage
13. Temporary heating and power

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D. Personnel Costs: Costs included in the modification must only be for General Conditions staff and workers actually present and working on project site. Modification costs for salaried workers are only allowed within the structure of a 40-hour week and no overtime or holiday pay will be allowed.

1. Worker Hourly Rates are costs directly associated with the individual worker and consist of the following:

a. Base Rate: The hourly rate paid directly to the worker
b. Labor Burden: Employer payments of all applicable burdens; includes insurance and taxes the business must pay on behalf of the worker to government entities and educational forums, such as:

1) Social Security
2) Medicare
3) Workers Compensation – Policy and company calculation to be made available.
4) Federal Unemployment Tax Act (FUTA) - Cap Rate and percentage to be proportionally allocated over one year.
5) State Unemployment Tax Act (SUTA) - Cap Rate and percentage to be proportionally allocated over one year.
6) Union agreement costs - Other costs required under an enforceable collective bargaining agreement.

c. Fringe Benefits: Various non-wage compensations provided to employees such as:

1) Health Care Insurance Premiums
2) Cell Phone
3) Clothing
4) 401K and Pensions
5) Vehicle allowances
6) Gas allowance
7) Life insurance premiums
8) Disability insurance
9) Other Fringe Benefits required under an enforceable collective bargaining agreement

E. Bonuses or Deferred Compensation: No Bonus or Deferred Compensation will be allowed within any components of pricing including Home Office Overhead, General Conditions, General Requirements, Hourly Worker Rates, or the direct costs of work.

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F. General Liability Insurance: An insurance policy that protects Contractor from claims resulting from bodily injury or property damage to a third party. Include as a separate line item within all modification proposals and provide a current insurance quote upon request.

G. Performance and Payment Bonds: A performance bond is a surety bond issued by an insurance company or bank to guarantee satisfactory completion of a project. The Payment Bond guarantees the Contractor will pay the labor and material costs incurred. Banks and Insurance companies charge a premium for individual project based on a sliding scale related to the size of the project. Include as a separate line item in modification proposals and provide current company bonding rates upon request.

H. Builder's Risk Insurance: Covers the contractor's loss due to fire, high winds, or other natural forces. Not reimbursed by the National Park Service (NPS) and shall not be included in modification proposals.

1.3 MODIFICATION PROPOSAL PRICING REQUIREMENTS

A. General:

1. Proposal be received in the format and within the time frame specified in the Request for Proposal (RFP) letter. Costs or delays resulting from failure of contractor to submit within the time frame specified will not be compensable.
2. Proposal shall be detailed with itemized lists of equipment, materials, labor, production rates, overhead, profit, and bond markup for each item. Labor costs must be itemized by craft and hourly rate, including Fringe Benefits and Labor Burden. If the costs of Fringe Benefits and Labor Burden are not itemized, it is assumed they are included in the hourly rate shown, or contractor is not requesting reimbursement. Contractor may utilize the government provided Contractor Estimate Form, or their own form, provided that it contains the same information and level of detail as the Government's form.
3. Requests for extensions of contract time as a result of change must be justified with a Time Impact Analysis (TIA). Refer to Section 01 32 16 "Construction Schedule", for time impact analysis requirements. TIA and associated costs shall be received with the proposal by the date shown within the Request for Proposal letter. Contractor's failure to submit within the specified time frame will be construed as the Contractor waiving right for additional time and no time extension will be allowed.
4. All supporting documentation used to justify the proposed modification will be made available to the Contracting Officer (CO) upon request.
5. Contractor shall review and approve all subcontractor/supplier pricing in detail for proper format, scope, production rates, and pricing prior to submission to NPS. All

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delay costs associated with not reviewing and approving subcontractor/supplier pricing will be borne by the Contractor.

6. All pricing and production rates within the estimate must be based on fair and reasonable pricing and cannot include built-in contingency.

B. Labor:

1. Contractor shall estimate cost of labor by itemizing each craft involved, indicating worker hourly rate (base rate + labor burden + fringe benefits) for each and itemizing hours required for each craft directly engaged in modification work. Any work proposed requiring overtime work or premium pay shall be itemized separately. Rates shall be in accordance with the Davis-Bacon Act as incorporated herein. Labor Burden may include payroll taxes, Social Security, unemployment insurances, workers compensation insurance, Federal Insurance Contributions Act (FICA), FUTA, and other direct costs resulting from Federal, State or local laws.
2. Itemize labor costs for equipment operators separate from equipment costs.
3. Labor cost for foremen shall only be costs for related work required for the modification.

C. Materials:

1. Estimated cost for materials shall include quotes from multiple sources. Material prices shall include applicable fees and credits, including but not limited to, sales tax, freight and delivery charges, and tax rebates.
2. No markup shall be applied to any material provided by NPS.

D. Equipment:

1. Equipment used for the project must be appropriately sized for work being performed.
2. Do not include costs for "miscellaneous tools and equipment", in your proposal for a replacement value of $500 or less. Costs shown in excess of $500 shall be broken out separately.
3. Regardless of ownership, rates to be used in determining equipment rental costs shall be the lowest cost from one of the following sources:

    a. United States (U.S.) Army Corps of Engineers, Ownership and Operating Expense Schedule (use latest edition and applicable region)
    b. Construction Blue Book
    c. Local equipment rental rates, documented by actual invoice charges, or itemized vendor quotes.

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4. Estimated equipment rates shall include operating costs of all fuel, oil, lubrication, supplies, small tools, necessary attachments, ground engaging components, tires and tracks, routine repairs and maintenance (cost of major repair and overhaul is not allowed per Federal Acquisition Regulation (FAR) 31.105(d)(2)), depreciation, storage, insurance, and all incidentals. Mobilization, if applicable, may be included for equipment solely used on the modification work but must be listed separately.
5. Estimate full rate for equipment only for duration that equipment will be utilized to accomplish work of the modification.
6. Standby unit rates used in accordance with paragraph 1.3, D, 2, above. If the U.S. Army Corp of Engineers is utilized then their standby rates prevail. If Bluebook or local equipment pricing is accepted, then 1/2 of equipment costs minus any operating costs, major repair and overhaul will be accepted.
7. If equipment is in standby mode due solely to a documented NPS delay, established standby rate shall apply from the first day of the delay.
8. Equipment not used and on job site for up to five consecutive days may be classified at standby rates, provided the equipment is or has been used solely to perform work on the modification and will be necessary to complete additional modification work. Equipment still on the jobsite but not in use after five consecutive days will not be considered in the modification pricing.
9. Requests for compensation for equipment stand by time must be justified, documented and itemized separately.
10. The estimated timeframe (daily, weekly, monthly) for use of the equipment must reflect the lowest cost to the Government.

E. Establishment and Application of Overhead and Profit Percentages:

1. Home Office Overhead and Profit (OH&P) shall be applied to direct costs only. Profit shall not be applied to overhead amounts; and overhead shall not be applied to profit. Home office overhead shall contain only allowable, allocable, and reasonable costs per the contract documents and FAR Part 31. Profit percentages are based on risk factors found in FAR Part 31which have been applied to the specific type of work included in this project. Negotiated rates shall not exceed the following percentages for OH&P for contractor self-performed work:

Overhead……10%
Profit……10%

Total aggregate limit of markup (OH&P) for Contractor and Subcontractors on modification work shall not exceed 25%. The NPS will not be responsible for allocation of percentages between contractor and subcontractors at any tier.

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2. If Contractors form a partnership, partnership may only receive home office overhead and profit in same amount as an individual Contractor (refer to paragraph 1.3,E,1 above). It is the responsibility of the partners to decide on division of revenue.
3. Combined Increases and Decreases: On proposals involving both increases and decreases in the Contract Price, overhead and profit mark-ups are required on net increases and deducted on net decreases.
4. At no time can profit be calculated on Overhead or itself, it must be calculated on direct costs of work only.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION

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SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. Definitions
2. Construction Coordination
3. Submittals
4. Coordination Drawings
5. Requests for Information (RFIs)
6. NPS Project Management and Communication Software
7. Project Meetings
8. Environmental Coordination
9. Permits

B. Related Requirements:

1. Section 01 32 16 "Construction Schedule" for preparing and submitting Construction Contractor’s construction schedule.
2. Section 01 73 40 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
3. Section 01 77 00 "Closeout Procedures" for coordinating closeout of the Contract.
4. Section 01 91 14 "Total Building Commissioning" for coordinating the work with Governemnt’s Commissioning Authority.

1.2 DEFINITIONS

A. Construction Permits – Contractor Provided Permits obtained by the Contractor based on the means and methods to conduct the work.

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1.3 CONSTRUCTION COORDINATION

A. Coordination: Coordinate construction operations included in different Sections of Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, which depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components with other Construction Contractors to ensure maximum accessibility for required maintenance, service, and repair.
3. Make provisions to accommodate items scheduled for later installation.
4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of components, including mechanical and electrical.
5. Properly plan construction operations to include permit requirements. Allow enough time to execute permit provisions to maintain work schedule, site visits, inspections, and reporting deadlines.

B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other Construction Contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to:

1. Preparation of Construction Contractor Construction Schedule
2. Preparation of the Schedule of Values
3. Installation and removal of temporary facilities and controls
4. Delivery and processing of submittals
5. Progress meetings
6. Permit requirements
7. Pre-installation conferences
8. Project closeout activities
9. Commissioning activities

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1.4 SUBMITTALS

A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.

1. Content: Project-specific information, drawn accurately to scale. Do not base Coordination Drawings on reproductions of Contract Documents or standard printed data. Include following information, as applicable:

a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
b. Indicate dimensions shown on Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Contracting Officer (CO) for resolution of such conflicts.
c. Indicate space requirements for routine maintenance and anticipated replacement of components during the life of the installation.
d. Show location and size of access doors required for access to concealed dampers, valves, and controls.
e. Indicate required installation sequences.

2. Refer to individual Sections for Coordination Drawing requirements for Work in those Sections.
3. Follow NPS DSC Electronic Drawing Standards.

B. Coordination Drawing Organization: Organize coordination drawings as follows:

1. Floor Plans and Reflected Ceiling Plans: Show architectural, structural, mechanical, plumbing, fire-protection, fire-alarm, and electrical elements. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
2. Plenum Space: Indicate sub-framing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.

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5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
6. Mechanical and Plumbing Work:

    a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
    b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
    c. Fire-rated enclosures around ductwork.

7. Electrical Work:

    a. Runs of vertical and horizontal conduit 1-1/4 inches (32 millimeters) in diameter and larger.
    b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
    c. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
    d. Location of pull boxes and junction boxes, dimensioned from column center lines.

8. Fire-Protection System:

    a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.

9. Review: Contracting Officer will review coordination drawings to confirm Work is being coordinated; details of coordination are Construction Contractor's responsibility. If Contracting Officer determines coordination drawings are not prepared in scope or detail, or are otherwise deficient, Contracting Officer will inform Construction Contractor, who shall make changes and resubmit.
10. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in Section 01 33 23 "Submittal Procedures."

C. Coordination Digital Data Files: Prepare coordination digital data files according to:

1. File Preparation Format: Same digital data software program, version, and operating system as original Drawings.
2. File Submittal Format: Submit or post coordination drawing files using Portable Document Format (PDF) file format.

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3. Contracting Officer will furnish Construction Contractor one set of digital data files (AutoCad.dwg) of Drawings for use in preparing coordination digital data files.

    a. Contracting Officer makes no representations as to accuracy or completeness of digital data files as they relate to Drawings.
    b. Digital Data Software Program: Drawings are available in AutoCad.dwg.

D. Division 1 documents:

1. Letter designating Project Superintendent
2. Construction Schedule
3. A Comprehensive Schedule of Values
4. Accident Prevention Plan
5. A List of Subcontractors for this project
6. Written statements from Subcontractors certifying compliance with applicable labor standard clauses.
7. Certificates of Insurance and Standard Form SF1413 for Contactor and all Subcontractors
8. Waste Management Plan
9. Quality Control Plan
10. Temporary Storm Water Pollution Prevention Plan (SWPP or UPPP)
11. Indoor Air Quality (IAQ) Management Plan
12. Construction Contractor Commissioning Plan
13. Historic Preservation Treatment Plan (HPTP)
14. List of Required Construction Permits. Include the following information for each permit:
    a. Name of Permit
    b. Agency(ies) with Jurisdiction issuing the permit
    c. Information required from Government to complete permit application

E. Provide items listed to Contracting Officer at least one week prior to Pre-Construction Conference, or as directed by Contracting Officer.

1. Failure to submit items may result in:

    a. Construction conference may be cancelled, Notice to Proceed may not be issued, and Contracting Officer will consider other contractual remedies.
    b. Work shall not commence until written Notice to Proceed has been issued and Certificates of Insurance and SF1413 documents are received for Construction Contractor and all Subcontractors.

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1.5 REQUESTS FOR INFORMATION (RFIs)

A. General: Immediately on discovery of the need for additional information or interpretation of Contract Documents, Construction Contractor shall prepare and submit an RFI utilizing form created on NPS project management and communication software.

1. Contracting Officer will not respond to RFIs submitted by other entities controlled by Construction Contractor.
2. Coordinate and submit RFIs in a prompt manner to avoid delays in the work.

B. Content of RFI: Include detailed, legible description of item needing information or interpretation and the following:

1. RFI number, numbered sequentially
2. Date
3. RFI subject
4. Specification Section number and title and related paragraphs, as appropriate.
5. Drawing number and detail references, as appropriate.
6. Field dimensions and conditions, as appropriate.
7. Construction Contractor's suggested resolution: If suggested resolution impacts Contract Time or Contract Sum, Construction Contractor shall state impact in RFI.
8. Construction Contractor's signature
9. Requested date for response
10. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. RFI Form: Complete and submit on NPS project management and communication software.

D. Contracting Officer’s Action: Contracting Officer will review each RFI, determine action required, and respond. Contracting Officer will determine critical nature of each RFI and issue response accordingly.

1. The following are not considered to be RFIs and will receive no action:

a. Requests for approval of submittals.
b. Requests for approval of substitutions.
c. Requests for approval of Construction Contractor's means and methods.

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d. Requests for coordination information already indicated in Contract Documents.
e. Requests for adjustments in Contract Time or Contract Sum.
f. Requests for interpretation of Contracting Officer's actions on submittals.
g. Incomplete RFIs or inaccurately prepared RFIs.

2. Contracting Officer's action may include a request for additional information; time for response will date from time of receipt of additional information.
3. Contracting Officer's action on RFIs may result in need for a change to Contract Time or Contract Sum. All contract changes will be processed following terms and conditions of contract.

1.6 PROJECT MANAGEMENT AND COMMUNICATION SOFTWARE

A. Use to manage project communication and document sharing during contract period on:

1. Project directory
2. Project correspondence
3. Meeting agendas and minutes
4. Contract modifications forms and logs
5. RFI form and processing
6. Task and issue management
7. Photo documentation
8. Baseline schedule, schedule updates and calendar management
9. Submittal form and processing
10. Payment coordination documentation
11. Reminder and tracking functions
12. Archiving functions
13. Notification of submittal and RFI statuses and current responsible party
14. Permits and addendums

B. Some documents are not suitable to be shared using NPS project management and communication software. Documents containing Personal Identifying Information (PII) (i.e. certified payrolls) shall not be shared and shall be coordinated with project team as appropriate.

1.7 PROJECT MEETINGS

A. Preconstruction Conference: Before start of construction, Contracting Officer will arrange an on-site meeting with Construction Contractor. Meeting agenda will include the following as a minimum:

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1. Roles & Responsibilities / Lines of Authority
2. Park rules and regulations
3. Jobsite Safety
4. Resolution of comments on required Division 1 documents
5. Coordination of Subcontractors
6. Labor law application
7. Modifications
8. Payments to Construction Contractor
9. Payroll reports
10. Contract time
11. Liquidated damages
12. Construction Contractor Performance Evaluation
13. Display of Hotline posters
14. Notice to proceed
15. Correspondence procedures
16. NPS project management and communication software
17. Acceptance/rejection of work
18. Progress meetings
19. Submittal procedures
20. NPS Final Accessibility Inspection
21. Environmental requirements
22. Permit requirements
23. As-constructed drawings/operation and maintenance (O&M) manuals.
24. Saturday, Sunday, holiday and night work.
25. Reference materials
26. Value engineering
27. Schedule of Values

B. Progress Meetings: Contracting Officer will schedule weekly meetings with Construction Contractor.

1. Attendees: In addition to Government Representatives, each Construction Contractor, Subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented. Participants at meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Meeting agenda will include:

    a. Approval of minutes of previous meetings
    b. Submittal status

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c. Review of off-site fabrication and delivery schedules.
d. Requests for information (RFI) and other issues.
e. Modifications
f. Work in progress and projected.

1) Status of required inspections (Special Inspections, Accessibility, etc.)

g. Inspections of work in progress and projected (Special inspections, Accessibility, etc.)
h. Construction Schedule update (provide updated Critical Path Method (CPM)).
i. Status of Project Record Drawings and O&M manuals.
j. Other business relating to work.
k. Permit requirements

C. Preinstallation Conferences: Conduct at Project site before each construction activity that requires coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend meeting. Advise Contracting Officer of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for particular activity under consideration, including requirements for:

a. Contract Documents
b. Options
c. Related RFIs
d. Related Change Orders
e. Purchases
f. Deliveries
g. Submittals
h. Review of mockups
i. Possible conflicts
j. Compatibility requirements
k. Time schedules
l. Weather limitations
m. Manufacturer's written instructions
n. Warranty requirements
o. Compatibility of materials
p. Acceptability of substrates
q. Temporary facilities and controls

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r. Space and access limitations
s. Regulations of agency(ies) with jurisdiction
t. Testing and inspecting requirements
u. Installation procedures
v. Coordination with other work
w. Required performance results
x. Protection of adjacent work
y. Protection of construction and personnel

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of meeting to each party present and to other parties requiring information.
5. Do not proceed with installation if conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of Work and reconvene conference at earliest feasible date.

1.8 ENVIRONMENTAL COORDINATION

A. Construction Contractor's Environmental Manager: Designate on-site party responsible for overseeing Construction Contractor's conformance to environmental goals for project and implementing procedures for environmental protection.

1. Qualifications: Minimum 3 years Construction experience on projects of similar size and scope; with environmental procedures similar to this project;; familiar with environmental regulations applicable to construction operations.
2. Responsibilities: Responsibilities shall include:

a. Compliance with applicable Federal, State, and local environmental regulations, including maintaining required documentation.
b. Implementation of Waste Management Plan (WMP).
c. Implementation of Indoor Air Quality (IAQ) Management Plan.
d. Implementation of Storm Water Pollution Prevention Plan (SWPPP).
e. Present overview of environmental issues and summarize site specific procedures relating to management plans at Preconstruction conference.
f. Training for Construction Contractor personnel in accordance with position requirements.
g. Monitoring and documentation of environmental procedures.

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B. Perform project quality control in accordance with requirements specified in Related Sections, including:

1. Quality Requirements
2. Regulatory Requirements
3. Indoor Air Quality (IAQ) Management
4. Noise and Acoustics Management
5. Temporary Storm Water Pollution Prevention Environmental Management
6. Construction Waste Management

C. Construction Contractor's Environmental Training Program: Construction Contractor shall provide environmental training for workers performing work on project site. Training shall include:

1. Overview of environmental issues related to building industry.
2. Overview of environmental issues related to Project.
3. Review of site-specific procedures and management plans:

    a. Construction Waste Management
    b. Indoor Air Quality (IAQ) Management
    c. Noise and Acoustics Management
    d. Temporary Storm Water Pollution Prevention

4. Pollution Prevention (P2) practices: Submit evidence of familiarity with P2 practices.
5. Green Building Rating Programs: Submit evidence of familiarity with ASTM E2432 [**xxxx**].
6. Compliance with environmental regulations: As specified in Regulatory Requirements. Submit Construction Contractor 40 CFR (Code of Federal Regulations) employee training records upon request of Contracting Officer.

D. Green Building Rating Program Documentation:

1. Prepare and submit package of documentation required in accordance with ASTM E2432. Respond to requests for answers to questions and other information from Contracting Officer to complete application process.
2. Evaluate progress toward goals, including green building rating and other goals. Coordinate work as necessary to meet the goals.

E. Provide documentation for environmental procedures as specified herein and in accordance with approved Waste Management Plan, IAQ Management Plan, and Storm Water Pollution Prevention Plan.

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1.9 PERMITS

A. General:

1. Permits and Responsibilities: Construction Contractor shall, without additional expense to the Government, be responsible for obtaining necessary licenses and permits, and for complying with Federal, State and municipal laws, codes, and regulations applicable to the performance of the work. Construction Contractor shall also be responsible for damages to persons or property that occur as a result of Construction Contractor's fault or negligence; and for materials delivered and work performed until completion and acceptance of the work.
2. For the purpose of this contract, Construction Contractor will not be considered an agent of the Government. Construction Contractor shall comply with appropriate Federal, State and local laws.

B. Coordination with Agency(ies) with Jurisdiction Issuing Permits

1. Coordination: Contact the Agency(ies) with Jurisdiction as needed and sufficiently in advance to avoid delaying work: Coordinate meetings, reporting requirements, inspections, and other requirements.

C. Administrative Procedures:

1. Coordinate scheduling and timing of required administrative provisions of project permits with Agency(ies) with Jurisdiction, Construction Manager, and Park to avoid conflicts.
2. Supply needed information to Agency(ies) with Jurisdiction issuing permits, pay fees required and provide material needed to comply with permit's conditions and provisions.
3. Upload permits to NPS project management and communication software when permits are obtained.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 31 00

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SECTION 013216 – CONSTRUCTION SCHEDULE

PART 1 - GENERAL

1.1 SUMMARY

A. Section consists of Construction Schedule requirements including:

1. Schedule of Values
2. Construction Schedule Requirements.
3. Construction Schedule Updates.
4. Time Impact Analysis.

B. Purpose: The Construction Schedule ensures adequate planning, coordination, scheduling, and reporting during execution of the work by the Construction Contractor. It shall assist the Construction Contractor and Contracting Officer (CO) in monitoring the progress of the work, evaluating proposed changes, and processing Construction Contractor's monthly progress payments. It shall include the dates in the contract, phases, milestones, occupancies, holidays, weather consideration, a critical path, and the requirements of this section.

1.2 DEFINITIONS

A. Activity: A discrete part of a project identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical activities are activities on the critical path. They start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. Cost Loading: Allocation of the Schedule of Values for completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum, unless otherwise approved by the Contracting Officer.

C. Critical Path Method (CPM): Method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

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D. Critical Path: Longest connected chain of interdependent activities through the network schedule that establishes minimum overall Project duration and contains no float.

E. Float: Measure of leeway in starting and completing an activity.

1. Float: Not for the exclusive use or benefit of the Government or Construction Contractor but is jointly owned.
2. Free Float: Amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
3. Total Float: Measure of leeway in starting or completing an activity without adversely affecting planned Project completion date.

F. Resource Loading: Allocation of manpower and equipment necessary for completion of an activity as scheduled.

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

1.3 SUBMITTALS

A. Electronic Copies: Schedules and reports submitted shall be posted on the NPS project management and communication software as PDF (portable document format) files. The intent of the Government is to limit the number of printed reports to those determined by the project team as essential.

B. Schedule of Values: After contract award and before Pre-Construction conference, submit schedule of dollar values based on Contract Price Schedule.

C. Construction Baseline Schedule: After contract award and before Pre-Construction conference, submit two paper copies of baseline schedule, large enough to show entire schedule for entire construction period. Utilize Schedule of Values in preparation of Construction Baseline Schedule.

D. Critical Path Method (CPM) Reports: Concurrent with CPM schedule, submit three paper copies of the following computer-generated reports. For each activity, include activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.

1. Activity Report: List of activities sorted by activity number and then early start date, or actual start date if known.
2. Logic Report: List of predecessor and successor tasks for activities sorted in ascending order by activity number and then early start date, or actual start date if known.

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3. Total Float Report: List of activities sorted in ascending order of total float.

E. Construction Schedule Updates: On or before 7th day preceding progress payment request date, submit estimates of percent completion of each schedule activity and necessary supporting data. Provide two paper copies.

F. Construction Schedule Revisions and Time Impact Analysis: For each Construction Schedule revision, submit two paper copies of a Time Impact Analysis. Incorporate a Fragmentary Network (Fragnet) into currently accepted Construction Schedule demonstrating proposal to incorporate a modification, change, delay, or Construction Contractor request.

1.4 QUALITY ASSURANCE

A. Construction Contractor shall meet with Contracting Officer on day of the preconstruction conference to go over:

1. Review software limitations, content and format for reports.
2. Verify availability of qualified personnel needed to develop and update schedule.
3. Discuss constraints, including phasing, work stages, interim milestones, and partial Government occupancy/substantial completions**.**
4. Review delivery dates for Government-furnished products.
5. Review schedule for work of separate Government contracts.
6. Review time required for review of submittals and re-submittals.
7. Review requirements for tests and inspections by independent testing and inspecting agencies.
8. Review time required for completion and startup procedures.
9. Review time required for obtaining and activating permits.
10. Review and finalize list of construction activities to be included in schedule.
11. Review baseline schedule comments, resolve issues and progress on incorporating them
12. Review procedures for updating schedule.
13. Discuss reporting requirements and establish protocol for naming and transmitting electronic schedules.

B. Construction Contractor's Schedule Representative: Before the preconstruction conference, designate an authorized representative to be responsible for preparing and maintaining the Construction Schedule. Submit resume outlining qualifications of Scheduler to Contracting Officer for acceptance. Scheduler shall have prepared and maintained at least 5 previous schedules of similar size and complexity similar to this Contract, demonstrating proficiency of using scheduling software. Authorized representative will be responsible for preparing the Baseline Schedule, required updates, revisions, Time Impact Analyses, and reports.

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1.5 COORDINATION

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

B. Coordinate Construction Baseline Schedule with Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.

1. In developing Construction Baseline Schedule, ensure Subcontractor's work at all tiers, and prime Construction Contractor's work, is included and coordinated.
2. Secure time commitments for performing critical elements of work from parties involved.
3. Coordinate each construction activity in network with other activities and schedule in proper sequence.

PART 2 - PRODUCTS

2.1 SCHEDULE OF VALUES

A. Breakdown each lump-sum item into component work activities used in the schedule for which progress payments may be requested. Work activities broken out within schedule of values shall be integrated into and made a logical part of the construction baseline schedule. Total costs for the component work activities shall equal contract price for that lump-sum item. Contracting Officer may request data to verify accuracy of dollar values. Include mobilization, general condition costs, overhead and profit in the total dollar value of unit price items and in the component work activities for each lump-sum item. Do not include mobilization, general condition costs, overhead or profit as a separate item.

B. Do not break down unit price items. Use only the contract price for unit price items.

C. Total cost of all items shall equal the contract price. The Schedule of Values will form the basis for progress payments and the Construction Schedule.

2.2 CONSTRUCTION SCHEDULE REQUIREMENTS

A. Construction Baseline Schedule: Prepare Construction Baseline Schedule using a computerized, cost and resource-based**,** time-scaled Critical Path Method network analysis diagram for the Work.

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1. Develop and finalize Construction Baseline Schedule so it can be accepted for use no later than 30 days after date established for the Notice of Award.

    a. Failure to include any work item required for performance of this Contract shall not excuse Construction Contractor from completing work within applicable completion dates, regardless of Governments acceptance of schedule.

2. Establish procedures for monitoring and updating Construction Baseline Schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.

B. Construction Baseline Schedule Preparation: Prepare a list of all activities required to complete the Work. Using preliminary Critical Path Method network diagram, prepare a skeleton network to identify probable critical paths.

1. Activities: Indicate estimated duration, sequence requirements, and relationship of each activity in relation to other activities.
2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the Critical Path Method schedule within the limitations of the Contract Time.
4. Show sequence and interdependence of activities required for completion of work. Ensure work sequences are logical and Construction Baseline Schedule shows a coordinated plan of the work.
5. Resource loading of each activity shall include personnel by labor category and equipment type and capacity proposed to complete the activity in duration shown.
6. Consider seasonal weather conditions in planning and scheduling work influenced by high and low ambient temperatures, wind, or precipitation to ensure completion of work within contract time.
7. Time Frame: Proposed duration assigned to each activity shall be Construction Contractor's best estimate of time required to complete activity considering the scope and resources planned for activity.

    a. An early finish date may be shown but the late finish date shall be same date as last day of contract period. An early completion schedule shall contain:

        1) Insert an activity titled "Project Float" as a successor to last activity in early project completion schedule network.

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2) Add a milestone titled "Contract End Date" as a successor to the activity "Project Float".
3) Add duration to the activity "Project Float" as required so the milestone "Contract End Date" equals the last day of Contract Period.

b. Contract completion date shall not be changed by submission of a schedule that shows an early completion date.
c. Construction Contractor shall limit use of lead or lag duration's between schedule activities.
d. Project Calendars: Develop and incorporate the following calendars:

1) Administrative Calendar: Include calendar based on a 7-day week to be used on activities based on calendar days. Apply this calendar to administrative tasks or other tasks not affected by non-working days (Federal Holidays, weather, etc.).
2) Project Calendar: Include calendar based on planned work week for the project. Include Federal Holidays, weekends, and non-workdays indicated in contract documents. Apply this calendar to activities not anticipated to be affected by weather. Be clear when identifying number of work days in work week.
3) Weather Calendar: Utilize Project Calendar and show anticipated normal downtime related to weather as non-working time. Weather days shall be based on data for local area from a reliable source like the National Oceanic and Atmospheric Administration (NOAA), National Park Service records, or source acceptable to Contracting Officer. Apply this calendar to activities anticipated to be affected by weather.

e. Activity Duration: Define so no activity is longer than 14 days, except for non-construction activities including mobilization, shop drawings and submittals, fabrication and delivery of materials and equipment.

f. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 calendar days, as separate activities in the schedule. Procurement cycle activities can include submittals, approvals, purchasing, fabrication, and delivery.
g. Submittal Review Time: Include review and re-submittal times indicated. Coordinate submittal review times in Construction Baseline Schedule.
h. Startup and Testing Time: Include not less than 5 days for startup and testing and commissioning activities.

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i. Substantial Completion: Allow time for Government administrative procedures necessary for certification of Substantial Completion. (For more information, refer to Specification 01 77 00 "Closeout Procedures.")

8. Constraints: Include constraints and work restrictions indicated in Contract Documents and as follows in schedule and show how the sequence of Work is affected.

   a. Phasing: Arrange list of activities on schedule by phase.
   b. Work under More Than One Contract: Include a separate activity for each contract.
   c. Work Restrictions: Show effect of the following on the schedule:

      1) Coordination with existing construction
      2) Limitations of continued occupancies
      3) Uninterruptible services
      4) Partial occupancy before Substantial Completion
      5) Use of premises restrictions
      6) Provisions for future construction
      7) Seasonal variations
      8) Environmental control
      9) Permit provisions

   d. Work Stages: Indicate important stages of construction for each major portion of the Work.

      1) Subcontract awards
      2) Submittals
      3) Purchases
      4) Mockups
      5) Fabrication
      6) Sample testing
      7) Deliveries
      8) Installation
      9) Tests and inspections
      10) Adjusting
      11) Curing
      12) Building flush-out.
      13) Building commissioning activities.

9. Milestones: Include milestones indicated in Contract Documents in schedule, including, but not limited to, Notice to Proceed, Substantial Completion.

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C. Joint Review, Revision, and Acceptance:

1. Within seven calendar days of receiving Construction Contractor's proposed Construction Baseline Schedule, Contracting Officer shall review initial Construction Baseline Schedule.
2. Within seven calendar days after review, Construction Contractor shall revise and resubmit Construction Baseline Schedule in accordance with comments presented from review.
3. In the event the Construction Contractor fails to define any element of work, activity, or logic and the Contracting Officer review does not detect this omission or error, such omission or error, when discovered by Construction Contractor or Contracting Officer, shall be corrected by Construction Contractor within seven calendar days and shall not affect contract period.
4. Upon acceptance of the Construction Baseline Schedule, Contracting Officer saves schedule as a baseline and updates on a monthly basis. Construction schedule update will be used to evaluate Construction Contractor's monthly applications for payment based upon information developed at monthly Construction Schedule update meeting.

D. Cost Correlation: In the heading of the schedule, provide a cost correlation line, indicating planned and actual costs. On the line, show dollar volume of Work performed as of dates used to prepare payment requests.

1. Construction Contractor shall assign cost to construction activities on Construction Baseline Schedule. Costs shall not be assigned to submittal activities unless specified otherwise but may, with Contracting Officer’s approval, be assigned to fabrication and delivery activities. Costs shall be included for testing and commissioning activities, operation and maintenance manuals, punch list activities, Project Record Documents, and demonstration and training (if applicable).
2. Each activity cost shall reflect an accurate value based on the Contract Price Schedule.
3. Total cost assigned to activities shall equal total Contract Price.

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

F. Computer Software: Prepare schedules using a program developed specifically to manage construction schedules.

1. Use Microsoft Project or Primavera, for current Windows operating system.

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PART 3 - EXECUTION

3.1 CONSTRUCTION SCHEDULE UPDATES

A. Progress Meeting Updates: Provide a 2 week look-ahead schedule, derived from the currently accepted schedule, before each weekly progress meeting. Utilize look-ahead schedule to facilitate and take notes on discussions held during progress meeting.

B. Monthly Schedule Updates:

1. General: Update Construction Schedule on monthly basis to reflect construction progress and activities throughout entire contract period and until project substantial completion. The status date of each schedule update shall be the 7th day preceding the progress payment request date.
2. Procedure: Construction Contractor shall meet with Contracting Officer each month at Construction Schedule update meeting to review progress made through the status date of the Construction Schedule update, including dates activities were started or completed and percentage of work completed on each activity started or completed.
3. Reports: Concurrent schedule revisions, prepare tabulated reports showing:

    a. Identification of activities that have changed
    b. Changes in early and late start dates
    c. Changes in early and late finish dates
    d. Changes in activity durations in workdays
    e. Changes in the critical path
    f. Changes in total float or slack time
    g. Changes in the Contract Time

4. Narrative: Report shall include a brief description of actual progress made during update period; actual and potential delaying activities; impediments to progress; issues related to inclement weather; progress toward established milestones and project float. Report shall include a brief description of work anticipated to be performed in the next month. Minor revisions to the schedule should be identified for evaluation and acceptance or rejection.
5. As Work progresses, indicate Actual Completion percentage for each activity.
6. If schedule update shows a late finish date after contract completion date, include:

    a. Known delays
    b. Actions to get back on schedule
    c. Pending modifications
    d. Impediments or constraints affecting progress

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7. Progress Payments: Monthly updating of the currently accepted Construction Schedule shall be an integral part of the process upon which progress payments will be made. If Construction Contractor fails to provide schedule updates or revisions, a portion of the monthly payment may be retained until corrections have been made.

C. Distribution: Distribute copies of accepted schedule to Contracting Officer, Contracting Officers Representative, Construction Management Representative, Subcontractors, testing and inspecting agencies, and other parties identified by Construction Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to same parties and post in same locations. Delete parties from distribution when they have completed their assigned portion of the Work.

D. Construction Schedule Revisions:

1. Required Revisions: If, as a result of the monthly schedule update, it appears the currently accepted Construction Schedule no longer represents actual prosecution and progress of the work, Contracting Officer will request, and Construction Contractor shall submit, a revision to the Construction Schedule. Construction Contractor may also request reasonable revisions to currently accepted Construction Schedule in event the Construction Contractor's planning for the work is revised. If Construction Contractor desires to make changes, Construction Contractor shall notify Contracting Officer in writing, stating reason for proposed revision. Accepted revisions shall be incorporated into currently accepted Construction Schedule for next monthly schedule update.
2. Procedure: If revision to currently accepted Construction Schedule is contemplated, Construction Contractor or Contracting Officer shall advise the other in writing at least seven calendar days prior to next monthly schedule update meeting, describing revision and reasons for the revision. Government-requested revisions will be presented in writing to the Construction Contractor, who shall respond in writing within seven calendar days.
3. Reports: Concurrent with making revisions to schedule, prepare tabulated reports showing:

a. Identification of activities changed
b. Changes in early and late start dates
c. Changes in early and late finish dates
d. Changes in activity durations in workdays
e. Changes in critical path
f. Changes in total float or slack time

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3.2 TIME IMPACT ANALYSIS FOR CONTRACT MODIFICATIONS CHANGES DELAYS AND CONSTRUCTION CONTRACTOR REQUESTS:

1. Requirements: When contract modifications or changes are initiated, delays experienced, or Construction Contractor desires to revise currently accepted Construction Schedule, Construction Contractor shall submit to Contracting Officer a written time impact analysis illustrating the influence of modification, change, delay, or Construction Contractor request on contract time.
2. Time Extensions: Activity delays, resulting in a late completion date projection, shall not automatically mean an extension of contract time is warranted or due to Construction Contractor. It is possible a modification, change, or delay will not affect existing critical path activities or cause non-critical activities to become critical. A modification, change, or delay may result in absorbing a part of available total float that may exist within an activity chain of the Schedule, not causing any effect on contract time. Time extensions will be granted in accordance with terms of contract.
3. Extension of contract time will be granted only to the extent the equitable time adjustments to activity or activities affected by modification, change, or delay exceeds total (positive or zero) float available on a particular activity.
4. Procedure: Each time impact analysis shall be submitted within time period stated in a request for proposal, or time period designated under the clauses entitled Changes or Default. In cases where Construction Contractor does not submit a written request for extension of time and a time impact analysis within the designated time, it is mutually agreed that the particular modification, change, delay, or Construction Contractor request does not require an extension of the contract time. Upon acceptance, time impact analysis shall be incorporated into currently accepted Construction Schedule at next monthly schedule update.
5. Contract Modifications: Prepare time-impact analysis using fragnets to demonstrate effect of proposed change on overall Construction Schedule for each proposed contract modification concurrent with submission.

END OF SECTION

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SECTION 013233 – PHOTO DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for:

1. Existing condition images
2. Periodic construction images

B. See Section 017700 "Closeout Procedures" for a complete listing of closeout documents.

1.2 SUBMITTALS

A. Construction Images: Submit images electronically within seven days of taking the image. Include:

1. Date, time and number (sequentially number all images) in filename.
2. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
3. Submit digital images exactly as originally recorded in digital camera, without alteration, or modifications using image-editing software.

B. Closeout: Submit complete set of digital image electronic files as a Project Record Document**.** Submit on provide USB drive or transfer through GC's share point / procore site or sharepoint site provided by Park.

1. Provide index as separate file on Disc. List each image as a file name with number, date, and time. Include description and or vantage point image was taken.
2. Submit images that have the same aspect ratio as the sensor, un-cropped.

PART 2 - PRODUCTS

2.1 FORMAT REQUIREMENTS

A. Media: DVD-R Archival Gold

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B. Media Labels: Provide USB drive or transfer through GC's share point / procore site or sharepoint site provided by Park..

C. Images: Provide sRGB (standard Red Green Blue) color images in JPEG (Joint Photographic Experts Group) format. Minimum sensor size of 8 megapixels, and at image resolution of not less than 3200 by 2400, and 300 dpi (dots per inch).

PART 3 - EXECUTION

3.1 CONSTRUCTION IMAGES

A. General: Take digital images using the maximum range of depth of field, in-focus, to clearly show the Work. No blurry or out-of-focus areas accepted.

1. Maintain index with each set of Construction images and identify the number, date, time, and description for each.
2. Maintain one set of images accessible in field office at Project site available for reference.

B. Existing Condition Images: Before starting construction, take color digital images of Project, including existing items to remain during construction, from different vantage points.

1. Flag construction limits before recording construction images.
2. Take eight separate images to show existing conditions adjacent to property before starting Work.

C. Periodic Construction Images: Take 12 color, digital images monthly, coinciding with cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last images were taken.

D. Additional Images: Contracting Officer may issue requests for additional images.

1. Three days advance, where feasible.
2. In emergency situations, take additional images within 24 hours of request.
3. Additional images include, but are not limited to:

a. Immediate follow-up when on-site events result in construction damage or losses.
b. Fabrication locations away from Project site.
c. Substantial Completion of a major phase or component of Work.
d. Extra record images at time of final acceptance.

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SECTION 013323 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 DEFINITIONS

A. Action Submittals: Written, graphic information, and physical samples that require Government's responsive action.

B. Informational Submittals: Written information that does not require Government's responsive action. Submittals may be rejected for not complying with requirements.

C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.

D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.3 GENERAL SUBMITTAL PROCEDURES

A. General: Prepare and submit submittals required by individual Specification Sections and in some cases as requested in drawings. Types of submittals are indicated in individual specific sections.

1. Contracting Officer (CO) reserves right to require submittals in addition to those called for in individual sections.

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B. Web-Based Project Management Software: Prepare submittals in PDF form, and upload to Procore Construction Management Software or equal web-based Project management software website. Enter required data in web-based software site to fully identify submittal.

C. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Review for legibility, accuracy, completeness, and compliance with Contract Documents.

1. Coordinate submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related parts of Work so processing will not be delayed because of need for concurrent review coordination.

a. Contracting Officer reserves right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

D. Submittal List: Submittal list is attached to the end of this Specification Section. The intent is to provide an overall summary of submittal requirements. The requirements of individual Specification Sections and terms and conditions of the Contract still apply regardless of what is shown on submittal list.

E. Processing Time: Allow enough time for submittal review and re-submittals. Contract time extensions will not be authorized if submittals are not transmitted with enough time to permit processing, including re-submittals.

1. Action Submittals

a. Initial Review: Allow ten days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required.
b. Re-submittal Review: Allow ten days for review of each re-submittal.

2. Informational submittals

a. Review: Allow seven days for review of each submittal.

F. Approved Equals:

1. For each item proposed as an "approved equal," submit supporting data, including:

a. Drawings and samples as appropriate.
b. Comparison of the characteristics of the proposed item with that specified.

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c. Changes required in other elements of the work because of the substitution.
d. Name, address, and telephone number of vendor.
e. Manufacturer's literature regarding installation, operation, and maintenance, including schematics for electrical and hydraulic systems, lubrication requirements, and parts lists. Describe availability of maintenance service, and state source of replacement materials.

2. A request for approval constitutes a representation that Construction Contractor:

a. Has investigated the proposed item and determined that it is equal or superior in all respects to that specified.
b. Will provide the same warranties for the proposed item as for the item specified.
c. Has determined that the proposed item is compatible with interfacing items.
d. Will coordinate installation of an approved item and make changes required in other elements of the work because of the substitution.
e. Waives claims for additional expenses that may be incurred as a result of the substitution.

G. Submittals: Identify and incorporate information in each submittal file as follows:

1. Transmittal Form (CM-16): Utilize NPS Transmittal Form for all submittals. No action will be taken on a submittal item unless accompanied by this Transmittal Form.
2. Physical samples: Complete Transmittal Form and deliver physical sample to the Contracting Officer (or designee) on site for processing. All comments and actions will be documented on the Transmittal Form.

H. Identification: Submittal number or other unique identifier, including revision identifier.

1. Submittal number shall use a sequential number (e.g. .001). Re-submittals shall include alphabetic suffix after another decimal point (e.g. .001.A).

I. Re-submittals: Make re-submittals using same process used with initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in the title block on the Transmittal Form (CM-16) and clearly indicate extent of revision.
3. Re-submit submittals until they are marked "Approved" or "Approved with notations".

J. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, and others as necessary for performance of construction activities.

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K. Use for Construction: Use only final submittals with mark indicating "Approved" or "Approved with notations". Ensure notations have been incorporated and, at a minimum, keep one copy of final approved submittal on site for use during construction.

1.4 CONSTRUCTION CONTRACTOR'S USE OF CAD/BIM FILES

A. General: At Contractor's written request, copies of Architect's CAD files will be provided to Contractor for Contractor's use in connection with Project, following the Contractor's execution of a waiver prepared by the Architect, the text of which is reproduced below:

USE OF ELECTRONIC FILES

The electronic files provided are not purported to contain information that reflects actual, measured conditions as they exist at the project site. Further, they do not reflect changes or addenda, if any, to the design of the Project made after the date of the last revisions. The information in the files was developed for its use in designing the Project. No other representation is hereby made that the files are suitable for any other use or for any other particular purpose, including but not limited to use as a base for the preparation of shop drawings, as coordination drawings, or as construction documents for additions, tenant fit-outs or modifications to the Project. Contractors are urged to perform dimensional and completeness reviews of all documents. In case of any conflict between the information contained in these files and that contained in the hard copy of the Contract Documents, their addenda and modifications, the latter shall govern.

Transmission of these electronic files does not convey either the copyright in the designs contained therein or a license to copy or use them for any purpose except the construction of the Project. Schwartz/Silver Architects Inc., and their consultants do not warrant that these files are compatible with any software or hardware other than that on which they were produced. No further reproduction and distribution of these files may be made without the written consent of the authors.

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Authorized Signature

_____

Company

_____

Date

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each submittal to show which products and options are applicable.
3. As applicable, include:

a. Manufacturer's product specifications.
b. Manufacturer's installation instructions: When Contract Documents require compliance with manufacturer's printed instructions, provide one complete set of instructions to Contracting Officer and keep another complete set of instructions at the project site until substantial completion.
c. Manufacturer's catalog cuts: Submit only pertinent pages; mark each page of standard printed data to identify specific products proposed for use.
d. Wiring diagrams showing factory-installed wiring.
e. Printed performance curves.
f. Operational range diagrams.
g. Compliance with specified referenced standards.
h. Testing by recognized testing agency.

4. Submit product data in PDF (portable document format) file format before or concurrent with samples.

B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal of CAD/BIM Drawings is otherwise permitted.

1. Preparation: Fully illustrate requirements in Contract Documents. As applicable, include:

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a. Dimensions
b. Identification of products
c. Fabrication and installation drawings
d. Roughing-in and setting diagrams
e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring
f. Shopwork manufacturing instructions
g. Templates and patterns
h. Schedules
i. Notation of coordination requirements
j. Notation of dimensions established by field measurement
k. Relationship to adjoining construction clearly indicated
l. Seal and signature of professional engineer if specified
m. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring

2. Submit shop drawings as PDF electronic file

C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Complete and post the Transmittal Form (CM-16) on the NPS project management and communication software website for processing and documentation of action on submitted samples.
3. Identification: Attach label on unexposed side of Samples that includes:

a. Generic description of Sample
b. Product name and name of manufacturer
c. Sample source
d. Submittal Number and title of appropriate Specification Section

4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing full range of colors, textures, and patterns available.

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a. Number of Samples: Submit two full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Contracting Officer will return with options selected.

6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

a. Number of Samples: Submit four sets of Samples. Contracting Officer will retain three Sample sets; remainder will be returned. Retain Sample set as a Project Record Sample.

D. Construction Materials: Construction Contractor is encouraged to submit products made out of recycled or environmentally responsible material. Every effort will be made by NPS to approve these materials.

2.2 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by individual Specification Sections.

1. Post informational submittals as PDF electronic files directly to the NPS project management and communication software.
2. Certificates and Certifications: Provide a notarized statement with signature of entity responsible for preparing certification. Certificates and certifications shall be signed by officer or other individual authorized to sign documents on behalf of that entity.
3. Informational submittals that do not comply with requirements specified in Contract Documents will be rejected and one copy will be returned.

B. Coordination Drawings: Comply with requirements specified in Section 013100 "Project Management and Coordination."

C. Construction Contractors Construction Schedule: Comply with requirements specified in Section 013216 "Construction Schedule."

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D. Accident Prevention Plan: Comply with requirements specified in Section 013523 "Safety Requirements."

E. Schedule of Values: Comply with requirements specified in Section 013216 "Construction Schedule."

F. Waste Recycling Plan: Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."

G. Quality Control Plan: Comply with requirements specified in Section 014000 "Quality Requirements."

H. Indoor Air Quality Management Plan: Comply with requirements specified in Section 015719.11 "Indoor Air Quality Management."

I. Sustainable Design Requirements: Comply with the requirements specified in Section 018113 “Sustainable Design Requirements for Non-LEED Projects.”

J. Qualification Data: Prepare written information demonstrating capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

K. Welding Certificates: Prepare written certification that welding procedures and personnel comply with Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on American Welding Society (AWS) forms. Include names of firms and personnel certified.

L. Installer Certificates: Prepare written statements on manufacturer’s letterhead certifying Installer complies with Contract Documents and, where required, is authorized by manufacturer for this specific Project.

M. Manufacturer Certificates: Prepare written statements on manufacturer’s letterhead certifying manufacturer complies with Contract Documents. Include evidence of manufacturing experience where required.

N. Product Certificates: Prepare written statements on manufacturer’s letterhead certifying product complies with Contract Documents.

O. Material Certificates: Prepare written statements on manufacturer’s letterhead certifying material complies with Contract Documents.

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P. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in Contract Documents.

Q. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements in Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

R. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project.

S. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in Contract Documents.

T. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

U. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in Contract Documents.

V. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Section 01 78 23 "Operation and Maintenance Data."

W. Design Data: Prepare written and graphic information, including: performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

X. Manufacturer's Instructions: Prepare written or published information documenting manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer.

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Y. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. As applicable, include:

1. Statement on condition of substrates and their acceptability for installation of product.
2. Summary of installation procedures being followed, compliance with requirements and, if not, what corrective action was taken.
3. Results of operational and other tests and a statement of whether observed performance complies with the requirements.

Z. Permit Compliance Products: Prepare required information for compliance with permit provisions. Products include written notification of project startup, suspension, and completion of work; photo documentation of site conditions; reports; and drawings.

PART 3 - EXECUTION

3.1 CONSTRUCTION CONTRACTOR'S REVIEW

A. Review each submittal and check for coordination with other Work of Contract and for compliance with Contract Documents. Note corrections and field dimensions.

3.2 CONTRACTING OFFICER'S ACTION

A. General: Submittals will be disapproved without technical review if identification information is missing, not filled in, or if placed on back of submittal; an incorrect format of submittals is provided; transmittal form is incorrectly filled out; submittals are not coordinated; or submittals do not show evidence of Construction Contractor's approval.

1. Any work done or orders for materials or services placed before approval shall be at Construction Contractor's own risk.

B. Action Submittals: Contracting Officer will review each submittal, generate comments on corrections or modifications required, and indicate appropriate action on the Transmittal Form (CM-16). Submittal will be marked as defined below:

1. APPROVED: Acceptable with no corrections.
2. APPROVED WITH NOTATIONS: Minor corrections or clarifications required. Comments are clear and no further review is required. Construction Contractor shall address review comments when proceeding with the work.

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3. DISAPPROVED - RESUBMIT: Rejected as not in accordance with the contract or as requiring major corrections or clarifications. Contracting Officer will identify reasons for disapproval. Construction Contractor shall revise and resubmit with changes clearly identified.

C. Informational Submittals: Contracting Officer will review each submittal and will either accept or reject it.

D. Partial submittals are not acceptable, will be considered non-responsive, and will be returned without review.

END OF SECTION

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SECTION 013523 - SAFETY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes establishing an effective accident prevention program and providing a safe working environment for personnel and visitors.

1.2 SUBMITTALS

A. Accident Prevention Plan (APP): Submit APP after contract award and before Pre-Construction conference. Contracting Officer (CO) will review proposed APP. If APP requires any revisions or corrections, Contractor shall resubmit Plan within 10 days. No progress payments will be made until the APP is accepted.

1.3 QUALITY ASSURANCE

A. Comply with contract clauses "Accident Prevention" and "Permits and Responsibilities." In case of conflicts between Federal, State, and local safety and health requirements, the most stringent shall apply. Onsite equipment shall meet 29 CFR 1926 (Code of Federal Regulations) (Occupational Safety and Health Administration (OSHA)) requirements. Failure to comply with requirements of this section and related sections may result in suspension of work.

B. Site Safety Supervisor:

1. Designate authorized onsite representative for preparation and maintenance of the APP.
2. Shall be responsible for:

    a. Implementation and enforcement of the APP
    b. Daily safety inspections
    c. Conducting and documenting weekly and monthly safety meetings
    d. Review of safety requirements at progress meetings
    e. Compilation and maintenance of Safety Data Sheets (SDS) and safety reference materials
    f. Tracking and resolution of safety violations

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g. Site personnel and visitor compliance with site safety and health requirements and APP
h. Investigation and reporting of accidents and injuries

C. Qualifications of Employees:

1. Physically and able to perform their assigned duties in a safe manner.
2. Do not allow employees whose ability or alertness is impaired because of prescription or illegal drug use, fatigue, illness, intoxication, or other conditions that may expose themselves or others to injury to perform work.
3. Provide operating instructions for equipment. Operators of vehicles, hoisting equipment, and hazardous plant equipment shall be able to understand signs, signals, operating instructions, and be fully capable of operating such equipment. Retain copies of operator licenses and certifications onsite.

1.4 ACCIDENT REPORTING

A. Reportable Accidents: Defined as: death, occupational disease, and/or traumatic injury to employees or the public; fires; and/or property damage by accident in excess of $100.

1. Notify Contracting Officer immediately in the event of a reportable accident.
2. Fill out and forward an Accident/Property Damage Report Form (CM-22) to Contracting Officer within 7 days of a reportable accident. Obtain form from Contracting Officer.

1.5 RESOURCES

A. COVID-19 (Coronavirus Disease 2019) information provided below is not intended to provide a complete analysis of requirements for Contractor and is provided as a courtesy.

1. Coronoavirus.gov
2. Occupational Safety and Health Administration (United States Department of Labor) - COVID-19
3. Center for Disease Control (CDC)

a. Get the Facts About Coronavirus
b. What Construction Workers Need to Know about COVID-19

4. Federal Emergency Management Agency (FEMA) - Coronavirus (COVID-19) Response
5. National Park Service (NPS) - NPS Public Health Update

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PART 2 - PRODUCTS

2.1 ACCIDENT PREVENTION PLAN (APP)

A. APP shall be written to comply with OSHA and project requirements (generic plan is not acceptable) including but not limited to:

1. Name and qualifications of supervisor responsible to carry out program.
2. Weekly and monthly safety meetings shall be documented with topics and attendees.
3. First aid and rescue procedures.
4. Job Hazard Analysis (JHA) for each major phase. List of hazards associated and methods proposed to provide for property protection and safety of the public, National Park Service personnel, and Contractor's employees. Include initial and continuing training.
5. Planning for possible emergency situations, as detailed in Article 1.2. Such planning shall take nature of construction, site conditions, and degree of exposure of persons and property into consideration.
6. Infectious Disease Preparedness:

    a. Contractors are responsible for their employees' safety and the safety of job site visitors during the performance of this contract. We encourage Contractors to follow guidance from the Department of Labor (DOL), Occupational Safety and Health Administration (OSHA), the Centers for Disease Control and Prevention (CDC), and all other applicable local, city, and state mandates. We encourage Contractors to develop policies for infection prevention and an Infectious Disease Preparedness and Response Plan.
    b. To the extent appropriate, Contractors should include the protective health and safety measures they intend to implement in any accident prevention or safety submittals required under this contract. These plans should contain preventive measures the Contractor intends to follow while performing work on government property as well as responsive and corrective actions to be taken if an employee exhibits symptoms or tests positive for contagion.
    c. Upon contract award, Contractors should communicate with Contracting Officer regarding Contractor decisions and actions to protect the health and safety of workers for the duration of contract performance under which pandemic conditions exist.

2.2 FIRST AID FACILITIES

A. Provide adequate facilities for number of employees and appropriate to construction hazards.

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2.3 PERSONNEL PROTECTIVE EQUIPMENT (PPE)

A. Selection shall conform to OSHA Subpart E.

PART 3 - EXECUTION

3.1 DAILY SAFETY INSPECTIONS

A. Conduct daily safety inspections and maintain daily safety reports which include:

1. Area/operation inspected
2. Date of inspection
3. Identified hazards
4. Corrective actions taken

3.2 EMERGENCY INSTRUCTIONS

A. Post telephone numbers and reporting instructions for ambulance, physician, hospital, fire department, and police in conspicuous locations at work site.

3.3 FIRE AND LIFE SAFETY

A. Comply with requirements of National Fire Protection Association (NFPA) 241 (Standard for Safeguarding Construction, Alteration, and Demolition Operations).

B. Comply with the requirements of the NPS Lowell National Historical Park Hot Work Permit for all construction activities that may produce spark or flame including but not limited to: soldering, grinding, field welding.

3.4 HAZARDOUS MATERIALS

A. Hazardous materials: Explosive, flammable, poisonous, corrosive, oxidizing, irritating, or otherwise harmful substances that could cause death or injury.

B. Store hazardous materials in accordance with manufacturer's and OSHA Subpart D requirements. Maintain Safety Data Sheets (SDS) for each chemical readily available on site.

1. Immediately report spills of hazardous materials to the Park.

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2. Maintain a spill emergency response kit.
3. Train employees how to respond to a spill and use emergency response kit.

3.5 PROTECTIVE EQUIPMENT

A. Inspect personal protective equipment daily and maintain in a serviceable condition. Clean, sanitize, and repair personal items as appropriate before issuing to another individual.

3.6 SAFETY MEETINGS

A. As a minimum, conduct one weekly 15-minute "toolbox" safety meeting conducted by a foreman or supervisor and attended by construction personnel at worksite. Topics shall coincide with work scheduled for following week. Document and submit meeting minutes to Contracting Officer within one day after meeting.

B. Conduct monthly safety meetings for personnel, contractors, and subcontractors performing work on the site. Notify Contracting Officer of meeting dates and times. Meetings shall be used to: review effectiveness of Contractor's safety effort; resolve current health and safety problems; provide a forum for planning safe construction activities, and for updating Accident Prevention Plan. Contracting Officers Representative will attend meetings and enter results of meetings into the daily log.

3.7 HARD HATS AND PROTECTIVE EQUIPMENT AREAS

A. A hard hat use area shall be designated by Contractor. Hard hat area shall be posted by Contractor in a manner satisfactory to Contracting Officer.

B. It is Contractor's responsibility to require persons working on or visiting site to wear hard hats and PPE in good repair at all times. As a minimum, maintain [**six**] <**Insert number**> hard hats and other APP required equipment.

3.8 TRAINING

A. First Aid: Provide training to personnel to ensure prompt and efficient first aid.

B. Hazardous Material: Train and instruct each employee exposed to hazardous material in safe and approved methods of handling and storage.

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SECTION 013591 - HISTORIC PRESERVATION TREATMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes special procedures for historic treatment on Project including, but not limited to:

1. Definitions
2. Submittals
3. Quality Assurance
4. Storage and protection of existing historic materials
5. Project site conditions
6. Historic Preservation Treatment Plan
7. Protection, General
8. Protection during application of chemicals
9. Protection during use of heat-generating equipment
10. Historic preservation treatment procedures

1.2 DEFINITIONS

A. "Preservation" - To apply measures necessary to sustain existing form, integrity, and materials of historic property. Work may include preliminary measures to protect and stabilize the property.

B. "Rehabilitation" - To make possible a compatible use for property through repair, alterations, and additions while preserving those portions or features that convey its historical, cultural, or architectural values.

C. "Restoration" - To accurately return form, features, and character of a property to its appearance at a particular period of time by means of removal of features from other periods in its history and repair and reconstruction of missing and deteriorated features from the restoration period.

D. "Reconstruction" - To reproduce in exact form and detail, a building, structure, or artifact as it appeared at a specific period in time. Reconstructed elements do not possess historic integrity in their own right since they are-not original fabric.

E. "Stabilize" - To apply measures designed to reestablish a weather-resistant enclosure and structural reinforcement of an item or portion of the building while maintaining essential form as it

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exists at present. This level of intervention is aimed at retarding or arresting adverse impacts to structures.

F. "Protect and Maintain" - To remove deteriorating corrosion, reapply protective coatings, and install protective measures such as temporary guards; to provide the least degree of intervention.

G. "Repair" - To stabilize, consolidate, or conserve; to retain existing materials and features while employing as little new material as possible. Repair includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials. Within restoration, repair also includes limited replacement in kind, rehabilitation, and reconstruction, with compatible substitute materials for deteriorated or missing parts of features when there are surviving prototypes.

H. "Replace" - To duplicate in its entirety, a historic element or feature by matching its historic pattern, detail and appearance. Replacement is justified when original or historic elements are damaged beyond repair or are missing. Replacement conditions and methods include:

1. Replacement with Original or Historic Fabric: Includes fabric salvaged from other locations or projects having identical architectural qualities. Duplication of appearance using identical material possessing historical significance.
2. Replacement with New Materials: Includes replacement with new material of like kind (custom fabricated of manufactured). Duplication of appearance using like material.
3. Replacement with Substitute Materials: Includes replacement with a compatible substitute that is frequently contemporary and unlike the historic fabric. Duplication of appearance using modern (non-traditional) material Use of substitute materials is not approved unless matching materials are not available.

I. "Remove" - To demolish or detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

J. "Remove and Salvage" - To detach items from existing construction and deliver them to Contracting Officer (CO) or designee.

K. "Remove and Reinstall" - To detach items from existing construction, repair and prepare for reuse, and reinstall where indicated.

L. "Existing to Remain" or "Retain" - Existing items of construction not to be removed and not otherwise indicated to be removed and salvaged or removed and reinstalled.

M. "Material in Kind" - Material that closely matches existing materials through comparison of architectural qualities and salient characteristic such as species, cut, color, grain, dimension, profile, thickness, and finish.

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1.3 SUBMITTALS

A. Historic Preservation Treatment Plan:

1. After contract award and before Pre-Construction conference, submit for approval a written Historic Preservation Treatment Plan (HPTP).
2. If the plan requires revisions or corrections, Contractor shall resubmit plan within 10 days.
3. No change in approved plan may be made without written concurrence by Contracting Officer.

B. Alternative Methods and Materials: If alternative methods and materials to those indicated are proposed for any phase of work, provide a written description including evidence of successful use on other, comparable projects, and program of testing to demonstrate effectiveness for use on this Project.

C. Photographs or Videotape: In accordance with Section 013233 "Photographic Documentation," show existing conditions of adjoining construction and site improvements including finish surfaces that might be misconstrued as damage caused by historic treatment operations. Submit before work begins.

1.4 QUALITY ASSURANCE

A. Historic Preservation Treatment Specialist Qualifications: Experienced firm with required certifications and training able to demonstrate through past performance they are qualified to perform this work.

1.5 STORAGE AND PROTECTION OF HISTORIC MATERIALS

A. Removed and Salvaged Historic Materials:

1. Clean salvaged historic items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in secure area until delivery to Contracting Officer.
4. Transport items to storage area.
5. Protect items from damage during transport and storage.
6. Do not dispose of items removed from existing construction without prior written consent of Contracting Officer.

B. Removed and Reinstalled Historic Materials:

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1. Clean and repair historic items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use as designed.

C. Existing Historic Materials to Remain: Protect construction indicated to remain against damage and soiling during historic treatment. When permitted by Contracting Officer, items may be removed to suitable, protected storage location during historic treatment and cleaned and reinstalled in their original locations after historic treatment operations are complete.

D. Storage and Protection: When removed from existing location, store historic materials within weather-tight enclosure protected from wetting by rain, snow, or ground water, and temperature variations. Secure stored materials to protect from theft.

1. Identify removed items with an inconspicuous mark indicating original location.
2. Develop key plan when many similar items are scheduled for removal and reinstallation.

1.6 PROJECT-SITE CONDITIONS

A. Exterior Cleaning and Repairing:

1. Proceed with work only when forecasted weather conditions are favorable.

   a. Wet Weather: Do not attempt repairs during rainy or foggy weather. Do not apply primer, paint, putty, or epoxy when relative humidity is above 80 percent. Do not remove exterior elements of structures when rain is forecast or in progress.
   b. Do not perform exterior wet work when air temperature is below 40 degrees Fahrenheit (5 degrees Celsius).
   c. Do not begin cleaning, patching, or repairing given likelihood of frost or freezing.
   d. Do not begin cleaning when either air or surface temperature is below 45 degrees Fahrenheit (7 degrees Celsius) unless approved means are provided for maintaining 45 degrees Fahrenheit (7 degrees Celsius) temperature of air and materials during, and for 48 hours subsequent to, cleaning.

2. Perform cleaning and rinsing of the exterior only during daylight hours.

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B. National Park Service will occupy portions of building area. Conduct historic treatment so National Park Service operations will not be disrupted. Provide 72 hours' notice to Contracting Officer of activities that will affect National Park Service operations.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 HISTORIC PRESERVATION TREATMENT PLAN

A. Prepare written plan for preservation work covering preservation components of project. Plan shall verify construction strategy and intent is compatible with Department of the Interior's (DOI) standards for Treatment of Historic Properties, guidelines for Treatment of Cultural Landscapes, and National Park Service management policies for cultural resources. Plan shall satisfy both project scope and resource protection requirements. Plan shall include:

1. Organized list of preservation components of project, systems, and tasks
2. Staging and sequence of work
3. Disassembly and reassembly techniques and steps
4. Equipment and tools required
5. Supplies and materials with manufacturer or supplier identified including specific clean up/storage procedure including frequency and documentation of such.
6. Skilled trades and crafts required
7. Anticipated testing and analysis of fabric
8. Additional investigations for extents or magnitude of treatments needed
9. Protective measures
10. Seasonal limitations on work
11. Alternative means if primary treatment method is unfeasible
12. Work conducted off-site (Approval from Contracting Officer required prior to taking resources off-site).

3.2 PROTECTION, GENERAL

A. Comply with manufacturer's written instructions for precautions and effects of products and procedures on adjacent building materials, components, and vegetation.

B. Ensure supervisory personnel are present when work begins and during progress.

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C. Temporary Protection of Historic Materials during Construction:

1. Protect existing materials during installation of temporary protections and construction. Do not deface or remove existing materials.
2. Attachments of temporary protection to existing construction shall be approved by Contracting Officer prior to installation.

D. Existing Drains: Prior to start of work or cleaning operations, test drains and other water removal systems to ensure drains and systems function properly. Notify Contracting Officer immediately of stopped or blocked drains or systems. Do not begin Work of this Section until drains are in working order.

1. Provide method to prevent solids including stone or mortar residue from entering drains or drain lines. Clean out drains and drain lines blocked or filled because of work performed under this Contract.
2. Protect storm drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.

3.3 PROTECTION DURING APPLICATION OF CHEMICALS

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

B. Comply with requirements in Section 015000 "Temporary Facilities and Controls."

C. Cover adjacent surfaces with materials proven to resist chemical cleaners selected for Project unless chemicals being used will not damage adjacent surfaces. Use covering materials containing only waterproof, UV (ultraviolet)-resistant adhesives. Apply masking agents to comply with manufacturer's written instructions. Do not apply liquid masking agent to painted or porous surfaces. Promptly remove masking to prevent adhesive staining on completion.

D. Do not clean surfaces during winds of sufficient force to spread cleaning solutions to unprotected surfaces.

E. Neutralize and collect alkaline and acid wastes and dispose of outside park boundaries.

F. Dispose of runoff from chemical operations by legal means and in a manner preventing soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.

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G. Document daily clean-up, proper storage, and disposition of any flammable/combustible materials with daily reports.

3.4 PROTECTION DURING USE OF HEAT-GENERATING EQUIPMENT

A. Comply with following procedures while performing work with heat-generating equipment, including welding, cutting, soldering, brazing, paint removal with heat, and other operations where open flames or implements utilizing heat are used:

1. Obtain Contracting Officer's approval for operations involving use of open-flame or welding equipment.

    a. Notification shall be given for each occurrence and location of work with heat-generating equipment.
    b. Obtain appropriate permit from the park as required.

2. As far as practical, use heat-generating equipment in shop areas or outside building.
3. Before work with heat-generating equipment commences, furnish fire watch (or watches) for location(s) where work is to be performed.
4. Do not perform work with heat-generating equipment in or near rooms or in areas where flammable liquids or explosive vapors are present or thought to be present. Use combustible gas indicator test to ensure area is safe.
5. Remove and keep area free of combustibles, including, rubbish, paper, waste, etc., within area of operations.

    a. If combustible material cannot be removed, provide fireproof blankets to cover such materials.

6. Where possible, furnish and use baffles of metal or gypsum board to prevent spraying of sparks or hot slag into surrounding combustible material.
7. Prevent extension of sparks and particles of hot metal through open windows, doors, holes, and cracks in floors, walls, ceilings, roofs, and other openings.
8. Inspect each location of day's work not sooner than 30 minutes after completion of operations to detect hidden or smoldering fires; ensure proper housekeeping is maintained.

B. Where sprinkler protection exists and is functional, maintain without interruption while operations are performed. If operations are performed near automatic sprinkler heads, shield individual heads temporarily with guards.

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3.5 HISTORIC PRESERVATION TREATMENT PROCEDURES

A. The principal aim of preservation work is to halt the process of deterioration and stabilize the item's condition to sustain the integrity of the historic element, feature or structure being preserved. Cyclic maintenance is often required as well as repair work. Repair is required where specifically indicated. The following procedures shall be followed:

1. Retain as much existing material as possible; repair and consolidate rather than replace.
2. Use additional material or structure to reinforce, strengthen, prop, tie, and support existing material or structure.
3. Use reversible processes wherever possible.
4. Use traditional replacement materials and techniques if possible. New work shall be distinguishable from old work and original materials and techniques.
5. Record repair work during construction with periodic construction photos and daily inspection reporting. Photo documentation is specified in Section 013233 "Photographic Documentation."

B. Prohibit smoking by personnel performing work on or near historic structures.

C. Notify Contracting Officer of visible changes in integrity of material or components due to environmental causes including biological attack, UV degradation, freezing, or thawing, or due to structural defects including cracks, movement, or distortion.

1. Do not proceed with work in question until directed by Contracting Officer.

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

E. Identify new or replacement materials and features with inconspicuous, permanent marks to distinguish from original materials. Record legend of identification marks and locations of these marks on Record Drawings.

F. When cleaning, match samples of existing materials that have been cleaned and identified for acceptable cleaning levels. Avoid over-cleaning to prevent damage. Use gentlest methods available. Initiate cleaning using hand cleaning methods before introducing power cleaning methods and equipment.

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SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

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

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with Contract Document requirements. Quality of work shall be responsibility of the Contractor.

1. Specified tests, inspections, and related actions do not limit Contractor's other quality assurance and control procedures that facilitate compliance with Contract Document requirements.

C. See Divisions 2 through 49 Sections for specific test and inspection requirements.

1.2 DEFINITIONS

A. Quality Assurance Services: Activities, actions, and procedures performed before and during execution of the work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality Control Services: Tests, inspections, procedures, and related actions during and after execution of the work to evaluate actual products incorporated into the work and completed construction comply with requirements.

C. Preconstruction Testing: Tests and inspections performed specifically for project before products and materials are incorporated into work to verify performance or compliance with specified criteria.

D. Product Testing: Tests and inspections performed by a Nationally Recognized Testing Laboratory (NRTL), a National Voluntary Laboratory Accreditation Program (NVLAP), or a testing agency qualified to conduct product testing, to establish product performance and compliance with industry standards.

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E. Source Quality Control Testing: Tests and inspections performed at the source, i.e., plant, mill, factory, or shop.

F. Field Quality Control Testing: Tests and inspections performed on-site for installation of work and for completed work.

G. Testing Agency or Laboratory: Entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

H. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

1. Using a term such as "carpentry" does not imply certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to trades people of corresponding generic name.

1.3 CONFLICTING REQUIREMENTS

A. Reference Standards: If compliance with two or more standards is specified and standards establish different or conflicting requirements for minimum quality levels, comply with most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Contracting Officer before proceeding.

B. Minimum Quality Levels: Quality level shown or specified shall be minimum provided or performed. Actual installation may comply exactly with minimum quality specified, or it may exceed minimum within reasonable limits. To comply with requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Contracting Officer before proceeding.

1.4 SUBMITTALS

A. Quality Control Plan:

1. After contract award and before Pre-Construction conference, submit a written Contractor Quality Control (CQC) plan.
2. If plan requires revisions or corrections, Contractor shall resubmit plan within 10 days.
3. Government reserves the right to require changes in plan during contract period as necessary to obtain the quality specified.

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4. No change in the approved plan may be made without written concurrence by Contracting Officer.

B. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in form of a recent report on inspection of testing agency by a recognized authority.

C. Contractor Quality Control (CQC) Daily Reports: Submit showing inspections and tests on first workday following date covered by report. Quality Control Supervisor shall utilize DSC Forms.

1. Review Construction Management Representative (CMR) Daily report if applicable and reconcile any differences prior to posting.

D. Test Reports

1. Test reports shall be completed by person performing test.
2. Submit Daily Test Information Sheets with Quality Control Daily Reports.
3. Submit failing test results and proposed remedial actions within four hours of noted deficiency.
4. Submit three copies of complete test results no later than one calendar day after test was performed.

E. Accessibility Inspection Report:

1. Fill out applicable sections of the Accessibility Inspection Report and attach to Contractor Quality Control Daily Report.
2. Utilize attached Accessibility Inspection form to document compliance with Architectural Barriers Act Accessibility Standards (ABAAS).
3. Inspect at various stages of construction as needed to ensure finished product meets standards.
4. Submit report no later than one calendar day after inspection was performed.

F. Off-Site Inspection Reports: Submit prior to shipment.

G. If Contractor Quality Control plan and Quality Control Daily Reports are not submitted as specified, Contracting Officer may retain payments until such time plan(s) is/are accepted and implemented, or may retain payments for work completed on days with no Quality Control Daily Reports.

H. Permits, Licenses, and Certificates: For National Park Service (NPS) records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices,

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receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of work.

1.5 QUALITY ASSURANCE

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

B. Contractors Quality Control Staff:

1. Contractor's Quality Control Supervisor may also perform other duties.
2. Contractor's Quality Control Supervisor shall be assigned no other duties.
3. Contractor's designated Quality Control Supervisor shall be on the project site whenever contract work is in progress.
4. Contractor's job supervisory staff may be used to assist Quality Control Supervisor supplemented, as necessary, by additional certified testing technicians.

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

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

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

F. Professional Engineer Qualifications: Professional engineer legally qualified to practice in jurisdiction where Project is located and is experienced in providing engineering services of kind indicated (including Structural Tests and Special Inspections (STSI)). Engineering services are defined as those performed for installations of system, assembly, or products similar to those indicated for Project in material, design, and extent.

G. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for activities indicated.

1. Requirement for specialists shall not supersede building codes and regulations governing Work.

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H. Testing Agency Qualifications: A Nationally Recognized Testing Laboratory (NRTL), a National Voluntary Laboratory Accreditation Program (NVLAP), or an independent agency with experience and capability to conduct testing and inspecting indicated, according to ASTM E 329; and with additional qualifications specified in individual Sections; and where required by Contract, is acceptable to Contracting Officer.

1. Nationally Recognized Testing Laboratory (NRTL): Nationally recognized testing laboratory according to 29 CFR 1910.7 (Code of Federal Regulations).
2. National Voluntary Laboratory Accreditation Program (NVLAP): Testing agency accredited according to National Institute of Standards and Technology's (NIST) National Voluntary Laboratory Accreditation Program.
3. Measuring devices, laboratory equipment, and instruments shall be calibrated at established intervals against certified standards in accordance with NIST requirements. Measuring and testing devices shall be made available for use by Government for verification tests.

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

J. Mockups: Before installing portions of work requiring mockups, build mockups for each form of construction and finish required to comply with following requirements, using materials indicated for completed work:

1. Build mockups in location and of size indicated; if not indicated, as directed by Contracting Officer.
2. Notify Contracting Officer seven days in advance of dates and times when mockups will be constructed.
3. Demonstrate proposed range of aesthetic effects and workmanship.
4. Obtain Contracting Officer's approval of mockups before starting work, fabrication, or construction.
5. Maintain mockups in an undisturbed condition as a standard for judging the completed work.
6. Demolish and remove mockups when directed, unless otherwise indicated.

K. Laboratory Mockups: Comply with requirements of preconstruction testing and those specified in individual Sections in Divisions 2 through 49.

L. Integrated Exterior Mockups: Construct integrated exterior mockup according to approved Shop Drawings. Coordinate installation of exterior envelope materials and products for which mockups are required in individual Specification Sections, along with supporting materials.

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1.6 QUALITY CONTROL

A. Contractor is responsible for testing and inspections, including Structural Tests and Special Inspections (STSI), as identified in attached STSI. Inspect and test work as needed to ensure quality of materials, workmanship, construction, finish, and functional performance are in compliance with applicable specifications, drawings, and those required by the Building Code.

1. Engage qualified testing agency to perform quality-control services.
2. Submit appropriate report for each quality-control service.
3. Testing and inspecting requested by Contractor and not required by Contract Documents are Contractor's responsibility.
4. Contracting Officer may designate test locations.

B. Manufacturer's Field Services: Where indicated, engage factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing.

C. Re-testing/Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and re-inspecting, for construction of replaced work that failed to comply with Contract Documents.

D. Testing Agency Responsibilities: Cooperate with NPS and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Contracting Officer and Contractor promptly of irregularities or deficiencies observed in work during performance of services.
2. Determine location from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections, State in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit 3 copies of certified written report of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase Contract Document requirements or approve or accept any portion of Work.

E. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide:

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1. Access to Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for material mixes that require control by testing agency.
7. Security and protection for samples and testing and inspecting equipment at Project site.

F. Coordination: Coordinate sequence of activities to accommodate required quality assurance and control services with minimum delay and to avoid removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

PART 2 - PRODUCTS

2.1 QUALITY CONTROL PLAN

A. Quality Control Plan shall include:

1. List of personnel responsible for quality control and assigned duties. Include each person's qualifications. Include alternate(s) and qualifications.
2. Copy of letter of direction to Contractor's Quality Control Supervisor(s) outlining assigned duties and authorities designated by principal or Government.
3. Names, qualifications / accreditations, and descriptions of laboratories to perform sampling and testing, and samples of proposed report forms from laboratories.
4. Methods of performing, documenting, and enforcing quality control of work including Contractor report forms and acknowledgment of NPS forms.
5. Methods of monitoring and controlling environmental pollution and contamination as required by regulations and laws.
6. Specific discussion regarding mockups, off-site visits, receiving inspections, manufacturers representation, startup requirements, and other aspects of performance specific to Project.
7. Provisions for substantial completion(s) and final inspection(s) per Contract.

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PART 3 - EXECUTION

3.1 OFF-SITE CONTROL

A. Items fabricated or assembled off-site shall be inspected for quality control at place of fabrication.

3.2 ON-SITE CONTROL

A. Notification:

1. Notify Contracting Officer at least 48 hours in advance of preparatory phase meeting.
2. Notify Contracting Officer at least 24 hours in advance of initial and follow-up phases.

B. Preparatory Phase: Perform before beginning each feature of work.

1. Review control submittal requirements with personnel directly responsible for quality assurance and quantity control of the work. As a minimum, Contractor's Quality Control Supervisor and foreman responsible for feature of work shall be in attendance.
2. Review applicable specifications sections and drawings related to feature of work.
3. Ensure copies of referenced standards related to sampling, testing, and execution for feature of work are available on site.
4. Ensure provisions have been made for field control testing.
5. Examine work area to ensure preliminary work has been completed.
6. Verify field dimensions and advise Contracting Officer of discrepancies with contract documents.
7. Ensure necessary equipment and materials are at project site and they comply with approved shop drawings and submittals.
8. Document preparatory phase activities and discussions on Contractor's Quality Control Daily Report.

C. Initial Phase:

1. As soon as work begins, inspect and test representative portion of particular feature of work for quality of workmanship.
2. Review control testing procedures to ensure compliance with contract requirements.
3. Document initial phase activities and discussions on Contractor's Quality Control Daily Report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.

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D. Follow-Up Phase: Inspect and test as work progresses to ensure compliance with contract requirements until completion of work.

E. Additional Preparatory and Initial Phases: Additional preparatory and initial phases may be required on same feature of work for following reasons:

1. Quality of on-going work is unacceptable.
2. Changes in quality control staff, on-site production supervision, or work crew.
3. Work on particular feature of work is resumed after substantial period of inactivity.

3.3 DOCUMENTATION

A. Maintain Quality Control Daily Reports, Daily Test Report Information Sheets, and Accessibility Inspection Reports of quality control activities and tests. (Download from DSC Workflows website > Forms/Templates/Samples/Guidelines page > Construction Forms section.)

B. Quality Control Daily Reports shall not be substituted for other written reports required under clauses of contract, such as Disputes, Differing Site Conditions, or Changes.

C. Quality Control Daily Reports shall accurately portray all work and materials. The materials shall match the materials as approved from the Construction Documents (CD) requirements. Combustible/flammable materials shall be documented as well.

3.4 ENFORCEMENT

A. Contractor shall stop work on any item or feature pending satisfactory correction of deficiency noted by quality control staff or Contracting Officer.

3.5 REPAIR AND PROTECTION

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

1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams as invisible as possible.
2. Comply with Contract Document requirements for Section 01 73 29 "Cutting and Patching."

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

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

END OF SECTION

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SECTION 01 42 00 – REFERENCE STANDARDS

PART 1 - GENERAL

1.1 ENVIRONMENTAL DEFINITIONS

A. Definitions pertaining to sustainable development: As defined in ASTM E2114 and as specified herein.

B. Biobased Materials: As defined in the Farm Security and Rural Investment Act, for purposes of Federal procurement of biobased products, "biobased" means a "commercial or industrial product (other than food or feed) that is composed, in whole or in significant part, of biological products or renewable domestic agricultural materials (including plant, animal, and marine materials) or forestry materials." Biobased materials also include fuels, chemicals, building materials, or electric power or heat produced from biomass as defined by The Biomass Research and Development Act of 2000.

1. Biobased content: Amount of biobased carbon in the material or product as a percentage of weight (mass) of total organic carbon in the material or product.

C. Chain-of-Custody: Process whereby a product or material is maintained under physical possession or control during its entire life cycle.

D. Deconstruction: Disassembly of buildings for purpose of recovering materials.

E. DFE (Design for the Environment): A technique that includes elements of resource conservation and pollution prevention as applied in various product sectors. A technique that incorporates approaches which are part of product (or assembly) concept, need and design. Considerations involve material selection, material and energy efficiency, reuse, maintainability and design for disassembly and recyclability. Refer to International Organization for Standardization (ISO) Guide 64 for additional clarification.

F. Environmentally preferable products: Products and services that have a lesser or reduced effect on the environment in comparison to conventional products and services. Refer to EPA's Final Guidance on Environmentally Preferable Purchasing Program.

G. Non-Renewable Resource: A resource that exists in a fixed amount that cannot be replenished on a human time scale. Non-renewable resources have potential for renewal only by geological,

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physical, and chemical processes taking place over of millions of years. Examples include iron ore, coal, and oil.

H. Perpetual Resource: A resource that is virtually inexhaustible on a human time scale. Examples include solar energy, tidal energy, and wind energy.

I. Recycled Content Materials: Products that contain pre-consumer or post-consumer materials as all or part of their feedstock. Recycled content claim shall be consistent Federal Trade Commission (FTC) Guide for Use of Environmental Marketing Claims.

J. Renewable Resource: A resource that is grown, naturally replenished, or cleansed, at a rate which exceeds depletion of the usable supply of that resource. A renewable resource can be exhausted if improperly managed. However, a renewable resource can last indefinitely with proper stewardship. Examples include trees in forests, grasses in grasslands, and fertile soil.

1.2 QUALITY ASSURANCE

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

B. Publication Dates: Comply with standards in effect as of date of Contract Documents, unless otherwise indicated.

C. Conflicting Requirements: Where compliance with two or more standards is specified, and standards may establish different or conflicting requirements for minimum quantities or quality levels, comply with most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Contracting Officer (CO) for decision before proceeding.

1.3 INDUSTRY STANDARDS

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

B. Publication Dates: Comply with standards in effect as of date of Contract Documents unless otherwise indicated.

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C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities found in Section 01 42 00 Sources for Reference Publications, Unified Facilities Guide Specifications (UFGS) (accessible via Masters website > Downloads section > click on UFGS Master (WBDG Website). Names, telephone numbers, and websites are subject to change and are believed to be accurate and up-to-date as of date of Contract Documents.

XX	EXAMPLE Association (The) www.EXAMPLE.org	

B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in following list. Names, telephone numbers, and websites are subject to change and are believed to be accurate and up-to-date as of date of Contract Documents.

DIN	Deutsches Institut fur Normung e.V. www.din.de	49 30 2601-3003
IAPMO	International Association of Plumbing and Mechanical Officials www.iapmo.org	(909) 472-4100
ICC	International Code Council www.iccsafe.org	(888) 422-7233
ICC-ES	ICC Evaluation Service, Inc. icc-es.org	(800) 423-6587 (562) 699-0543

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C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in following list. Names, and websites are subject to change and are believed to be accurate and up-to-date as of date of Contract Documents.

ABA & ABAAS United States Access Board	Architectural Barriers Act (ABA) Architectural Barriers Act Accessibility Standards (ABAAS) www.access-board.gov
CoE	Army Corps of Engineers www.usace.army.mil
CPSC	Consumer Product Safety Commission www.cpsc.gov
DOC	Department of Commerce www.commerce.gov
DOD	Department of Defense www.defense.gov
DOJ	Department of Justice www.justice.gov
DOE	Department of Energy www.energy.gov
EPA	Environmental Protection Agency www.epa.gov
FAA	Federal Aviation Administration www.faa.gov
FCC	Federal Communications Commission www.fcc.gov
FDA	Food and Drug Administration www.fda.gov

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GSA	General Services Administration www.gsa.gov
HUD	Department of Housing and Urban Development www.hud.gov
LBL	Lawrence Berkeley National Laboratory www.lbl.gov
NCHRP	National Cooperative Highway Research Program (See TRB (Transportation Resource Board))
NIST	National Institute of Standards and Technology www.nist.gov
OSHA	Occupational Safety & Health Administration www.osha.gov
PHS	U.S. Department of Health and Human Services www.hhs.gov
RUS	Rural Utilities Service (See USDA (Department of Agriculture))
SD	State Department www.state.gov
TRB	Transportation Research Board www.nationalacademies.org/trb/transportation-research-board
USDA	Department of Agriculture www.usda.gov
USP	U.S. Pharmacopeia www.usp.org
USPS	Postal Service www.usps.com

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D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in following list. Names, telephone numbers, and websites are subject to change and are believed to be accurate and up-to-date as of date of Contract Documents.

ABAAS	Architectural Barriers Act Accessibility Standards www.access-board.gov
CFR	Code of Federal Regulations Available from Government Printing Office www.govinfo.gov/app/collection/cfr
DOD	Department of Defense Military Specifications and Standards Available from Department of Defense Single Stock Point www.dsp.dla.mil/Specs-Standards/
DSCC	Defense Supply Center Columbus (See FS (Federal Specification))
FED-STD	Federal Standard (See FS (Federal Specification))
FS	Federal Specification Available from Department of Defense Single Stock Point www.dsp.dla.mil/Specs-Standards/ Available from General Services Administration www.gsa.gov Available from National Institute of Building Sciences www.nibs.org
FTMS	Federal Test Method Standard (See FS (Federal Specification))
MIL	(See MILSPEC (Military Specification and Standards))
MIL-STD	(See MILSPEC (Military Specification and Standards))
MILSPEC	Military Specification and Standards

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Available from Department of Defense Single Stock Point
www.dsp.dla.mil/Specs-Standards/

UFAS Uniform Federal Accessibility Standards
Available from Access Board
www.access-board.gov/guidelines-and-standards/buildings-and-sites/about-the-aba-standards/ufas
*(UFAS is **only** for housing projects per Fair Housing Act. See also the Fair Housing Act Design Manual, www.huduser.gov/portal/publications/destech/fairhousing)*

1.5 ENVIRONMENTAL REFERENCE STANDARDS

A. American Forest and Paper Association:

1. Sustainable Forestry Initiative

B. American Society of Heating Refrigerating and Air Conditioning Engineers (ASHRAE):
- ASHRAE 52.2, *Method of Testing General Ventilation Air Cleaning Devices for Removal Efficiency by Particle Size*
- ASHRAE 55, *Thermal Environmental Conditions for Human Occupancy*
- ASHRAE 62.1, *Ventilation for Acceptable Indoor Air Quality*
- ASHRAE 62.2, *Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings*
- ASHRAE/IESNA 90.1, *Energy Standard for Buildings, Except Low-Rise Residential Buildings*
- ASHRAE 90.2, *Energy Efficient Design of Low-Rise Residential Buildings*

C. American Association of State Highway and Transportation Officials (AASHTO):
- M288 Geotextile Specification for Highway Applications
- MP009-06 Standard Specification for Compost for Erosion/Sediment Control (Filter Berms and Filter Socks)
- MP010-03 Standard Specification for Compost for Erosion/Sediment Control (Compost Blankets)

D. American Society for Testing and Materials International (ASTM):
- A478 Standard Specification for Chromium-Nickel Stainless Steel Weaving and Knitting Wire
- A580/A580M Standard Specification for Stainless Steel Wire
- A653/A653M Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

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- B813 Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube
- C1240 Standard Specification for Silica Fume Used in Cementitious Mixtures
- C128 Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate
- C131 Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
- C1319 Standard Specification for Concrete Grid Paving Units
- C1338 Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings
- C136 Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
- C1371 Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers
- C1386 Standard Specification for Precast Autoclaved AERATED Concrete (PAAC) Wall Construction Units
- C1483 Standard Specification for Exterior Solar Radiation Control Coatings on Buildings
- C1549 Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer
- C1601 Standard Test Method for Field Determination of Water Penetration of Masonry Wall Surfaces
- C289 Standard Test Method for Potential Alkali-Silica Reactivity of Aggregates (Chemical Method)
- C311 Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use as a Mineral Admixture in Portland-Cement Concrete
- C33 Standard Specification for Concrete Aggregates
- C593 Standard Specification for Fly Ash and Other Pozzolans for Use With Lime
- C595 Standard Specification for Blended Hydraulic Cements
- C618 Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete
- C67 Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile
- C739 Standard Specification for Cellulosic Fiber (Wood-Base) Loose-Fill Thermal Insulation
- C936 Standard Specification for Interlocking Concrete Paver Units
- C989 Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars
- D1435 Standard Practice for Outdoor Weathering of Plastics
- D1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 foot pound force per cubic foot (ft-lbf/ft3) (2,700 kilonewton meter per cubic meter (kN-m/m3))

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- D1972 Standard Practice for Generic Marking of Plastic Products
- D198 Standard Test Methods of Static Tests of Lumber in Structural Sizes
- D2103 Standard Specification for Polyethylene Film and Sheeting
- D217 Standard Test Methods for Cone Penetration of Lubricating Grease
- D2369 Standard Test Method for Volatile Content of Coatings
- D3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
- D3786 Standard Test Method for Hydraulic Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method
- D3792 Standard Test Method for Water Content of Coatings by Direct Injection Into a Gas Chromatograph
- D3864 Standard Guide for Continual On-Line Monitoring Systems for Water Analysis
- D3960 Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings
- D4017 Standard Test Method for Water in Paints and Paint Materials by Karl Fischer Method
- D4263 Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method
- D4444 Standard Test Methods for Use and Calibration of Hand-Held Moisture Meters
- D4491 Standard Test Methods for Water Permeability of Geotextiles by Permittivity
- D4552 Standard Practice for Classifying Hot-Mix Recycling Agents
- D4632 Standard Test Method for Grab Breaking Load and Elongation of Geotextiles
- D4716 Test Method for Determining the (In-plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head
- D4833 Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Product
- D4840 Standard Guide for Sampling Chain-of-Custody Procedures
- D4887 Standard Test Method for Preparation of Viscosity Blends for Hot Recycled Bituminous Materials
- D5106 Standard Specification for Steel Slag Aggregates for Bituminous Paving Mixtures
- D5116 Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products
- D5199 Standard Test Method for Measuring the Nominal Thickness of Geosynthetics
- D5261 Standard Test Method for Measuring Mass per Unit Area of Geotextiles
- D5268 Standard Specification for Topsoil Used for Landscaping Purposes
- D5359 Standard Specification for Glass Cullet Recovered from Waste for Use in Manufacture of Glass Fiber
- D5505 Standard Practice for Classifying Emulsified Recycling Agents
- D5509 Standard Practice for Exposing Plastics to a Simulated Compost Environment

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- D5512 Standard Practice for Exposing Plastics to a Simulated Compost Environment Using an Externally Heated Reactor
- D5539 Standard Specification for Seed Starter Mix
- D5957 Standard Guide for Flood Testing Horizontal Waterproofing Installations
- D5603 Standard Classification for Rubber Compounding Materials—Recycled Vulcanizate Particulate Rubber
- D5663 Standard Guide for Validating Recycled Content in Packaging Paper and Paperboard
- D5759 Standard Guide for Characterization of Coal Fly Ash and Clean Coal Combustion Fly Ash for Potential Uses
- D5792 Standard Practice for Generation of Environmental Data Related to Waste Management Activities: Development of Data Quality Objectives
- D5834 Standard Guide for Source Reduction Reuse, Recycling, and Disposal of Solid and Corrugated Fiberboard (Cardboard)
- D5851 Standard Guide for Planning and Implementing a Water Monitoring Program
- D5852 Standard Test Method for Erodibility Determination of Soil in the Field or in the Laboratory by the Jet Index Method
- D6002 Standard Guide for Assessing the Compostability of Environmentally Degradable Plastics
- D6006 Standard Guide for Assessing Biodegradability of Hydraulic Fluid
- D6007 Standard Test Method for Determining Formaldehyde Concentration in Air from Wood Products Using a Small Scale Chamber
- D6046 Standard Classification of Hydraulic Fluids for Environmental Impact
- D6081 Standard Practice for Aquatic Toxicity Testing of Lubricants: Sample Preparation and Results Interpretation
- D6108 Standard Test Method for Compressive Properties of Plastic Lumber and Shapes
- D6109 Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastic Lumber
- D6112 Standard Test Methods for Compressive and Flexural creep and Creep-Rupture of Plastic Lumber and Shapes
- D6117 Standard Test Methods for Mechanical Fasteners In Plastic Lumber and Shapes
- D6155 Standard Specification for Nontraditional Coarse Aggregates for Bituminous Paving Mixtures
- D6245 Standard Guide for Using Indoor Carbon Dioxide Concentrations to Evaluate Indoor Air Quality and Ventilation
- D6261 Standard Specification for Extruded and Compression Molded Basic Shapes Made from Thermoplastic Polyester (TPES)
- D6262 Standard Specification for Extruded, Compression Molded, and Injection Molded Basic Shapes of Poly(aryl ether ketone) (PAEK)

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- D6270 Standard Practice for Use of Scrap Tires in Civil Engineering Applications
- D6329 Standard Guide for Developing Methodology for Evaluating the Ability of Indoor Materials to Support Microbial Growth Using Static Environmental Chambers
- D6330 Standard Practice for Determination of Volatile Organic Compounds (Excluding Formaldehyde) Emissions from Wood-Based Panels Using Small Environmental Chambers Under Defined Test Conditions
- D6345 Standard Guide for Selection of Methods for Active, Integrative Sampling of Volatile Organic Compounds in Air
- D6400 Standard Specification for Compostable Plastics
- D6435 Standard Test Method for Shear Properties of Plastic Lumber and Plastic Lumber Shapes
- D6629 Standard Guide for Selection of Methods for Estimating Soil Loss by Erosion
- D6662 Standard Specification for Polyolefin-Based Plastic Lumber Decking Boards
- D6712 Standard Specification for Ultra-High-Molecular-Weight Polyethylene (UHMW-PE) Solid Plastic Shapes
- D6886 Standard Test Method for Speciation of the Volatile Organic Compounds (VOCs) in Low VOC Content Waterborne Air-Dry Coatings by Gas Chromatography
- D692 Standard Specification for Coarse Aggregate for Bituminous Paving Mixtures
- D696 Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30°C and 30°C With a Vitreous Silica Dilatometer
- D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3))
- D7186 Standard Practice for Quality Assurance Observation of Roof Construction and Repair
- E1021 Standard Test Methods for Measuring Spectral Response of Photovoltaic Cells
- E1038 Standard Test Method for Determining Resistance of Photovoltaic Modules to Hail by Impact with Propelled Ice Balls
- E1039 Standard Test Method for Calibration of Silicon Non-Concentrator Photovoltaic Primary Reference Cells Under Global Irradiation
- E1040 Standard Specification for Physical Characteristics of Nonconcentrator Terrestrial Photovoltaic Reference Cells
- E1105 Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform or Cyclic Static Air Pressure Difference
- E1171 Standard Test Method for Photovoltaic Modules in Cyclic Temperature and Humidity Environments
- E1333 Standard Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates from Wood Products Under Defined Test Conditions Using a Large Chamber

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- E1362 Standard Test Method for Calibration of Non-Concentrator Photovoltaic Secondary Reference Cells
- E1433 Standard Guide for Selection of Standards on Environmental Acoustics
- E1462 Standard Test Methods for Insulation Integrity and Ground Path Continuity of Photovoltaic Modules
- E1596 Standard Test Methods for Solar Radiation Weathering of Photovoltaic Modules
- E1597 Standard Test Method for Saltwater Pressure Immersion and Temperature Testing of Photovoltaic Modules for Marine Environments
- E1609 Standard Guide for Development and Implementation of a Pollution Prevention Program
- E1686 Standard Guide for Selection of Environmental Noise Measurements and Criteria
- E1690 Standard Test Method for Determination of Ethanol Extractives in Biomass
- E1721 Standard Test Method for Determination of Acid-Insoluble Residue in Biomass
- E1755 Standard Test Method for Ash in Biomass
- E1758 Standard Test Method for Determination of Carbohydrates in Biomass by High Performance Liquid Chromatography
- E1780 Standard Guide for Measuring Outdoor Sound Received from a Nearby Fixed Source
- E1799 Standard Practice for Visual Inspections of Photovoltaic Modules
- E1802 Standard Test Methods for Wet Insulation Integrity Testing of Photovoltaic Modules
- E1821 Standard Test Method for Determination of Carbohydrates in Biomass by Gas Chromatography
- E1827 Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door
- E1830 Standard Test Methods for Determining Mechanical Integrity of Photovoltaic Modules
- E1861 Standard Guide for Use of Coal Combustion By-Products in Structural Fills
- E1918 Standard Test Method for Measuring Solar Reflectance of Horizontal and Low-Sloped Surfaces in the Field
- E1971 Standard Guide for Stewardship for the Cleaning of Commercial and Institutional Buildings
- E1980 Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces
- E1991 Standard Guide for Environmental Life Cycle Assessment of Building Materials/Products
- E2047 Standard Test Method for Wet Insulation Integrity Testing of Photovoltaic Arrays
- E2114 Standard Terminology for Sustainability Relative to the Performance of Buildings
- E2128 Standard Guide for Evaluating Water Leakage of Building Walls

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- E2129 Standard Practice for Data Collection for Sustainability Assessment of Building Products
- E2397 Standard Practice for Determination of Dead Loads and Live Loads associated with Green Roof Systems
- E2398 Standard Test Method for Water Capture and Media Retention of Geocomposite Drain Layers for Green Roof Systems
- E2399 Standard Test Method for Maximum Media Density for Dead Load Analysis of Green Roof Systems
- E2400 Standard Guide for Selection, Installation, and Maintenance of Plants for Green Roof Systems
- E241 Standard Guide for Limiting Water-Induced Damage to Buildings
- E2432 Standard Guide for General Principles of Sustainability Relative to Buildings
- E408 Standard Test Methods for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques
- E413 Standard Classification for Rating Sound Insulation
- E477 Standard Test Method for Measuring Acoustical and Airflow Performance of Duct Liner Materials and Prefabricated Silencers
- E648 Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
- E683 Standard Practice for Installation and Service of Solar Space Heating Systems for One- and Two-Family Dwellings
- E779 Standard Test Method for Determining Air Leakage Rate by Fan Pressurization
- E781 Standard Practice for Evaluating Absorptive Solar Receiver Materials When Exposed to Conditions Simulating Stagnation in Solar Collectors With Cover Plates
- E782 Standard Practice for Exposure of Cover Materials for Solar Collectors to Natural Weathering Under Conditions Simulating Operational Mode
- E823 Standard Practice for Nonoperational Exposure and Inspection of a Solar Collector
- E881 Standard Practice for Exposure of Solar Collector Cover Materials to Natural Weathering Under Conditions Simulating Stagnation Mode
- E90 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
- E903 Standard Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres
- E948 Standard Test Method for Electrical Performance of Photovoltaic Cells Using Reference Cells Under Simulated Sunlight
- F1869 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
- F2034 Standard Specification for Sheet Linoleum Floor Covering

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- F2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes

E. Bat Conservation International:
- Bat Approved Bat Houses

F. Carpet and Rug Institute
- Green Label & Green Label Plus Testing Programs, carpet-rug.org/testing/green-label-plus

G. Center for Resource Solutions
- Green-e program

H. Environmental Protection Agency (EPA):
- Comprehensive Procurement Guidelines
- ENERGY STAR
- Environmentally Preferable Purchasing Program Final Guidance
- GreenScapes program
- Heat Island Initiative
- Indoor Air Quality Building Education and Assessment Model (I-BEAM)
- National Environmental Performance Track
- Pollution Prevention (P2)
- Product Stewardship Program
- Significant New Alternatives Policy (SNAP) Program

I. Federal Trade Commission:
- Guide for the Use of Environmental Marketing Claims

J. Forest Stewardship Council:
- Chain-Of-Custody
- Forest Management

K. Green Building Initiative (GBI):
- Green Globes - US

L. Green Seal:
- GC-03 Anti-Corrosive Paints
- GC-12 Occupancy Sensors
- GC-13 Split-Ductless Air-Source Heat Pumps
- GS-05 Compact Fluorescent **Lamps**

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- GS-11 Paints
- GS-13 Windows
- GS-14 Window Films
- GS-31 Electric Chillers
- GS-32 Photovoltaic Modules
- GS-36 Commercial Adhesives
- GS-37 Industrial & Institutional Cleaners

M. International Iron and Steel Institute:
- CO2 Breakthrough Program

N. International Organization of Standardization:
- Guide 64; Guide for Inclusion of Environmental Aspects in Product Standards
- 9660 Information processing -- Volume and file structure of CD-ROM for information interchange
- 14001 Environmental management systems – Specification with guidance for use
- 14004 Environmental Management Systems – General Guidelines on Principles, Systems and Supporting Techniques
- 14020 Environmental labels and declarations – General principles
- 14024 Environmental labels and declarations – Type I environmental labelling - Principles and procedures
- 14040 Environmental management – Life cycle assessment – Principles and framework

O. National Association of Home Builders:
- Advanced Framing Techniques: Optimum Value Engineering

P. National Institute of Building Sciences:
- MOIST program for transfer of heat and moisture
- Whole Building Design Guide

Q. National Institute of Standards and Technology:
- BEES (Building for Environmental and Economic Sustainability) Lifecycle Decision Support Tool

R. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA):
- IAQ Guidelines for Occupied Buildings Under Construction

S. Southcoast Air Quality Management District:
- 1168 Adhesive And Sealant Applications

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T. US Composting Council:
- Seal of Testing Assurance Program

U. US Department of Agriculture:
- Biobased Products – Definitions and Descriptions

V. US Green Building Council:
- LEED™ 2009 Green Building Rating System
- LEED™ v4 (version 4) Green Building Rating System

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

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SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 USE CHARGES

A. General: Cost or use charges for temporary facilities shall be included in Contract Sum as required.

B. Water Service: Potable Water from existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations without any additional permit costs.

C. Electric Power Service: Provide connections and extensions of services as required for construction operations without any additional permit costs.

1.3 QUALITY ASSURANCE

A. Electric Service: Comply with National Electrical Contractors Association (NECA), National Electrical Manufacturers Association (NEMA), and Underwriter Laboratories (UL) standards and regulations for temporary electric service. Install service to comply with National Fire Protection Association (NFPA) 70.

B. Environmental Protection: Provide environmental protection as required by agency(ies) with jurisdiction and as indicated in Contract Documents. Coordinate with requirements of the following:

1. Regulatory Requirements
2. Noise Management
3. Environmental Management
4. Construction Waste Management

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PART 2 - PRODUCTS

2.1 MATERIALS

A. Temporary materials may be new or used, but must be adequate in capacity for required usage, must not create unsafe conditions, and must not violate requirements of applicable codes and standards.

2.2 TEMPORARY FACILITIES

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

B. ~~Contracting Officers Field Office:~~ NOT USED

C. Toilets: Sufficiently lighted and ventilated toilet facilities in weatherproof, sight proof, handicap accessible, sturdy enclosures with privacy locks.

1. Provide separate toilet facilities for men and women.

2.3 EQUIPMENT

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

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B. Direct Digital Control (DDC) Internet Connection: Furnish, install and maintain a high-speed connection (Digital Subscriber Line (DSL) or similar) between the project's DDC system and the internet through a Contractor furnished internet service provider. Contractor is responsible for maintenance of this connection and costs associated with internet service provider through warranty period of this contract. Upon completion of warranty period, service shall be transferable to the Government at which time future costs for connection will no longer be the responsibility of Contractor.

~~C.~~ ~~Contracting Officers Field Office~~ NOT USED

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

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

1. Locate facilities to limit site disturbance and as directed by the Contracting Officer.

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

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, NPS, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services. Acquire necessary permits.

B. Storm Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.

1. Connect temporary sewers as directed by the agency(ies) with jurisdiction.

C. Potable water is available on site. Make connections to existing facilities as needed. Facilities must be cleaned and maintained in a condition acceptable to NPS. At Substantial Completion, restore these facilities to condition existing before initial use.

D. Sanitary Facilities: Provide temporary toilets, and wash facilities for use by construction personnel.

1. Place in approved locations secluded from public observation and convenient to work stations. Relocate as work progress requires.
2. Maintain and clean toilet facilities at least weekly.
3. Completely remove sanitary facilities on completion of work.
4. Toilets: Use of existing toilet facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to NPS. At Substantial Completion, restore facilities to condition existing before initial use.

E. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.

F. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

G. Telephone Service: No telephone service is available on site for Contractor's use. Make arrangements with Telephone Company and pay costs.

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3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide incombustible construction for offices, shops, and sheds located within construction area or within 50 feet of building lines. Comply with NFPA 241.
2. Maintain support facilities until near Substantial Completion. Remove structures, equipment, and furnishings, and terminate services after punch list is 100 percent completed or when directed by Contracting Officer. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Contracting Officer.

B. ~~Contracting Officer's Field Office:~~ NOT USED

C. Traffic Controls: Erect and maintain barricades, lights, danger signals, and warning signs in accordance with Manual on Uniform Traffic Control Devices (MUTCD), Part IV, latest edition.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.
3. Illuminate barricades and obstructions at night; keep safety lights burning from sunset to sunrise.
4. Adequately barricade and post open cuts in or adjacent to thoroughfares.
5. Protect pedestrian traffic by guardrails or fences.
6. When pedestrian traffic is detoured onto a roadway, provide temporary walkways with protection as required at ends and overhead. For walkways, use lumber running parallel to direction of traffic movement and provide ramps at changes of elevation.
7. Cover pipes, hoses, and power lines crossing sidewalks and walkways with troughs using beveled edge boards.
8. Install Barrier Tape where directed by Contracting Officer. Keep a minimum of two rolls on site.

D. Parking: Parking for construction personnel is limited. Comply with requirements of Contracting Officer.

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E. Dewatering Facilities and Drains: Comply with requirements of the agency(ies) with jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in lawful manner that will not result in flooding Project or adjoining properties nor endanger permanent Work or temporary facilities.
2. Remove snow and ice as required to minimize accumulations.

F. Project Identification and Temporary Signs: Provide Project identification and other signs. Fence, barricade, or otherwise block off the immediate work area to prevent unauthorized entry.

1. Provide temporary, directional signs for construction personnel and visitors.
2. Maintain and touchup signs so they are legible at all times.
3. Erect and maintain sufficient detour signs at road closures and along detour routes.

G. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of agency(ies) with jurisdiction.

H. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.

1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

B. Cleaning of Equipment: Contractor shall ensure prior to moving on to Project Area, equipment, is free of soil, seeds, vegetative matter, or other debris that could contain or hold seeds. Ensure equipment has been pressure washed and is free of exotic species. Equipment shall be considered free of soil, seeds, and other debris when visual inspection does not disclose such material. Disassembly of equipment components or specialized inspection tools are not required.

C. Pest Control: Follow NPS requirements to minimize attraction and harboring of rodents, roaches, and other pests and perform extermination and control procedures at regular intervals so Project will be free of pests and residues at Substantial Completion. Perform control operations lawfully, using environmentally safe materials.

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D. Site Enclosure Fence: Before construction operations begin, furnish and install chain link fencing to prevent people and animals from easily entering site except by entrance gates.

1. Extent of Fence: As directed by Contracting Officer or required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
2. Locate vehicular gates to avoid interference with traffic on public thoroughfares.
3. Locate pedestrian entrance gates as required to provide controlled personnel entry.
4. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Provide Contracting Officer with one set of keys.

E. Barricades, Warning Signs, and Lights: Comply with requirements of Manual on Uniform Traffic Control Devices (MUTCD), part IV, 2003 edition for erecting structurally adequate barricades, including warning signs and lighting.

F. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.

1. Responsible Person: Capable and qualified person shall be placed in charge of fire protection. Responsibilities shall include locating and maintaining fire protective equipment and establishing and maintaining safe torch cutting and welding procedures.
2. Tobacco Use, Smoking, and Vaping: Smoking within buildings or temporary storage sheds is prohibited.
3. Supervise sources of fire ignition according to requirements of NPS. Check with Park; many require "burn permits" for cutting.
4. Develop and supervise overall fire-prevention and -protection program for personnel at Project Site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
5. Provide temporary standpipes and hoses for fire protection. Hang hoses with warning sign stating hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.
6. Hazard Control: Take necessary precautions to prevent fire during construction. Do not store flammable or combustible liquids in buildings. Provide adequate ventilation during use of volatile or noxious substances. Ensure cleanup procedures and storage requirements are followed at close of every work session.
7. Spark Arresters: Equip gasoline or diesel powered equipment used during periods of potential fire hazards or in potential forest and grass fire locations with spark arresters approved by United States Department of Agriculture (USDA) Forest Service.

    a. Written determinations of periods and areas of potential fire hazard will be issued by Contracting Officer.

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8. Vehicles and Equipment: Provide one extinguisher on each vehicle or piece of equipment.
9. Service and Refueling Areas: Locate areas a minimum of 50 feet from buildings. Shut down equipment before refueling.

3.5 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. Minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on 24-hour basis where required to achieve indicated results and avoid possibility of damage.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. NPS reserves right to take possession of Project identification signs.
2. At Substantial Completion, clean and renovate permanent facilities used during construction period.

END OF SECTION

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SECTION 016700 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 DEFINITIONS

A. Products: Items purchased for incorporating into Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, current as of date of Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility, except that products consisting of recycled-content materials are allowed, unless explicitly stated otherwise. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product demonstrated and approved through submittal process, or where indicated as a product substitution, to have indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Definitions pertaining to sustainable development: As defined in ASTM E2114.

C. Biobased Materials: As defined in Farm Security and Rural Investment Act, for purposes of Federal procurement of biobased products, "biobased" means a "commercial or industrial product (other than food or feed) composed, in whole or in significant part, of biological products or renewable domestic agricultural materials (including plant, animal, and marine materials) or forestry materials." Biobased materials also include fuels, chemicals, building materials, or electric power or heat produced from biomass as defined by The Biomass Research and Development Act of 2000.

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1. Biobased content: Amount of biobased carbon in material or product as a percentage of weight (mass) of total organic carbon in material or product.

D. Chain-of-Custody: Process whereby a product or material is maintained under physical possession or control during its entire life cycle.

E. Environmentally preferable products: Products and services with lesser or reduced effect on the environment in comparison to conventional products and services. Refer to Environmental Protection Agency's (EPA) Final Guidance on Environmentally Preferable Purchasing for more information.

F. Stewardship: Responsible use and management of resources in support of sustainability.

G. Sustainability: Maintenance of ecosystem components and functions for future generations.

1. Recycled Content Materials: Products containing pre-consumer or post-consumer materials as all or part of their feedstock. Recycled content claim shall be consistent with International Organization for Standardization (ISO) 140001 Standard for the Use of Environmental Marketing Claims.
2. Rapidly Renewable Material: Material made from plants typically harvested within a ten-year cycle.
3. Regional Materials: Materials manufactured and extracted, harvested, or recovered within a radius of 500 miles from Project location.

1.3 SUBMITTALS

A. Record Submittals as specified in – Sustainable Design Close-Out Documentation, submit:

1. Affirmative Procurement Reporting Form. Submit on form in Appendix A of this Section, or similar form as approved by Contracting Officer (CO).
2. Submit environmental data in accordance with Table 1 of ASTM E2129 for these products:

a. Joint Sealers
b. Gypsum Board
c. Paints & Coatings
d. HVAC equipment
e. Lighting equipment

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.Material Safety Data Sheets (MSDS): For each product required by OSHA to have a MSDS, submit an MSDS. MSDS shall be prepared within the previous five years. Include information for MSDS Sections 1 to 16 in accordance with ANSI Z400.1 and as follows:

a. Section 1: Chemical Product and Company Identification
b. Section 2: Composition/Information on Ingredients
c. Section 3: Hazards Identification
d. Section 4: First Aid Measures
e. Section 5: Fire Fighting Measures
f. Section 6: Accidental Release Measures
g. Section 7: Handling and Storage
h. Section 8: Exposure Controls/Person Protection
i. Section 9: Physical and Chemical Properties
j. Section 10: Stability and Reactivity Data
k. Section 11: Toxicological Information. Include data used to determine the hazards cited in Section 3. Identify acute data, carcinogenicity, reproductive effects, and target organ effects.
l. Section 12: Ecological Information. Include data regarding environmental impacts during raw materials acquisition, manufacture, and use. Include data regarding environmental impacts in event of accidental release.
m. Section 13: Disposal Considerations. Include data regarding proper disposal of the chemical. Include information regarding recycling and reuse. Indicate whether or not product is considered to be "hazardous waste" according to United States EPA Hazardous Waste Regulations 40 CFR 261 (Code of Federal Regulations).
n. Section 14: Transportation Information. Identify hazard class for shipping.
o. Section 15: Regulatory Information. Identify federal, state, and local regulations applicable to the material.
p. Section 16: Other Information. Include additional information relative to recycled content, biobased content, and other information regarding environmental and health impacts. Identify the date MSDS was prepared.

4. Chain of Custody: Submit chain-of-custody documentation for sustainable forestry for these products:

a. Rough Carpentry
b. Finish Carpentry
c. Wood Doors
d. Windows
e. Wood Flooring
f. Furnishings & Accessories

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1.4 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in undamaged condition; in manufacturer's original sealed container or other packaging system; complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to ensure compliance with Contract Documents. Ensure products are undamaged and properly protected.
5. Obtain materials in biodegradable or recyclable/reusable packaging which uses minimum amount of packaging possible.

C. Storage:

1. Allow for inspection and measurement of quantity or counting of units.
2. Store materials in manner to not endanger Project structure.
3. Store products subject to damage by the elements, under cover in weather tight enclosure above ground, with ventilation adequate to prevent condensation.
4. Store cementitious products and materials on elevated platforms.
5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
7. Protect stored products from damage and liquids from freezing.
8. Store loose granular materials in well-drained area on solid surfaces to prevent mixing with foreign matter.

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1.6 PACKAGING

A. Where Contractor has option to provide one of listed products or equal, preference shall be given to products with minimal packaging and easily recyclable packaging as defined in ASTM D5834.

B. Maximize use of source reduction and recycling procedures outlined in ASTM D5834.

C. Provide minimum 45 percent post-consumer recycled content and minimum 100 percent recovered fiber content of industrial paperboard in accordance with EPA's Comprehensive Procurement Guidelines and ASTM D5663.

D. Provide minimum 10 percent post-consumer recycled content and minimum 10 percent recovered fiber content of carrier board in accordance with EPA's Comprehensive Procurement Guidelines and ASTM D5663.

E. Provide minimum 20 percent post-consumer recycled content and minimum 40 percent recovered fiber content of brown papers (e.g., wrapping papers and bags) in accordance with EPA's Comprehensive Procurement Guidelines and ASTM D5663.

1.7 ENVIRONMENTALLY PREFERABLE PRODUCTS

A. Provide environmentally preferable products to greatest extent possible.

1. To greatest extent possible, provide products and materials with a lesser or reduced effect on the environment considering raw materials acquisition, production, manufacturing, packaging, distribution, reuse, operation, maintenance, and/or disposal of the product.
2. Eliminate use of ozone depleting compounds during and after construction where alternative environmentally preferable products are available, consistent with either Montreal Protocol and Title VI or Clean Air Act Amendments of 1990, or equivalent overall air quality benefits that take into account life cycle impacts.
3. Use products meeting or exceeding EPA's recycled content recommendations for EPA-designated products. Use materials with recycled content such that the sum of post-consumer recycled content plus one-half of the pre-consumer content constitutes at least 10% (based on cost) of total value of the materials in project.

1.8 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by Contract Documents. Manufacturer's disclaimers and limitations on

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product warranties do not relieve Contractor of obligations under requirements of Contract Documents.

1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for product specifically endorsed by manufacturer to Government.
2. Special Warranty: Written warranty required by or incorporated into Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Government.

B. Special Warranties: Prepare written document containing appropriate terms and identification, ready for execution. Submit draft for approval before final execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with Specifications, prepare written document using appropriate form properly executed.
3. Refer to Divisions 2 through 49 Sections for specific content requirements and particular requirements for submitting special warranties.

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

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products to comply with Contract Documents, undamaged and, unless otherwise indicated, new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types produced and used successfully in similar situations on other projects.
3. Government reserves right to limit selection to products with warranties not in conflict with requirements of Contract Documents.
4. Where products are accompanied by term "as selected," Contracting Officer will make selection.
5. Where products are accompanied by term "match sample," sample to be matched is Governments.

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6. Descriptive, performance, and reference standard requirements in Specifications establish "salient characteristics" of products.

B. Product Selection Procedures:

1. Product: Where Specifications name single product and manufacturer, provide named product that complies with requirements or approved equal.
2. Manufacturer/Source: Where Specifications name single manufacturer or source, provide product by named manufacturer or source that complies with requirements or approved equal.
3. Products: Where Specifications include list of names of both products and manufacturers, provide one of the products listed that complies with requirements or approved equal.
4. Manufacturers: Where Specifications include list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements or approved equal.
5. Available Products: Where Specifications include list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
6. Available Manufacturers: Where Specifications include list of manufacturers, provide a product by one of the manufacturers listed, or an unnamed manufacturer, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
7. Product Options: Where Specifications indicate sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide specified product, system, or approved equal.
8. Basis-of-Design Product: Where Specifications name product and include a list of manufacturers, provide specified product or a comparable product by one of the other named manufacturers, or approved equal. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics based on the product named.
9. Visual Matching Specification: Where Specifications require matching an established Sample, select product that complies with requirements and matches Contracting Officer's sample. Contracting Officers decision will be final on whether a proposed product matches.

    a. If no product available within specified category matches and complies with other specified requirements, comply with provisions in Part 2 "Product Substitutions" Article for proposal of product.

10. Visual Selection Specification: Where Specifications include phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product that complies with other specified requirements.

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a. Standard Range: Where Specifications include phrase "standard range of colors, patterns, textures" or similar phrase, Contracting Officer will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.
b. Full Range: Where Specifications include phrase "full range of colors, patterns, textures" or similar phrase, Contracting Officer will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

A. Conditions: Contracting Officer will consider Contractor's request for comparable product when the following conditions are satisfied. If following conditions are not satisfied, Contracting Officer will return requests without action, except to record noncompliance with these requirements:

1. Evidence proposed product does not require revisions to Contract Documents, that it is consistent with Contract Documents and will produce indicated results and is compatible with other portions of Work.
2. Detailed comparison of significant qualities of proposed product with those named in Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
3. Evidence proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
5. Samples, if requested.

PART 3 - EXECUTION

3.1 PROTECTION AFTER INSTALLATION

A. Provide adequate coverings as necessary to protect installed materials from damage resulting from natural elements, traffic, and subsequent construction. Remove when no longer needed.

END OF SECTION 01 67 00

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AFFIRMATIVE PROCUREMENT REPORTING FORM
Recycled Content Materials & Biobased Content Materials

Project Name: _____ Project Number: _____

Contractor Name: _____ License Number: _____

Contractor Address: ___

Product	Total $ value provided	Total $ value with recycled content Pre-consumer	Total $ value with recycled content Post-consumer	Total $ value with biobased content	Exempted indicate 1,2,3,4	Comments
Hydraulic Mulch (paper based)						
Hydraulic Mulch (wood based)						
Compost						
Parking Stops (Concrete w/ fly ash, slag cement or low cement content)						
Parking Stops (Plastic/Rubber)						
Patio Blocks/Rubber						
Patio Blocks/Plastic						
Playground Surfaces						
Concrete with fly ash						
Concrete with slag cement						
Concrete with low cement content						
Plastic lumber						
Building Insulation						
Rock Wool						
Fiber glass						
Cellulose						
Perlite Comp Board						
Plastic Rigid Foam						
Glass Fiber Reinforced Foam						
Phenolic Rigid Foam						
Ceramic tile						
Resilient flooring						
Floor Tiles/Rubber						
Floor Tiles/Plastic						
Running Tracks						
Carpet (PET)						

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Paint						
Reprocessed Latex Paint White & Light Colors						
Reprocessed Latex Dark Colors						
Consolidated Latex Paint						
Toilet/Shower partitions (plastic or steel)						
Other						

CERTIFICATION

I hereby certify the information provided herein is accurate and that the requisition/procurement of all materials listed on this form comply with current EPA standards for recycled/recovered materials content.

The following exemptions may apply to the non-procurement of recycled/recovered content materials:

1. The product does not meet appropriate performance standards.
2. The product is not available within a reasonable time frame.
3. The product is not available competitively (from two or more sources).
4. The product is only available at an unreasonable price (compared with a comparable non-recycled content product.)

Signature: _____ Date: _____

END OF
AFFIRMATIVE PROCUREMENT REPORTING FORM
Recycled Content Materials & Biobased Content Materials

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SECTION 017310 - CUTTING AND PATCHING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

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

B. Related Sections include the following:

1. Other Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

1.03 DEFINITIONS

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

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

1.04 QUALITY ASSURANCE

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

B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operating elements include the following:

1. Primary operational systems and equipment.
2. Air or smoke barriers.

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3. Fire-suppression systems.
4. Mechanical systems piping and ducts.
5. Control systems.
6. Communication systems.
7. Conveying systems.
8. Electrical wiring systems.

C. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Miscellaneous elements include the following:

1. Water, moisture, or vapor barriers.
2. Membranes and flashings.
3. Equipment supports.
4. Piping, ductwork, vessels, and equipment.
5. Noise- and vibration-control elements and systems.

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

E. Power Actuated Fasteners: The use of power actuated fasteners, including pneumatic, gas fuel, powder or electro-mechanical (“flywheel”) actuated type fasteners, is specifically prohibited. Use only self-tapping screw-type fasteners or anchors placed in pre-drilled holes.

1.05 SUBMITTALS

A. General: Where patching requires use of new materials that visually match existing conditions, submit samples for review by Contracting Officer. Samples may be “in-place,” and may remain if samples are approved.

PART 2 - PRODUCTS

2.01 MATERIALS

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

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B. In-Place Materials: Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.01 EXAMINATION

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

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

3.02 PREPARATION

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

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

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

3.03 PERFORMANCE

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

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B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Division 31 Sections where required by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

    a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    b. Restore damaged pipe covering to its original condition.

3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

    a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface

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containing the patch. Provide additional coats until patch blends with adjacent surfaces.

4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and matches adjoining construction.

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

END OF SECTION

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SECTION 017340 - EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general procedural requirements governing execution of Work including:

1. Coordination with utility service providers
2. Construction layout
3. Field engineering and surveying
4. General installation of products
5. Progress cleaning
6. Starting and adjusting
7. Protection of installed construction
8. Correction of the Work

1.2 SUBMITTALS

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: Existence and location of site improvements and other construction indicated as existing are not guaranteed.

1. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
2. Before construction, verify the location and points of connection of utility services.

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B. Existing Utilities: Existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify existence and location of underground utilities and other construction affecting Work.

1. Before construction, verify location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
2. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
3. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
4. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 COORDINATION WITH UTILITY SERVICE PROVIDERS

A. Coordination with Utility Service Providers: Contact following Utility Service providers, sufficiently in advance to avoid delaying the work, to coordinate Contractor's portion of Work, testing requirements, inspections, etc.

1. Electrical: Service Contact: Contact service provider to coordinate Electrical service requirements.
2. Water Service Contact: Contact service provider to coordinate Water service requirements.
3. Wastewater Service Contact: Contact authority to coordinate Wastewater service requirements.
4. Telephone Service Contact: Contact service provider to coordinate Telephone service requirements.

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3.3 PREPARATION

A. Field Measurements: Take field measurements as required to fit Work properly. Recheck measurements before installing each product. Where portions of Work are indicated fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying Work.

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

C. Review of Contract Documents and Field Conditions: Immediately on discovery of need for clarification of the Contract Documents caused by differing field conditions outside control of Contractor, submit request for information to Contracting Officer in accordance with Section 013100 "Project Management and Coordination."

3.4 INSTALLATION

A. General: Locate Work and components of Work accurately in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.

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

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

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

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

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

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

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Contracting Officer.
2. Allow for building movement, thermal expansion, and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors to be embedded in concrete or masonry. Deliver to Project site in time for installation.

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

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

3.5 PROGRESS CLEANING

A. General: Clean Project site, work areas, and common areas daily. Coordinate progress cleaning for joint-use areas where more than one Installer has worked. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in National Fire Protection Association (NFPA) 241 for removal of combustible waste materials and debris at the end of every work session.
2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 degrees Fahrenheit (27 degrees Celsius).
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

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

C. Work Areas: Clean areas where work is in progress to level of cleanliness necessary for proper execution of Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of Work, broom-clean or vacuum entire work area, as appropriate.
3. Contractor shall provide progress cleaning that minimizes sources of food, water, and harborage available to pests.

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

1. Utilize non-toxic cleaning materials and methods.

a. Comply with Green Seal Standard (GS) 37 for general purpose cleaning and bathroom cleaning.
b. Use natural cleaning materials where feasible. Natural cleaning materials include:

1) Abrasive cleaners: substitute 1/2 lemon dipped in borax.
2) Ammonia: substitute vinegar, salt and water mixture, or baking soda and water.
3) Disinfectants: substitute 1/2 cup borax in gallon water.
4) Drain cleaners: substitute 1/4 cup baking soda and 1/4 cup vinegar in boiling water.
5) Upholstery cleaners: substitute dry cornstarch.

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

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

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways.

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

I. Clean and provide maintenance on completed construction as frequently as necessary through remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

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

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K. Final Cleaning: At completion of Work, remove remaining waste materials, rubbish, tools, equipment, machinery and surplus materials. Clean exposed surfaces and leave Project clean and ready for occupancy.

1. Provide final cleaning in accordance with ASTM E1971.

3.6 STARTING AND ADJUSTING

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

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

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

D. Manufacturer's Field Service: If factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Section 01 40 00 "Quality Requirements."

3.7 PROTECTION OF INSTALLED CONSTRUCTION

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

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

3.8 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Section 01 73 29 "Cutting and Patching."

1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

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

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

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

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

END OF SECTION

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SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for:

1. Salvaging nonhazardous demolition and construction waste.
2. Recycling nonhazardous demolition and construction waste.
3. Disposing of nonhazardous demolition and construction waste.

1.2 DEFINITIONS

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

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

C. Solid Waste: Garbage, debris, sludge, or other discharged material (except hazardous waste) including solid, liquid, semisolid, or contained gaseous materials resulting from domestic, industrial, commercial, mining, or agricultural operations.

D. Debris: Non-hazardous solid waste generated during construction, demolition, or renovation of a structure which exceeds 2.5 inch (60 millimeter) particle size that is: a manufactured object; plant or animal matter; or natural geologic material (e.g. cobbles and boulders). A mixture of debris and other material such as soil or sludge is also subject to regulation as debris if mixture is comprised primarily of debris by volume, based on visual inspection.

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

F. Environmental Pollution and Damage: Presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances; or degrade utility of environment for aesthetic, cultural, or historical purposes.

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G. Garbage: Refuse and scraps resulting from preparation, cooking, dispensing, and consumption of food.

H. Hazardous Materials: Material regulated as a hazardous material in accordance with 49 CFR 173 (Code of Federal Regulations), requires a Material Safety Data Sheet (MSDS) in accordance with 29 CFR 1910.1200, or which during end use, treatment, handling, storage, transportation or disposal meets or has components which meet or have potential to meet the definition of Hazardous Waste in accordance with 40 CFR 261.

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

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

K. Single-use plastic products: Plastic items intended to be disposed of immediately after use, including plastic and polystyrene food and beverage containers, bottles, straws, cups, cutlery, and disposable plastic bags.

1.3 PERFORMANCE REQUIREMENTS

A. General: Project shall minimize creation of construction, deconstruction, and demolition waste to protect and restore natural habitat and resources. Minimize factors contributing to waste such as over packaging, improper storage, ordering error, poor planning, breakage, mishandling, single-use plastic products, and contamination. A Waste Management Plan shall be developed to ensure that existing site and building materials are reused, salvaged, or recycled. Minimize waste disposal in landfills.

B. Salvage /Recycle Requirements: Develop waste management plan resulting in end-of-Project rates for salvage/recycling of 50 percent by weight of total waste generated by the Work. The following waste categories, at a minimum, shall be diverted from a landfill:

1. Clean dimensional wood, palettes
2. Plywood, OSB (oriented strand board), and particle board
3. Cardboard, paper, packaging, newsprint
4. Metals (from banding, stud trim, piping, rebar, roofing, other trim, steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze)
5. Gypsum drywall - unpainted
6. Non-hazardous paint and paint cans
7. Beverage containers: Aluminum, glass, and plastic containers
8. Ductwork

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9. Wiring
10. Other mixed construction and demolition waste as appropriate.

C. If waste materials encountered during deconstruction/demolition or construction phase are found to contain lead, asbestos, polychlorinated biphenyls (PCBs), (such as fluorescent lamp ballasts), or other harmful substances, they are to be handled and removed in accordance with local, state, and federal laws and requirements concerning hazardous waste.

D. Existing items and material to be removed during deconstruction/demolition phase shall be reused in construction phase of the Project. Items that cannot be reused shall be recycled. Items considered for reuse must be in refurbishable condition and must meet quality standards set forth in these specifications. Contractor shall ensure quality of the item(s) in question will meet or exceed accepted industry or trade standards for first quality commercial grade application. During construction, deconstruction, or demolition Contracting Officer (CO) may designate other objects or materials for reuse.

1.4 SUBMITTALS

A. Waste Management Plan: After award of contract and prior to scheduled Pre-Construction Conference, Contractor shall submit a draft Waste Management Plan to Contracting Officer for approval. Submit 3 copies of plan. Revise and resubmit Plan as required by Contracting Officer. Approval of Contractor's Plan will not relieve Contractor of responsibility for compliance with applicable environmental regulations.

B. Progress Documentation: Supplemental to Waste Management Plan, document solid waste disposal, diversion, and cost/revenue analysis and submit completed worksheet on a monthly basis. See Project Waste Management Plan Worksheet Sample, attached to the end of the Division 1 Specifications, and report totals to date for column headings.

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

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

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

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

G. Qualification Data: For Waste Management Coordinator andrefrigerant recovery technician.

H. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating refrigerant that was present was recovered and recovery was performed according to Environmental Protection Agency (EPA) regulations. Include name and address of technician and date refrigerant was recovered.

I. Progress payment requirements:

1. With each Application for payment, submit an updated Project Waste Management Plan worksheet for solid waste disposal and diversion.
2. With each Application for Payment, submit manifests, weight tickets, receipts, and invoices specifically identifying the Project and waste material.

J. Closeout Submittals

1. With Closeout Submittals, submit a summary of a Project Waste Management Plan worksheet for solid waste disposal and diversion.

1.5 QUALITY ASSURANCE

A. Waste Management Coordinator Qualifications: Experienced firm, with record of successful waste management coordination of projects with similar requirements, that employs a LEED™-Accredited Professional, certified by USGBC, as waste management coordinator.

B. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.

C. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

D. Waste Management Meeting: Conduct separate meeting or cover in Pre-Construction Conference and comply with requirements in Section 01 31 00 "Project Management and Coordination." Review methods and procedures related to waste management including:

1. Review and discuss waste management plan including responsibilities of Waste Management Coordinator.
2. Review requirements for documenting quantities of each type of waste and its disposition.

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3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
5. Review procedures for reduction of single-use plastic products on site.
6. Review waste management requirements for each trade.

PART 2 - PRODUCTS

2.1 WASTE MANAGEMENT PLAN

A. General: Develop plan consisting of waste identification and waste reduction work plan.

B. Waste Identification: Indicate anticipated types of demolition, and construction waste generated by the Work.

C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.

1. Salvaged Materials for Reuse: For materials salvaged and reused in Project, describe methods for preparing salvaged materials before incorporation into the Work.
2. Salvaged Materials for Sale: For materials sold to individuals and organizations, include list of names, addresses, and telephone numbers.
3. Salvaged Materials for Donation: For materials donated to individuals and organizations, include list of names, addresses, and telephone numbers.
4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
6. Handling and Transportation Procedures: Include method used for separating recyclable waste including sizes of containers, container labeling, and designated location on Project site where materials separation will be located.
7. Reduction of single-use plastic products: Include methods for water distribution to include bottle refilling stations if available for personnel.

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PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

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

B. Contractor shall establish contacts with local recycling and reuse companies to set up lines of responsibility. Contractor shall be responsible for coordination in terms of identifying materials, pickup schedules, and standard quality for recycled materials.

C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.

1. Distribute waste management plan to everyone concerned within three days of submittal return.
2. Distribute waste management plan to entities when they begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

E. Separation facilities:

1. Contractor shall designate and Contracting Officer shall approve specific area or areas to facilitate separation of materials for potential reuse, salvage, recycling, and return.
2. Place waste and recycling bins near each other, and close to point of waste generation but out of traffic pattern.
3. Keep recycling and waste bin areas neat, clean, and clearly marked in order to avoid co-mingling of materials.
4. Protect bins during non-working hours from off-site contamination.
5. Check garbage dumpsters periodically for recyclables being thrown away and undocumented materials that could be recycled.

F. Materials handling procedures: Material to be recycled shall be protected from contamination and shall be handled, stored, and transported in a manner that meets requirements set by designated facilities for acceptance. Establish defined area for operations of each trade, especially woodcutting so off-cuts are kept in one area and can be sorted by dimension for future reuse.

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3.2 SALVAGING DEMOLITION WASTE

A. Salvaged Items for Reuse in the Work:

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

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

3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

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

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

C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to maximum extent practical.

1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

    a. Inspect containers and bins for contamination and remove contaminated materials if found.

2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off ground and protect from weather.
5. Remove recyclable waste off Government property and transport to recycling receiver or processor.

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

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E. Metals: Separate metals by type.

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

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

G. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.

H. Plumbing Fixtures: Separate by type and size.

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

J. Lighting Fixtures: Separate lamps by type and protect from breakage.

K. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

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

M. Electronic Products: Ensure non-usable electronic products are reused, donated, sold, or recycled using environmentally sound management practices at end of life.

3.4 RECYCLING CONSTRUCTION WASTE

A. Packaging:

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

B. Site-Clearing Wastes: Chip brush, branches, and trees [**on-site**] [**at landfill facility**].

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C. Wood Materials:

1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
2. Clean Sawdust: Bag sawdust not containing painted or treated wood.

D. Gypsum Board: Stack large clean pieces on wood pallets and store in dry location.

1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

3.5 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose in landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials to accumulate on-site.
2. Remove and transport debris in manner preventing spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials.

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

D. Disposal: Transport waste materials off Government property and legally dispose of them.

END OF SECTION

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SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including:

1. Project Record Drawings
2. Closeout Submittals
3. Substantial Completion and Final Inspection
4. Permit Closure and Transfer
5. Final Acceptance of the Work
6. Warranties

1.2 PROJECT RECORD DRAWINGS

A. Maintain one complete full-size set of contract drawings and one full-size set of vendor-supplied drawings. Clearly mark changes, deletions, and additions using National Park Service (NPS) drafting standards to show actual construction conditions. Show additions in red, deletions in green and special instructions in blue.

B. Keep record drawings current. Make record drawings available to Contracting Officer (CO) for inspection at the time of monthly progress payment requests. If project record drawings are not current, Contracting Officer may retain an appropriate amount of progress payment.

C. Submit complete record drawings on completion of total project. Include shop drawings, sketches, and additional drawings to be included in final set, with clear instructions showing the location of these drawings.

1.3 CLOSEOUT SUBMITTALS

A. A list of closeout requirements has been attached at the end of the Division 1 Specifications for your convenience. The intent is to provide an overall summary of requirements and not a comprehensive list. Terms and conditions of the contract require satisfaction of requirements of individual specification sections regardless of what is shown on the list. Submit the following before requesting final inspection:

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1. Specific warranties, guarantees, workmanship bonds, final certifications, and similar documents.
2. NPS required forms for occupancy, Fire Sprinkler/Alarm acceptance, and other similar forms or certificates.
3. Project Record Documents, operation and maintenance manuals, final completion construction digital images recorded on CD-R (compact disc-recordable) or DVD-R (digital video disc-recordable) with index and descriptions, and similar final record information.
4. Environmental Record Documents: As specified in individual specification sections and as follows:

    a. IAQ Management Plan: As specified in Section 015719.11 ‘Indoor Air Quality (IAQ) Management.”
    b. Product Data for filtration media: As specified in 015719.11 “Section Indoor Air Quality (IAQ) Management.”
    c. Moisture Control inspections and reports: As specified in Section 015719.11 “Section Indoor Air Quality (IAQ) Management.”
    d. Material Safety Data Sheet (MSDS) Data: As specified in Section 015719.11 “Section Indoor Air Quality (IAQ) Management” and Section 016700 “Product Requirements.”
    e. Final Summary of Solid Waste Disposal and Diversion: As specified in Section 017419 “Construction Waste Management.”
    f. Commissioning Report: As specified in Mechanical Sections.

5. Posted Operating Instructions: As specified in individual sections. Furnish operating instructions attached to or posted adjacent to equipment. Include wiring diagrams, control diagrams, control sequence, start-up, adjustment, operation, lubrication, shut-down, safety precautions, procedures in the event of equipment failure, and other items of instruction recommended by manufacturer.
6. Deliver tools, spare parts, extra materials, and similar items to location designated by Contracting Officer. Label with manufacturer's name and model number where applicable.

    a. Special Tools: One set of special tools required to operate, adjust, dismantle, or repair equipment. Special tools are those not normally found in possession of mechanics or maintenance personnel.

7. Keys and Keying Schedule: Submit keys including duplicates. Wire keys for each lock securely together. Tag and plainly mark with lock number, equipment identification, or panel or switch number, and indicate location, building, and room name or number.
8. Make final changeover of permanent locks and deliver keys to Contracting Officer. Advise Park personnel of changeover in security provisions.

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9. Approved pre-functional checklists and functional performance testing reports from commissioning documentation.

    a. Equipment start-up requires coordination with commissioning process.

10. Test and balance report.
11. Terminate and remove temporary facilities, mockups, construction tools, and similar elements from Project site, complete final cleaning requirements, including touchup painting.
12. Touch up and repair and restore marred exposed finishes to eliminate visual defects.
13. Instruct NPS personnel in operation, adjustment, and maintenance of products, equipment, and systems.

1.4 FINAL INSPECTION, SUBSTANTIAL COMPLETION AND ACCEPTANCE PROCEDURES

A. Request final inspection in writing when project or designated portion of project is substantially complete. Contracting Officer will proceed with inspection within 10 days of receipt of written request or will advise Contractor of items that prevent project from being substantially complete.

B. If work is determined substantially complete, following final inspection, Contracting Officer will prepare Punch List and issue a Letter of Substantial Completion.

C. If work is not determined substantially complete following final inspection, Contracting Officer will notify Contractor in writing. Contractor shall request new final inspection after completing work. Re-inspection costs may be charged against Contractor in accordance with Inspection of Construction contract clause.

D. Contractor shall complete Punch List within 30 calendar days, documented weather permitting.

    1. Prior to requesting final inspection:

        a. Complete commissioning requirements unless approved in writing by Contracting Officer.

E. If Contractor completes items of work on Punch List and contractually required items, Contracting Officer will issue Letter of final acceptance of work.

F. If Contractor fails to complete work within the time frame, Contracting Officer may correct work with an appropriate reduction in contract price or charge for re-inspection costs in accordance with Inspection of Construction contract clause.

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1.5 PERMIT CLOSURE AND TRANSFER

A. When work covered by the permits is complete, create list of tasks required to close or transfer permits to Park. Submit to Contracting Officer for approval.

B. After substantial completion and Punch List completion, permits shall be closed and documented by Agency(ies) with Jurisdiction for the permit.

C. If responsibility for permits is to be transferred to Park, Park shall be informed of permit provisions completed and responsibilities transferring to Park staff.

1.6 WARRANTIES

A. Submittal Time: Submit written warranties on request of Contracting Officer for designated portions of Work where commencement of warranties other than date of Substantial Completion is indicated.

B. Organize warranty documents into an orderly sequence based on table of contents of Project Manual.
   1. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF (portable document format) file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

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

PART 2 - PRODUCTS

2.1 MATERIALS

A. See Division 1 Specification Section "Execution" for information on cleaning agents.

PART 3 - EXECUTION

3.1 FINAL CLEANING

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

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B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:

a. Clean Project site in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Rake grounds that are neither planted nor paved to smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Remove snow and ice to provide safe access to building.
f. Clean exposed exterior and interior hard-surfaced finishes to dirt-free condition, free of stains, films, and foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to original condition.
g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
h. Sweep concrete floors broom clean in unoccupied spaces.
i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo, soil or stains remain.
j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and vision-obscuring materials. Replace chipped or broken glass and transparent materials. Polish mirrors and glass.
k. Remove labels that are not permanent.
l. Touch up, repair, and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.

1) Do not paint over "UL" (Underwriters Laboratories) and similar labels, including mechanical and electrical nameplates.

m. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
n. Replace parts subject to unusual operating conditions.
o. Clean plumbing fixtures to sanitary condition, free of stains, including stains resulting from water exposure.

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p. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
q. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out and noticeably dimmed bulbs, and defective or noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
r. Leave Project clean and ready for occupancy.

C. Pest Control: Engage experienced, licensed exterminator to make a final inspection and rid project of rodents, insects, and other pests. Provide Government with report.

D. Waste Disposal: Comply with requirements of Section 017419 "Construction Waste Management and Disposal."

END OF SECTION

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SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS FOR NON-LEED™ PROJECTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general requirements and procedures for compliance with Federal Sustainability requirements. This project is not seeking Leadership in Energy & Environmental Design (LEED™) certification but shall comply with applicable Federal Sustainability requirements. Requirements include laws (Executive Orders (EO) and regulations), management policies, building codes and standards, Federal directives, and National Park Service (NPS) guidelines.

B. Many Federal requirements can be achieved only through intelligent and integrated design of the project and are beyond control of the Contractor. Certain requirements relate to the products and procedures used for construction, therefore, full cooperation of the Contractor and Subcontractors is essential to successful compliance with Federal requirements.

C. Contractors shall familiarize themselves with relevant requirements and provide necessary information and instruction to subcontractors and installers.

1. Some requirements involve quantifying percentages by weight; these require careful recordkeeping and reporting by Contractor.
2. See Denver Service Center (DSC) Workflows Sustainability Standards for a list of Federal Sustainability requirements. Applicable Federal Sustainability requirements are also summarized on the project's NPS Project Sustainability Checklist. Contractor is responsible for ensuring the elements in the NPS Project Sustainability Checklist, identified by the contracting officer, are incorporated into the construction of the project.

D. Related Sections:

1. See Divisions 1 through 49 Sections for sustainability requirements specific to work of each of these Sections.

1.2 DEFINITIONS

A. Chain-of-Custody Certificates: Certificates signed by manufacturers certifying wood used to make products was obtained from forests certified by a Forest Stewardship Council (FSC)-accredited certification body to comply with FSC Standard STD-01-001, "FSC Principles and Criteria for

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Forest Stewardship." Certificates shall include evidence manufacturer is certified for chain of custody by an FSC-accredited certification body.

B. LEED™: Leadership in Energy & Environmental Design. Sustainability rating system developed by United States Green Building Council (USGBC).

C. Rapidly Renewable Materials: Materials made from plants typically harvested within 10-year or shorter cycle. Rapidly renewable materials include products made from bamboo, cotton, flax, jute, straw, sunflower seed hulls, vegetable oils, or wool.

D. Recycled Content: Recycled content value of a material assembly shall be determined by weight.

1. "Post-consumer" material: Waste material generated by households or by commercial, industrial, and institutional facilities in their role as end users of product, which can no longer be used for intended purpose.
2. "Pre-consumer" material: Material diverted from waste stream during manufacturing process. Reutilization of materials such as rework, regrind, or scrap generated in a process and capable of being reclaimed within the same process that generated it is excluded.

E. Biopreferred Products: Commercial or industrial products (other than food or feed) composed in whole, or in significant part, of biological products, renewable agricultural materials (including plant, animal, and marine materials), or forestry materials and includes biobased intermediate ingredients or feedstocks.

1.3 FEDERAL SUSTAINABILITY DOCUMENTATION SUBMITTALS

A. Most of Federal sustainability documentation submittals are aggregations of submittals already required in relevant technical specifications. They are mentioned here to ensure they are collected and organized together to efficiently document compliance with sustainability requirements.

B. Provide preliminary submittals to NPS indicating how the following Federal requirements will be met:

1. Recycled Content: List of specified/proposed materials with recycled content. Indicate cost, post-consumer recycled content, and pre-consumer recycled content for each product having recycled content.
2. Certified Wood: Product data and/or chain-of-custody certificates for products containing certified wood. Include statement indicating cost for each certified wood product.

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3. Construction Indoor Air Quality (IAQ) Management Plan – During Construction:

    a. Construction indoor-air-quality management plan.
    b. Product data for temporary filtration media.
    c. Product data for filtration media used during occupancy.
    d. Construction Documentation: Six photographs at three different times during construction period, along with brief description of the Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) approach employed, documenting implementation of indoor-air-quality management measures, such as protection of ducts and on-site stored or installed absorptive materials.

4. Construction IAQ Management Plan – Before Occupancy:

    a. Signed statement describing building air flush-out procedures including dates when flush-out was started and completed and statement filtration media was replaced after flush-out.
    b. Product data for filtration media used during flush-out and during occupancy.

5. Low Emitting Materials - Adhesives and Sealants: Product data for adhesives and sealants used inside weatherproofing system indicating Volatile Organic Compound (VOC) content of each product used. Indicate VOC content in g/L (grams per liter) calculated according to 40 CFR 59 Subpart D (Code of Federal Regulations).
6. Low Emitting Materials - Paints and Coatings: Product data for paints and coatings used inside weatherproofing system indicating [**chemical composition and**] VOC content of each product used. Indicate VOC content in g/L calculated according to 40 CFR 59 Subpart D.
7. Low Emitting Materials - Flooring: Product data for products containing composite wood or agrifiber products or wood glues indicating they do not contain urea-formaldehyde resin.
8. Biopreferred Products: Provide list of bio-based products used on project.

PART 2 - PRODUCTS

2.1 RECYCLED CONTENT OF MATERIALS

A. Recycled Content: Provide building materials with recycled content such that post-consumer recycled content plus one-half of pre-consumer recycled content constitutes a minimum of 10 percent of cost of materials used for Project.

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1. Determine cost of post-consumer recycled content by dividing weight of post-consumer recycled content in item by total weight of item and multiplying by cost of item.
2. Determine cost of pre-consumer recycled content of an item by dividing weight of pre-consumer recycled content in item by total weight of item and multiplying by cost of item.
3. Do not include furniture, mechanical and electrical components, and specialty items such as elevators and equipment in calculation.

2.2 BIOPREFERRED PRODUCTS

A. Use bio-based products found on United States Department of Agriculture (USDA) Biopreferred Products list where applicable on project.

2.3 LOW-EMITTING MATERIALS

A. For applications inside the weatherproofing system, use adhesives and sealants that comply with VOC content limits in Specification Divisions 2 through 49.

B. For field applications inside the weatherproofing system, use paints and coatings that comply with VOC content limits in Specification Divisions 2 through 49.

C. Do not use composite wood or agrifiber products or adhesives that contain urea-formaldehyde resin.

END OF SECTION

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SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Demolition and removal of selected portions of building or structure.
2. Removal for reuse of existing items or materials for work indicated in other sections

B. Related Sections include the following:

1. Section 011000 - "Summary of Work" for use of premises, and phasing**,** and Government-requirements.
2. Section 017310 - "Cutting and Patching" for cutting and patching procedures.

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Detach items or materials from existing construction and deliver them to the Goverment, at a location as directed.

C. Remove and Reinstall: Detach items or materials from existing construction and prepare for use in the work, at original locations or new locations as indicated. The contract documents refer to these items or materials also as "salvaged" when shown at installed locations in the work.

D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

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1.4 MATERIALS OWNERSHIP

A. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Government that may be encountered during selective demolition remain Government's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Government.

1.5 QUALITY ASSURANCE

A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.

B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Standards: Comply with ANSI A10.6 and NFPA 241.

1.6 PROJECT CONDITIONS

A. Conditions existing at time of inspection for bidding purpose will be maintained by Government as far as practical.

1. Before selective demolition, Government will remove the following items:

a. Loose furnishings.
b. Wall-hung framed paintings and photographs.

B. Notify Contracting Officer of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

C. Hazardous Materials: Hazardous materials abatement work may be present. If such materials are found, notify Government.

D. Storage or sale of removed items or materials on-site is not permitted.

E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

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1. Maintain fire-protection facilities in service during selective demolition operations.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped.

B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Contracting Officer.

E. Survey of Existing Conditions: Record existing conditions by use of measured drawings.

F. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.

1. Comply with requirements for existing services/systems interruptions specified in Division 1 Section "Summary."

B. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Arrange to shut off indicated utilities with utility companies.

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2. If services/systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.

    a. Where entire wall is to be removed, existing services/systems may be removed with removal of the wall.

3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Comply with requirements for access and protection specified in Division 1.

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches.
5. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
6. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.

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7. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
8. Dispose of demolished items and materials promptly.

B. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Government.
4. Transport items to Government's storage area designated by Government.
5. Protect items from damage during transport and storage.

C. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Contracting Officer, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Government's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Government's property and legally dispose of them.

3.6 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION

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SECTION 028200--ASBESTOS REMEDIATION

PART 1—GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 1 – GENERAL REQUIREMENTS that are hereby made a part of this Section of the Specifications.

B. Equality of material, article, assembly or system other than those named or described in this Section shall be determined in accordance with the provisions of the CONTRACT AND GENERAL CONDITIONS.

C. Within this section, the entities listed shall be designated as follows.

1. The Boston National Historical Park shall be referred to as the GOVERNMENT OR CONTRACTING OFFICER.
2. Schwartz/Silver Architects shall be referred to as the ARCHITECT.
3. The designated industrial hygienist/consultant, Environmental Health & Engineering, Inc. (EH&E), shall be referred to as the CONSULTANT
4. The Asbestos Remediation Sub-Contractor to be selected for the removal and/or remediation of asbestos-containing materials (ACMs) shall be referred to as the REMEDIATION CONTRACTOR

1.2 DESCRIPTION OF WORK

A. This plan includes specifications for the removal of asbestos containing materials (ACM) located at Building 22 and 28, the Constitution Museum (the Buildings) at the Boston National Historical Park, 21 Second Avenue, Charlestown Navy Yard, Boston, Massachusetts. The REMEDIATION CONTRACTOR shall furnish all labor, material, supervision, construction tools, transport vehicles and equipment necessary to perform the following work:

1. Pre-bid inspection. The potential Bidders are encouraged to visit the Buildings prior to bidding in order to determine the actual amounts of materials and contaminated materials to be removed. The bidders must review all elements of this specification prior to submitting their final bid.

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2. This document serves as the basis of information pertaining to the locations and amounts of materials to be remediated at the Site. If any discrepancies exist between the site specifications and the site conditions, the REMEDIATION CONTRACTOR must notify the GOVERNMENT and the CONSULTANT prior to signing the contract. Additional compensation to correct a difficulty or difference from conditions implied or indicated in this document that would have been apparent during the site visit will not be approved.
3. The REMEDIATION CONTRACTOR shall be required to submit a Site-Specific Work Plan conforming to the requirements in this specification for removing or clearing the materials in the locations outlined in this section or depicted in Schwartz/Silver Building 22 and 28 Restoration Repairs A2.1 – A2.8, A5.1 – A5.7, A6.1 – A6.6, and Sash Demolition Plans AD1.1– AD1.6.
4. The REMEDIATION CONTRACTOR shall furnish all permits, labor, material, supervision, construction tools, transport vehicles and equipment necessary to perform the following work including, but not limited to:

    - Coordination with the GOVERNMENT for access to interior spaces and for protection of exhibits, artifacts, and sensitive documents
    - Installation of polyethylene sheeting, sealed to interior, accessible window and door openings (a substantial number of Building 28 windows are behind permanent solid wall barriers) prior to ACM removal
    - Installation of drop cloths beneath exterior active work areas
    - Decontamination of windows' sills and wells, and door frames from weathered ACM debris prior to brick mold and sash removal
    - Labeling of historically valuable window and door components for location and orientation prior to brick mold and sash removal
    - Removal of ACM caulk from brick mold and adjacent masonry
    - Stabilization of installed ACM glazing compound and application of painter's tape to seal the ACM prior to removal of historically valuable window sashes if performing abatement at remote locations
    - Complete sash removal and disposal of non-historically valuable windows as ACM
    - Abatement by removal of ACM glazing compound from historically valuable window sashes
    - Transfer possession of historically valuable window components to others for restoration
    - Coordination with others as to temporary weather enclosures of window openings

    The REMEDIATION CONTRACTOR shall perform removal of ACM under MassDEP 310 CMR 7.15 U Asbestos (11) Requirements for Window Painting and/or Repair Work that Result in the Disturbance of Asbestos-Containing Glazing and/or Caulking Compounds requirements,

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including regulated area and with HEPA vacuum shrouded cutting/grinding tools. This specification assumes that the caulk and sealants materials are non-friable. A unit cost is requested to accommodate friable materials if discovered through subsequent assessment activities. Removal of ACM will include the following:

a. Removal of ACM caulk and sealants located along the perimeter wooden brick mold and trim, and adjacent masonry around eighty historically valuable windows and four doors on Building 22, covering approximately 1,200 linear feet; and forty-three historically valuable window trim components and six doors on Building 28, covering approximately 1,500 linear feet.

   The REMEDIATION CONTRACTOR shall label the wooden components of historically valuable windows as to location and orientation, remove them in as intact state as possible, decontaminate them to the no visible debris criteria, and transfer them to others for restoration.

b. Removal of ACM window glazing compound from thirty-three, historically valuable windows' sashes, in Building 22.

   The REMEDIATION CONTRACTOR shall label the sashes and glazing panes of historically valuable windows as to location and orientation. Using wet methods, and infrared heat or steam, remove the ACM glazing compound from the panes in as intact state as possible, decontaminate the panes and wood mullions to the no visible debris criteria, and transfer the sashes and panes to others for restoration. The REMEDIATION CONTRACTOR may elect to remove the ACM glazing compound from the sashes at a remote location, under full negative pressure enclosure.

c. Removal of ACM glazing compound sashes from forty-three windows in Building 28. The sashes shall be wrapped and sealed in polyethylene sheeting, then either packaged in bulk containers or double wrapped individually and labeled for disposal.

5. Alternate work plans deviating from this specification must be approved by the CONSULTANT prior to starting the work.
6. Documentation of worker training, respiratory protection and medical examination.
7. Provide access, support and protection to all authorized visitors and inspectors.
8. Filing of and/or obtaining all required notifications, permits, work plans and payment of all required associated costs and fees, including any applicable royalty or patent payments for use of any technology on the project.
9. Work area preparation and work practices.

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10. Proper removal, packaging, transport and disposal of all ACM as specified herein. Note that vehicles transporting bulk-loaded demolition debris containing a reportable quantity (greater than 1 pound) of asbestos shall be properly placarded in accordance with U.S. Department of Transportation (DOT) regulations. All drivers shall be appropriately trained and licensed to transport this material.
11. Isolation of the Work Area for the duration of the work so as to prevent asbestos-contaminated dust or debris from passing beyond the isolated area.

B. In addition to the specific methods in this document, it is the REMEDIATION CONTRACTOR's responsibility to determine the most efficient method to legally perform this Work.

C. The REMEDIATION CONTRACTOR shall perform all work in accordance with these specifications: the U.S. Environmental Protection Agency (EPA) and the U.S. Occupational Safety and Health Administration (OSHA) regulations, National Institute for Occupational Safety and Health (NIOSH) recommendations, Massachusetts Department of Environmental Protection (MassDEP) and Massachusetts Department of Labor Standards (MADLS) regulations, local statutes, local ordinances, local codes and any other applicable federal, state and local government regulations and guidelines.

D. The contractor is responsible for worker and site safety, including storing and securing all equipment, materials and waste.

E. Related Sections

1. Section 01 11 00 (Summary of Work)
2. Section 01 33 00 (Submittal Requirements)
3. Section 01 42 00 (References)
4. Section 01 50 00 (Temporary Facilities and Controls)
5. Section 01 77 00 (Contract Closeout)
6. Section 02 41 19 (Selective Demolition)

1.3 PERMITS

A. The REMEDIATION CONTRACTOR shall be responsible for obtaining all permits, or submittal of all notifications necessary to execute work conducted for the project at Building 1 at the Charlestown Navy Yard, Boston National Historical Park. The cost for securing all necessary permits shall be included in the REMEDIATION CONTRACTOR's bid. The REMEDIATION CONTRACTOR shall be responsible for adhering to all applicable federal, state, and local rules

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and regulations including but not limited to, except where more stringent requirements are specified:

- EPA
- OSHA
- MassDEP
- MADLS
- The Boston Fire Department
- The City of Boston

1.4 SCHEDULING

A. The REMEDIATION CONTRACTOR, CONTRACTING OFFICER, and the GOVERNMENT shall develop an abatement schedule for each phase of work prior to commencement. The GOVERNMENT may choose to alter the work sequence as they see fit.

B. The CONTRACTOR shall update the schedule and submit any schedule changes for review by the CONTRACTING OFFICER and the GOVERNMENT at the weekly construction meetings.

1.5 AUTHORITY TO STOP WORK

A. The GOVERNMENT has the authority to stop the work at any time if it is determined either personally or through the services of the CONSULTANT that conditions are not within the specifications and applicable regulations. The stoppage of work shall continue until conditions have been corrected and corrective steps have been taken to the satisfaction of the GOVERNMENT and CONSULTANT. Standby time required to resolve violations shall be at REMEDIATION CONTRACTOR's expense, and any fines, etc., for hazardous conditions or non-compliance will be at the REMEDIATION CONTRACTOR's expense and will not be grounds for change orders or time extension.

B. Stop work orders may be issued for but not limited to the following:

1. Not conducting the work in compliance with this and related specifications
2. Breaks in barriers
3. Inadequate work area control or isolation
4. Leakage to other areas

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5. Fiber concentrations outside the work area that exceed 0.010 fibers per cubic centimeter (f/cc) (0.010 f/cc above established background levels) for any one phase contrast microscopy (PCM) sample
6. If the REMEDIATION CONTRACTOR disregards laws or regulations of any regulatory or governing body having jurisdiction
7. If the REMEDIATION CONTRACTOR's work presents a risk to the building, to building occupants, to the general public or to the environment as determined by the GOVERNMENT or the CONSULTANT

C. The absence of a stop work order by the GOVERNMENT or the CONSULTANT shall not in any way be construed as an approval or acceptance of the REMEDIATION CONTRACTOR's work.

1.6 CONTRACTOR QUALIFICATIONS

A. The GOVERNMENT shall approve the proposed REMEDIATION CONTRACTOR and will be based upon submission by the REMEDIATION CONTRACTOR of the following:

1. Insurance and bonding as stated in the Contract Documents
2. Licensing by the MADLS as an Asbestos Abatement Contractor
3. Names and locations of at least three asbestos abatement projects similar in scope and size to this project completed by the proposed REMEDIATION CONTRACTOR. Provide the name and phone number of a contact person for each referenced asbestos abatement project.
4. History of violations and fines issued to the abatement contractor by any regulatory or governing agency

1.7 PERSONNEL QUALIFICATIONS

A. All personnel of the REMEDIATION CONTRACTOR or any approved SUB-CONTRACTOR involved with this work shall meet the following minimum qualifications:

1. Asbestos worker medical examination within the past year in accordance with OSHA 1926.1101 with a physician's written opinion that the worker has no condition that would preclude him/her from working with asbestos or wearing a respirator.
2. Workers performing removal of ACM exterior caulk and window glazing compound may comply with either OSHA or EPA training as set forth in 29 CFR 1926.1101 (k)(9)(iv) or 40 CFR Part 763, Subpart G, as applicable, in lieu of fulfilling the training requirements of 454 CMR 28.00.
3. There shall be a sufficient number of trained and qualified workers, foremen and superintendents to accomplish the work within the required schedule. No untrained or fully qualified and pre-approved person shall be employed to speed up completion of the abatement work.

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1.8 BUILDING INSPECTION

A. The REMEDIATION CONTRACTOR must inspect the site and ascertain the locations and amounts of asbestos materials to be removed. If discrepancies exist between these specifications and/or site conditions, the contractor must notify the GOVERNMENT's project manager prior to signing the contract. Additional compensation to correct a difficulty or difference from conditions implied or indicated in this specification that would have been apparent during the site visit will not be approved.

1.9 DISPOSAL

A. Disposal of all ACM waste streams shall be in strict accordance with applicable state and federal regulations and sent to licensed facilities that receive and retain asbestos waste. All asbestos materials removed from this site will be kept separate from other waste streams the contractor may handle. Copies of all bill of lading, waste shipment records, and any other documentation must be submitted as proof of proper disposal of asbestos waste.

1.10 DEFINITIONS

A. All terms not defined herein shall have the meaning given in the applicable publications and regulations.

1. Abatement—Procedures to control fiber release from asbestos materials including encapsulation, enclosure and removal.
2. Air Monitoring—The process of measuring the fiber content of a specific volume of air in a stated period of time.
3. Asbestos—The name given to a number of naturally occurring hydrated mineral silicates that possess a unique crystalline structure, are incombustible and are separated into fibers. Asbestos includes chrysotile, crocidolite, amosite, anthophyllite and actinolite.
4. Asbestos-containing material (ACM)—Any material containing more than 1 percent by weight of asbestos of any type or mixture of types. According to MassDEP, an ACM is any material that contains greater than or equal to (≥)
   1 percent asbestos.
5. Asbestos Materials—ACMs and materials that contain less than 1 percent (trace) asbestos.
6. Asbestos Wastes—All building materials and debris, insulation, disposable clothing and protective equipment, plastic sheeting and tape, exhaust systems or vacuum filters, or any abatement equipment that is or has been contaminated with asbestos and cannot be completely cleaned by vacuuming or by washing.

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7. Authorized Visitors—Any visitor authorized by the GOVERNMENT, the GOVERNMENT, the GOVERNMENT or any representative of a regulatory agency or other agency having jurisdiction over the project.
8. Barrier—Any surface that seals off the work area to inhibit the movement of fibers.
9. Critical Barrier—A solid asbestos impermeable partition erected to constitute a work area closure; the outer perimeter of an asbestos work area, usually erected across corridors or other open Building to complete containment.
10. Friable ACM—Material that contains 1 percent or more asbestos by weight and that can be crumbled, pulverized or reduced to powder by hand pressure when dry.
11. HEPA Filter—Equipment with a high efficiency particulate air (HEPA) filter, greater than 99.97 percent efficiency by 0.3-micron DOP (dioctyl phthalate) test and complying with American National Standards Institute (ANSI) Z9.2 (1979).
12. Non-friable Asbestos Material—Material that contains asbestos and that cannot be crumbled, pulverized or reduced to powder by hand pressure when dry.
13. Removal—All herein specified procedures necessary to strip all ACM and asbestos wastes from designated areas and to dispose of these materials at an acceptable site.
14. Regulated Area—A work area established to demarcate areas where airborne concentrations of asbestos exceed, or where there is a reasonable possibility they may exceed the permissible exposure limits. Only authorized individuals shall enter regulated areas.
15. Respirator—A device designed to protect the wearer from the inhalation of harmful atmospheres.
16. Visible Emissions—Any emissions containing particulate asbestos material that are visually detectable without the aid of instruments. This does not include condensed uncombined water vapor.

1.11 EMERGENCY PRECAUTIONS

A. The REMEDIATION CONTRACTOR shall develop and submit a written fire protection plan that specifically addresses fire protection during work. This plan shall be submitted to GOVERNMENT for review prior to the start of work.

B. The REMEDIATION CONTRACTOR shall establish and maintain emergency and fire exits from the work areas. The REMEDIATION CONTRACTOR shall submit a written emergency evacuation plan to the City of Boston Fire Department and to the GOVERNMENT for review if applicable.

C. Local emergency medical personnel, both ambulance crews and hospital emergency room staff shall be notified prior to commencement of work as to the possibility of having to handle contaminated, injured workers, and they shall be advised on safe decontamination. The

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REMEDIATION CONTRACTOR shall submit copies of such notifications to the GOVERNMENT.

D. The REMEDIATION CONTRACTOR shall have a written Health and Safety Plan. When an injury occurs, the REMEDIATION CONTRACTOR shall stop work and implement fiber reduction techniques (e.g., water spraying) until the injured person has been removed from the work area.

E. Before the REMEDIATION CONTRACTOR starts any removal of the asbestos material, the REMEDIATION CONTRACTOR shall notify the local police and fire departments as to the proper personal protective equipment (PPE) required by persons providing emergency response services. The REMEDIATION CONTRACTOR shall make every effort to help these agencies form plans of action should their personnel need to enter contaminated areas.

1.12 SUBMITTALS

A. The REMEDIATION CONTRACTOR shall submit each item in this Article according to the Conditions of the Contract, for information only, unless otherwise indicated.

B. All submittals shall be submitted to the GOVERNMENT and the CONSULTANT prior to the start of work.

C. Abatement Plans shall include, at a minimum, the following:

1. Layout of project execution components showing the configuration of the containment and work area.
2. A description of Security System, warning signs and labels for waste containers.
3. Access routes to controlled asbestos work areas.
4. Copy of notification to police department, fire department and local ambulance and hospital.
5. A description of wetting agents and low pressure wetting system.
6. Description of enclosures and work area controls to be used.
7. Fire Protection Plan, Safety Plan and Emergency Evacuation Plan.
8. Submit manufacturer's certification that vacuums, ventilation equipment and other equipment required to contain airborne asbestos fibers conform to ANSI Z9.2 and to requirements as listed in this Specification.
9. Safety Data Sheets (SDSs) for all products used on the project.
10. A detailed plan for the movement of material, personnel and waste in and out of work areas, building and the site.
11. Standard Operating Procedure showing how workers, visitors and employees will be protected from exposure and how Building outside the work areas will be protected from contamination until completion of the work.

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12. Written site-specific Health and Safety Plan to be developed and implemented for abatement work performed at the site. These procedures must ensure maximum protection of workers, visitors and employees from all health and safety issues and situations specific for this worksite that may or may not be foreseen. These procedures will include but are not limited to emergency escape procedures, fall protection, electrical hazards, etc.

D. To comply with applicable regulations, notify appropriate regulatory agencies of abatement activities.

1. Provide the required written notification at least 10 working days before the start of the asbestos abatement activity to the MassDEP and MADLS.
2. Provide required written notification by mail to local authorities as required.
3. Obtain and process all applicable forms and permits required.

E. Respiratory Protection System(s): Include literature describing sample respirators, hoses and certificate with system literature for the air supply system from manufacturer stating that air supply system meets specifications on quality, quantity and escape time. These submittals are required only if supplied air respiratory protection is used.

F. Obtain certification of compliance with OSHA requirements including but not limited to medical surveillance, record keeping and personal monitoring.

G. Obtain documentation of certification in accordance with Title 454 of the Code of Massachusetts Regulations (CMR), Part 28, for each employee.

H. Document final landfill destination(s) and copies of transporter and Landfill permits as well as Waste Shipment Records

I. Maintain copies of all Notifications made to Massachusetts Asbestos Program, Local Board of Health, Local Fire Department and any other agencies, as required.

J. Apply for and obtain waivers and exemptions, which may be required by various regulatory agencies.

1.13 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in text by basic designation only. The list provided below is not intended to be all inclusive of all regulations prevailing over the work.

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B. U.S. Environmental Protection Agency (EPA):

1. Regulations for Asbestos (Title 40 of the Code of Federal Regulations (CFR), Part 61)
2. Guidance for Controlling Asbestos-Containing Materials in Buildings
3. A Guide to Respiratory Protection for the Asbestos Abatement Industry

C. U.S. Occupational Safety and Health Administration (OSHA):

1. Asbestos Construction Standard 29 CFR 1926.1101
2. Asbestos General Industry Standard 29 CFR 1910.1001
3. Respiratory Protection, 29 CFR 1910.134

D. National Institute for Occupational Safety and Health (NIOSH):

1. “Respiratory Protection A Guide for the Employee"

E. American National Standards Institute (ANSI):

1. Z86.1-1973—Commodity Specification for Air
2. Z9.2—HEPA Filter Specifications
3. Z88.2-1980—Respiratory Protective Equipment

F. Massachusetts Department of Labor Standards (MADLS)

1. The Removal, Containment, Maintenance, or Encapsulation of Asbestos (454 CMR 28)

G. Massachusetts Department of Environmental Protection (MassDEP)

1. Amendments to Regulations 310 CMR 7.00, 7.09, 7.15 to Control Airborne Asbestos Emissions for the Control of Air Pollution
2. MassDEP Policy Statement Concerning Non-Friable Asbestos Containing Materials, Policy #BWP-96-012

H. U.S. Department of Transportation (DOT)

1. 49 CFR 171 – 180, Hazardous Materials Regulations

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PART 2—MATERIALS AND EQUIPMENT

2.1 GENERAL

A. All materials or equipment delivered to the site shall be unloaded, temporarily stored, and transferred to the work area in a manner that shall not interfere with operation of others at the site or employee's access and safety and must be authorized by the GOVERNMENT.

B. Damaged or deteriorated materials shall not be used and shall be promptly removed from the premises. Materials that become contaminated by asbestos materials shall be thoroughly cleaned, or sealed in plastic bags or sheeting, labeled and legally disposed of in an approved, secure landfill.

C. All materials and equipment shall comply, at a minimum, with all sections of this specification, applicable federal, state and local codes and industry standards.

2.2 ABATEMENT EQUIPMENT AND SUPPLIES

A. HEPA-Filtered Exhaust Fans—Air inside each interior work area shall be exhausted through a HEPA filter that is 99.97% efficient at 0.3 microns in particle size. Commercially manufactured HEPA-filtered exhaust units, with specification plates intact, must be provided for each work area to attain, at a minimum, four air volume changes per hour and an inward flow velocity of clean air into each work area at least 100 feet per minute. The HEPA filter shall be preceded by replaceable prefilters and the unit must be designed so that it cannot be operated unless all filters are in place. The units must also be designed with a gauge to indicate the pressure drop across filters, and lights and audible alarms to indicate that the filters are properly installed, functional, and when they must be changed. Flexible ducting shall be required to allow exhausting to the exterior of the building. No exhaust with any other type of particulate cleaning system (such as electrostatic precipitators) shall be allowed without prior written approval.

B. Polyethylene sheeting—only 6-millimeter, fire-retardant, polyethylene sheeting. Written authorization for use of an alternate product that meets Boston Fire Department requirements for flame retardancy must be issued.

C. Ground fault circuit interrupters—Underwriters Laboratories Inc. (UL) listed ground fault circuit interrupters (GFCIs) will be used for all electrical connections.

D. Vacuum cleaners—all vacuum cleaners (UL listed) shall be emptied prior to being brought on site and shall have a HEPA filter as the final air filter that is 99.97% efficient at 0.3 microns in aerodynamic particle size.

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E. Wetting Agent or Surfactant—shall be 50 percent polyoxyethylene ester and 50 percent polyoxyethylene ether, or equivalent, mixed in the proportion of 1 ounce of surfactant per 5 gallons of water. The material shall be odorless, nontoxic, nonirritating and noncarcinogenic. It shall be applied as a mist using a low-pressure sprayer recommended by the surfactant manufacturer.

F. Tape and Glue—shall be capable of sealing plastic joints and attaching plastic to finished surfaces. The bonding strength and resulting seal integrity shall not be affected by mist or water, wetting or encapsulating agent or any other materials to be used in the work area.

G. Warning Signs and Labels—shall comply with all federal, state and local codes and regulations.

H. Waste Containers and Transportation—shall be suitable for loading, temporary storage, transport and unloading of contaminated waste without risk of ripping, rupture or exposure to persons, or emissions to the atmosphere. Transportation methods shall comply with the provisions of 40 CFR 61, Subpart M, and with any and all state and local hazardous or special waste regulations for temporary storage, transport and disposal if such codes are enforced in states in which the waste will be stored, transported or disposed.

I. Truck Liners—shall be polyethylene or equivalent with a thickness of at least 10 millimeters for all applications.

J. Scaffolding—scaffolding, lifts, ladders and aerial equipment as required to accomplish the specified work shall meet all applicable safety regulations.

K. Transportation Equipment—as required, shall be suitable for loading, temporary storage, transport and unloading of contaminated waste without exposure to persons or property. The equipment shall be secured at all times and access restricted to unauthorized personnel.

2.3 SAFETY SUPPLIES AND EQUIPMENT

A. Respirator Types—Provide all workers with a full or half-face respirator that is approved by NIOSH/Mine Safety and Health Administration (MSHA) for protection against airborne asbestos and that meets the requirements of the OSHA Asbestos Standard. Minimum respiratory protection required shall be compliant with current OSHA and MADLS regulations including 454 CMR 28 and 29 CFR 1926.1101.

B. Protective Clothing—Provide all workers and approved visitors with disposable coveralls, head and foot coverings, gloves, eye protection (i.e., safety glasses) and half-face respiratory protection including replacement HEPA-filter cartridges.

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PART 3—EXECUTION

3.1 COORDINATION AND SCHEDULING

A. The REMEDIATION CONTRACTOR shall coordinate all work with the GOVERNMENT and the CONSULTANT.

B. The REMEDIATION CONTRACTOR shall submit to the GOVERNMENT, prior to contract performance, a schedule of work including sequencing of asbestos removal areas and demolition.

C. The REMEDIATION CONTRACTOR shall give no less than a two-week advance notice of proposed time for shutting down or interrupting any utility, service or facility that may affect normal facility operations.

D. The REMEDIATION CONTRACTOR shall make all required notifications and obtain all permits including but not limited to MassDEP and MADLS. All associated costs and fees shall be paid for by the REMEDIATION CONTRACTOR and included in the base bid price.

3.2 RESPIRATORY PROTECTION SYSTEMS

A. Provide all workers and authorized visitors with NIOSH-approved respirators compliant with OSHA regulations and a sufficient quantity of disposable filters, so that workers can change filters during the workday.

B. Workers shall always wear a respirator properly fitted on the face while within the work area. Any worker failing to wear his/her respirator or in any way performing his/her work in an unsafe manner shall be restricted from working at this site.

C. Instruct and train workers in proper respirator use.

3.3 PROTECTIVE CLOTHING

A. Provide to all workers, supervisors, superintendents and authorized visitors and inspectors protective disposable clothing consisting of full-body coveralls, head covers, gloves and 18-inch-high, boot-type covers or reusable footwear as required by job conditions and safety regulations.

B. Provide eye protection and hard hats as required by job conditions and safety regulations.

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C. Reusable footwear, hard hats and eye protection devices shall be properly stored while not in use or until the end of the remediation work.

D. All disposable protective clothing shall be discarded and disposed of as asbestos waste every time the wearer exits the work area.

E. Provide all personnel throughout the abatement process with specified protective clothing and gear. Ensure that all personnel entering and leaving the workspace use the following procedures:

1. Entering from the Outside: Don protective clothing and wear clean protective gear.
2. Exiting from the Work Area: Dispose of all protective clothing into labeled plastic bags for asbestos waste.
3. Post written procedures in the workplace and train all personnel on the procedures for the evacuation of the injured and the handling of potential fires. Provide aid to a seriously injured worker without delay for decontamination. Make provisions to minimize exposure of rescue workers and to minimize spreading of contamination during evacuations and fire procedures. Exceptions to normal, routine-exiting procedures shall be made for emergencies such as but not limited to serious personal injury and fires.
4. The REMEDIATION CONTRACTOR shall instruct all employees and workers in the proper care of their personally issued respiratory equipment, including daily maintenance, sanitizing procedures, etc.

F. All respiratory equipment shall be inspected by the REMEDIATION CONTRACTOR's personnel at the beginning of each work period, including breaks and lunch periods.

3.4 GENERAL PREPARATION PROCEDURES

A. Upon receipt of a Notice to Proceed, the REMEDIATION CONTRACTOR shall meet at the site with the GOVERNMENT and the CONSULTANT to reach agreement on:

1. Scope and manner of work performance and all schedules
2. Contractor and supporting vendor vehicle access and parking
3. Access to the work areas, including approved doors, stairways and corridors
4. Location of water supply and wastewater drain connection points, if available
5. Determination of all equipment and other items to be removed from the work areas, and the location of temporary storage space, if applicable
6. Any other logistical factors to minimize interference with public safety and health, and other contractor activities.

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B. For the removal of ACM, the REMEDIATION CONTRACTOR shall isolate the work area in a manner that is sufficient to control dust generated during work including:

1. Six (6)-millimeter polyethylene sheeting shall be placed under the work area. The poly-sheeting shall be taped to the side walls under the work, extending a minimum of 10 feet beyond the area of removal.
2. Cover all non-moveable objects under the removal work area using 6-millimeter poly-sheeting.
3. The removal work area shall be demarcated using appropriate signage and barrier/caution tape and be placed at the entrance to each removal work.
4. Worker decontamination area: The REMEDIATION CONTRACTOR shall establish a personnel decontamination area (PDA) and waste decontamination area (WDA), and ensure that the PDA is the only location where workers egress the work area. The PDA shall be contiguous to the work area to prevent inadvertent cross contamination of asbestos into adjacent areas. The PDA shall be sized in a manner to sufficiently allow for personnel access, and the decontamination and removal of contaminated coveralls and/or clothing and containerization of contaminated PPE. The REMEDIATION CONTRACTOR is responsible for determining the exact size and configuration of the PDA. At a minimum, the PDA shall consist of two layers of 6-millimeter polyethylene sheeting placed on the floor. PDA shall be kept clean for the duration of the work, maintaining it free of asbestos materials, contaminated equipment, PPE, etc.

C. Prepare each work area according to the following general sequence of procedures to ensure that proper fiber containment and protection systems are installed before any work, which could generate airborne asbestos fibers and ensure that all utilities leading to the work area have been locked-out and tagged-out by a licensed electrician.

1. Establish work area, PDA, and WDA as required.
2. Perform pre-cleaning/surface decontamination where appropriate prior to installing protective poly sheeting.
3. Isolate and seal airtight with plastic and tape all HVAC return system openings in the interior work areas.
4. Obtain formal approval from the CONSULTANT of all preparation work and containment areas before commencing asbestos material removal. The CONSULTANT shall be given at least 48 hours notification of the intent to start removal work in any work area.

D. Isolation of Electrical Systems

1. The scope of the electrical isolation work covers the protection of electrical equipment that is in areas where asbestos removal work is performed and where the water used for wetting the material before or during removal could possibly contact the equipment and create a hazard.

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2. Provide portable electrical panels with ground fault protection for all non-battery power requirements. These panels shall have sufficient capacity for all HEPA exhausts and vacuums, power tools, portable lighting, and all other electrical needs.
3. Provide a licensed electrician to perform all electrical work including, but not limited to connecting, energizing, and de-energizing the electrical panels and to be on call to handle any electrical problem, which may arise during the course of the work.
4. All materials and workmanship shall comply with the latest editions of applicable codes, standards, and specifications.
5. Once a work area becomes isolated by containment, only weatherproof lighting and washable tools and equipment will be allowed in the area.

3.5 DECONTAMINATION FACILITIES

A. Description—Any person or thing exiting from the work areas must pass through the PDA or WDA. All containers passing through the WDA must be cleaned thoroughly before exiting the facility. All asbestos materials shall be containerized and disposed of as an asbestos-containing waste material.

B. Construction—PDAs and WDAs shall be constructed and maintained as specified in applicable regulations and shall be located in areas approved by the GOVERNMENT and CONSULTANT.

C. All personnel shall enter the PDA and put on clean protective clothing and respirators; then put on any additional equipment and enter the work area. All personnel exiting the work area shall enter the PDA, remove and store or dispose of all contaminated clothing and PPE.

D. Cleaning—the PDA and WDA shall be cleaned using a HEPA-filtered vacuum at least once every shift or more frequently, if needed, to prevent dust accumulation.

E. Prohibitions—Smoking, drinking, or eating shall not be permitted in any work area, WDA, or PDA.

3.6 ASBESTOS REMOVAL PROCEDURES

A. General Procedures

1. The removal of exterior non-friable ACM must be performed within a regulated area, with protective ground covering, and the material wetted with amended water and carefully removed (not dropped) to prevent the release of ACM and creation of airborne dust.
2. Thoroughly wet ACMs to be removed prior to stripping, handling, or tooling to reduce fiber dispersal into the air. Accomplish wetting by a fine spray (mist) of amended water, or

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penetrating/removal encapsulant (wetting agent). Allow sufficient time for the wetting agent to penetrate material thoroughly. If a removal encapsulant is used, apply in accordance with manufacturer's instructions. Removal of ACM shall be performed while simultaneously spraying wetting agent on the material.

3. Continuously mist the work area with amended water to reduce airborne fiber levels.
4. Dry sweeping is strictly prohibited.
5. Use HEPA vacuum during the abatement activity and prevent the accumulation of settled asbestos dust or debris inside of the abatement area.
6. No unnecessary dust generation activities shall be permitted during abatement.
7. Remove wetted ACM in small sections from the source location. Do not allow the material to dry out.
8. Place ACWM, while still wet, into disposal bags, twist the top of the bag, bend over and seal (goose-neck), with a minimum of three wraps of duct tape. The ACWM in the bag must be adequately wet.
9. Clean the outside of the bag and move to the wash down station adjacent to the material decontamination unit/waste load-out area.
10. Place ACWM bag inside another ACWM bag (double-bag).
11. Carefully lower waste bags to the ground for either containerization or live loading into transport vehicle.
12. If the CONSULTANT or the GOVERNMENT determines that the REMEDIATION CONTRACTOR fails to prevent the release of asbestos dust or renders the non-friable ACM friable, then the non-friable asbestos must be removed under the conditions of a full negative pressure enclosure. During the work, access shall be limited to asbestos associated personnel and/or those trained in accordance with OSHA 29 CFR 1926.1101(k)(9)(iv)(C). All personnel entering the work area shall wear respiratory protection in accordance with 29 CFR 1926.1101(h)(1).

3.7 WORK AREA CLEANUP, DECONTAMINATION AND WASTE DISPOSAL

A. General Requirements

1. After all ACMs have been removed, remove all ACWM and perform a final cleanup and decontamination of each work area. Final cleaning shall be performed only after all ACWM is packaged and removed, but before reinstalling or demolishing any equipment, or dismantling any barrier, decontamination area, or protective coverings. Cleaning shall be subject to the approval of the CONSULTANT based on a visual inspection.

B. Cleaning Methods and Approvals

1. All waste containers and removal equipment shall be thoroughly cleaned with a HEPA-filtered

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vacuum, decontaminated with the use of amended water, and then promptly removed from the work area.

2. All surfaces in the work area shall be thoroughly wiped/washed clean and, after drying, thoroughly decontaminated with a HEPA-filtered vacuuming device.
3. After cleaning, the CONSULTANT shall inspect the work area. To facilitate scheduling of inspections, the REMEDIATION CONTRACTOR shall notify The CONSULTANT of the anticipated completion of the final work area cleaning at least 48 hours in advance. Final visual inspection(s) for the Work Area, shall be conducted in accordance with 454 CMR 28.10 (9)—*Clearance Monitoring Procedures* and 310 CMR 7.15 (8)—*Visual Inspection* as well as applicable federal regulations.
4. If any visible waste, dust, debris, or materials specified for removal are observed within the work area during the inspection, the REMEDIATION CONTRACTOR shall perform additional cleanup and decontamination.
5. Once waste containers and equipment have been properly packaged and removed from the work area as contaminated waste, package and properly dispose of all remaining plastic sheeting, disassemble and remove the decontamination area and HEPA exhausts, and perform a final HEPA vacuuming and/or wet cleaning of all surfaces.

C. Waste Disposal

1. General Requirements—All asbestos wastes must be handled, packaged, stored, transported, and disposed of as specified in this subsection, and in compliance with all federal, state, and local regulations and codes.
2. Waste Labeling—If waste containers are not already so pre-printed, warning labels having waterproof print and permanent adhesive shall be affixed to the lid and/or sides of the containers, whether or not these containers are further packaged. Warning labels shall be conspicuous and legible, and conform to the latest OSHA, EPA and DOT labeling requirements.
3. Waste Packaging—All asbestos waste shall be thoroughly wetted when packaged and the REMEDIATION CONTRACTOR shall inspect each bag, drum or container to observe that water condensation is visible. Insufficiently wetted bags shall be opened, rewetted, and resealed inside a negative pressure enclosure. When a waste bag is full, it shall be securely sealed with tape, and then placed in the designated temporary storage area inside of the work area.

D. Waste Container Removal and Disposal Documentation

1. The REMEDIATION CONTRACTOR shall coordinate the removal of asbestos materials from the building with the GOVERNMENT and the CONSULTANT. Asbestos waste shall be

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appropriately containerized and transported using wheeled carts or carried by hand. The REMEDIATION CONTRACTOR is responsible for ensuring that no building damage will occur during waste handling and transport.

2. If is stored on site, it will be in a designated storage area and be located in a secured, weatherproof enclosure.
3. It is the responsibility of the REMEDIATION CONTRACTOR to determine current waste handling, transportation, and disposal regulations for the worksite and for each waste disposal landfill. The GOVERNMENT must approve the landfill destination. The REMEDIATION CONTRACTOR must comply fully with these documents and all DOT and EPA requirements.
4. The REMEDIATION CONTRACTOR, transporter and landfill shall document generation, transport and disposal of the asbestos waste at the designated landfill by completing a Waste Shipment Record and forwarding the original along with the Bill of Lading to the GOVERNMENT within the 30-day time period specified by EPA.
5. Measure the volume of each container or load of ACWM removed from the Site. The REMEDIATION CONTRACTOR shall provide the CONSULTANT with an estimated total volume of each load/container of waste and provide an accurate count of each type of container for each load BEFORE the waste is removed from the Site.
6. Provide legal transportation of the asbestos waste to the disposal landfill, and complete or obtain all required licenses, manifests, dump slips, or other forms. Proper truck placarding must be performed in accordance with DOT regulations. Legible copies of all forms or licenses, and the signed original of the Waste Disposal Form (e.g., Asbestos Waste Shipment Record) for each waste load, shall be given to the GOVERNMENT.

3.9 MONITORING, TESTING, AND INSPECTIONS

A. All air monitoring, with the exception of the REMEDIATION CONTRACTOR personnel monitoring (for OSHA compliance), will be performed by the CONSULTANT. The REMEDIATION CONTRACTOR is responsible for personnel monitoring in compliance with OSHA regulations. The CONSULTANT may, at his or her discretion, also conduct personnel monitoring on REMEDIATION CONTRACTOR personnel. Monitoring by the CONSULTANT shall not relieve the REMEDIATION CONTRACTOR of obligation to perform personal exposure assessments.

B. The performance and execution of the work will be closely monitored by the CONSULTANT. The monitoring will be inside the work areas and surroundings to evaluate compliance with these specifications and applicable regulations. The REMEDIATION CONTRACTOR shall provide cooperation and support to the CONSULTANT throughout the abatement process. The monitoring may include air samples in the workspace, personnel samples at breathing levels for a number of workers to be determined solely by the CONSULTANT, air samples in the areas surrounding the work area and the outside, checking of the standard operating procedures, engineering control

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system, respiratory protection system, labeling, packaging, transporting and disposal of asbestos, decontamination facilities and procedures and any other aspects of the abatement process that may impact the health and safety of the public or the pollution of the environment. This monitoring is further intended to document type and quantities of asbestos materials removed and to evaluate the REMEDIATION CONTRACTOR compliance with regulations and the Contract Documents.

C. The REMEDIATION CONTRACTOR is responsible for meeting OSHA requirements for their personnel, including but not limited to, monitoring requirements, safety compliance and record keeping. Personal monitoring results from the previous day shall be posted each day, and legible copies of the results forwarded to the CONSULTANT.

D. The REMEDIATION CONTRACTOR shall not start containment dismantling operations until REMEDIATION CONTRACTOR has received approval from the CONSULTANT.

3.10 FINAL INSPECTION AND TESTING

A. After thorough cleaning and removal of all asbestos waste and materials, tools and equipment, the REMEDIATION CONTRACTOR's Asbestos Supervisor shall perform an initial inspection of the work area to determine if it is ready for a final visual inspection by the CONSULTANT. Once REMEDIATION CONTRACTOR has determined that the containment or regulated work area is ready for the final visual inspection, the CONSULTANT shall be notified no less than 48 hours in advance to schedule and perform the required final inspection and final clearance air testing. The CONSULTANT will visually inspect the work area for visible waste, dust, debris, or materials specified for removal or contamination. All surfaces shall be dry before the visual inspection.

B. After the specified post-abatement levels have been confirmed through the final inspection specified herein, the work area can be deconstructed and disposed of as asbestos waste. A final check will be carried out by the CONSULTANT to ensure that no dust or debris remain on surfaces as the result of asbestos removal and related activities and containment dismantling operations.

C. After achieving the level of cleanliness and decontamination as specified herein and as confirmed by the final inspection, the CONSULTANT and GOVERNMENT will thoroughly inspect the work areas jointly with the REMEDIATION CONTRACTOR to determine whether any damage has been done to any building component, finish, equipment or any other part of the workspace or property that will not be subsequently demolished or have been specifically designated for salvage. A final inspection report shall be prepared jointly between the CONSULTANT and the GOVERNMENT detailing the list of items to be fixed by the REMEDIATION CONTRACTOR.

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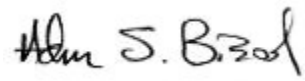
Prepared by Adam S. Bisol, Massachusetts Asbestos Designer #AD034163.



END OF SECTION

Attachments:
Appendix A: Asbestos-containing Materials, Location, Description, and Estimated Quantity
Appendix B: EH&E report dated January 24, 2025: *Updated Targeted Asbestos and Lead Inspection, Buildings 22 and 28 (the Constitution Museum) Window and Door Restoration, Charlestown Navy Yard.*

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Appendix A
Asbestos-containing Materials
Location, Description, and Estimated Quantity

Note: ACM locations are reflected in the Appendix E report and the Schwartz/Silver Building 22 and 28 Restauration Repairs A2.1 – A2.8, A5.1 – A5.7.

Table 1 Regulated[1] Asbestos-containing Material Identified, Buildings 22 and 28 (the Constitution Museum) Window and Door Restoration, Charlestown Navy Yard, October 16, 2024, and January 16, 2025

Homogenous Material Code/Sample IDs		Material Description	Material Location(s)*	Percent Asbestos & Type	Approximate Quantity
28-CLK 1	A-C	Exterior caulk, light gray	Perimeter of the windows and doors, between wood frame and brick, building 28	2% CHR	1,200 LF
22-CLK 1	A-C	Exterior caulk, light gray	Perimeter of the windows and doors, between wood frame and brick, building 22	2% CHR	1,500 LF
22-WS 1	A-C	Exterior window glassing compound, light gray	Edges of the glass panes, building 22	2% CHR	5,200 LF

CHR chrysotile
LF linear feet

[1] Regulated asbestos-containing materials (ACMs) are building materials determined to contain ≥1.0% asbestos by polarized light microscopy (PLM).

* Approximate sample locations are illustrated in Appendix E.

Samples were analyzed using PLM by Asbestos Identification Laboratory (AIL) in Woburn, Massachusetts. AIL is accredited by the National Institute of Standards and Technology's (NIST) National Voluntary Laboratory Accreditation Program (NVLAP) for asbestos analysis of bulk samples by PLM with dispersion staining. Samples were analyzed for chrysotile, amosite, crocidolite, actinolite, tremolite, and anthophyllite type asbestos fibers.

SECTION 04 01 20 - BRICK MASONRY RESTORATION

PART 1 – GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the work of brick masonry restoration as shown on the Drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:

1. Rebuilding areas of displaced brick using salvaged existing brick or new brick to match existing original brick in locations as indicated on Drawings.
2. Removing individual damaged bricks and replacing with new brick to match existing original brick in locations as indicated on Drawings.
3. Preparing and pointing joints in brick masonry as required. All window returns to be included in work.

B. Related Work Specified Elsewhere

1. Asbestos Remediation – Section 02 82 00
2. Stone Masonry Restoration – Section 04 01 40
3. Cast Stone Restoration – Section 04 72 00
4. Architectural Woodwork Restoration – Section 06 01 40
5. Exterior Joint Sealants – Section 07 92 00
6. Wood Door Restoration – Section 08 01 14
7. Wood Window Restoration – Section 08 01 52
8. New Wood Windows – Section 08 52 00
9. Paint Removal – Section 09 01 10
10. Exterior Painting – Section 09 91 00

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1.3 QUALITY ASSURANCE

A. Brick Masonry Restoration:

1. Foreman: Brick masonry restoration shall be directly supervised by a full-time foreman who has successfully completed at least five years' experience with work on historic buildings similar to that required by this Section. Foreman shall be on site daily for duration of work of this Section. Same foreman shall remain on Project throughout work unless his performance is deemed unacceptable.
2. Mechanics: Brick masonry restoration shall be carried out by a steady crew of skilled brick masons who are thoroughly experienced with restoration of historic brick masonry using materials and methods specified and have a minimum of three years' experience with work on historic buildings similar to that required by this Section. In acceptance or rejection of work of this Section, no allowance will be made for workers' inattention or lack of skill.

B. Laws, Codes, and Regulations: Work of this Section shall comply with applicable federal, state, and local laws, codes, and regulations.

C. Referenced Standards: Comply with applicable requirements and recommendations of the latest editions of the referenced standards listed herein, except as modified by more stringent requirements of the Contract Documents and of applicable laws, codes, and regulations. In each case in which there is a conflict between requirements of referenced standards; requirements of laws, codes, and regulations; and requirements of this Section, the most stringent or restrictive requirement shall govern.

1. ASTM International (ASTM)

a. ASTM C 144, Standard Specification for Aggregate for Masonry Mortar.
b. ASTM C 150, Standard Specification for Portland Cement.
c. ASTM C 216, Standard Specification for Facing Brick.

2. The Masonry Society

a. TMS 402/602, Building Code Requirements and Specification for Masonry Structures (formerly ACI 530)

D. Sources of Materials: Obtain each type of material required for brick masonry restoration from a single source to ensure a match in quality, performance, and appearance.

E. Access for Observation and Approvals: Provide Contracting Officer access on a continuing basis to locations on which mock-ups are being carried out, on which work is ongoing, and where work has been completed to allow for observation and approvals. Provide means of access complying

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with laws and regulations regarding safety and acceptable to Contracting Officer. Provide manpower and equipment to facilitate observation and approvals.

F. Restoration of Damaged Masonry Units: Repair or replace all broken, lost, and damaged masonry units resulting from work of this Section to Contracting Officer's satisfaction at no additional cost to Government.

1.4 SUBMITTALS

A. General: Submit the following in compliance with the requirements of the Contract Documents. Revise and resubmit each item as required to obtain Contracting Officer's approval.

B. Product Data: Submit manufacturer's published technical data for each product to be used in work of this Section including material description, chemical composition (ingredients and proportions), physical properties, recommendations for application and use, test reports and certificates verifying that product complies with specified requirements, and Safety Data Sheets (SDS). SDS for record only.

C. Samples

1. Face Brick: Sets of each type of brick to be used including sufficient numbers of brick to show full range of colors and textures to be expected in completed work. Brick shall match existing brick.

D. Prepare mock-ups as specified in Section 1.5 Mock-Ups, below.

1.5 MOCK-UPS

A. General: Before beginning general brick masonry restoration, prepare mock-ups to provide standards for work of this Section. Do not proceed with brick masonry restoration until Contracting Officer has approved mock-ups.

1. Locate mock-ups as directed by Contracting Officer.
2. Notify Contracting Officer 48 hours prior to start of each mock-up.
3. Contracting Officer will monitor mock-ups. Mock-ups not performed in presence of Contracting Officer will be rejected.
4. Use crew that will execute the work and follow requirements of this Section.
5. Allow mock-ups with mortar to dry for seven days to allow material to reach final color and allow potential problems to appear. Notify Contracting Officer when mock-up is ready for review.
6. Repeat mock-ups as necessary to obtain Contracting Officer's approval.

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7. Protect approved mock-ups to ensure that they are without damage, deterioration, or alteration at time of Substantial Completion.
8. Approved mock-ups in undamaged condition at time of Substantial Completion may be incorporated into the Work.
9. Approved mock-ups will represent minimum standards for brick masonry restoration. Subsequent brick masonry restoration work that does not meet standards of approved mock-ups will be rejected.

B. Prepare the Following Mock-Ups

1. Providing New Brick Masonry to Replace Damaged and Deteriorated Brick Masonry: One location.
2. Preparing Joints in Brick Masonry: One panel, minimum 6 sq. ft.
3. Pointing Joints in Brick Masonry: One panel, minimum 6 sq. ft.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products and materials to prevent damage, deterioration, degradation, and intrusion of foreign material.

B. Discard and remove from site deteriorated materials, contaminated materials, and products that have exceeded their expiration dates. Replace with fresh materials.

1.7 PROJECT CONDITIONS

A. Safety: Protect all persons, whether or not involved in the work of this Section, from harm caused by or resulting from work of this Section.

1. Protection from Hazardous Materials: Use procedures necessary to protect workers and other persons from contact with hazardous materials resulting from work of this Section.

a. Silica: Use procedures necessary to protect workers and other persons from exposure to respirable crystalline silica. All work should be performed in compliance with applicable OSHA regulations, including but not limited to “Respirable Crystalline Silica Standard” (Title 29, Code of Federal Regulations (CFR) Section 1926.1153) and with other applicable state and local laws and regulations.

B. Protection of Building: Protect building elements and finishes from damage and from deterioration caused by work of this Section. Repair damage to materials and damage to finishes to Contracting Officer’s satisfaction at no additional cost to Government.

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1. Exclusion of Water: Cover open joints and areas from which units have been removed during periods when work is suspended to ensure materials and finishes are not damaged by water penetration.
2. Prevention of Staining: Prevent grout, mortar and adhesives from staining exposed faces of masonry.
3. Protection from Fire: Take precautions necessary to prevent fire and spread of fire.

    a. Covers: Membranes, insulation blankets, and other materials used to cover masonry shall be flame retardant and fire resistant.
    b. Warming Devices: Heating blankets, infrared heaters, and other warming devices shall be UL approved and inspected for damage before use.
    c. Open Flame Heaters: No open flame heaters shall be used to protect finished masonry.

1.8 ENVIRONMENTAL REQUIREMENTS

A. General:

1. Manufacturer's Recommendations: Perform work only when temperature of products being used, temperatures of existing and new materials and surfaces, and temperature and humidity of air at Project site comply with manufacturer's requirements and recommendations.
2. Conflicting Requirements: In each case in which there is a conflict between manufacturer's recommendations, recommendations of referenced standards, and other requirements specified in this Section, the most stringent and restrictive requirement shall govern.

B. Cold Weather Brick Masonry Restoration: Cold weather brick masonry restoration shall adhere to following requirements for work, performed in ambient temperatures indicated. Work shall not be permitted when temperature of air or wall is below 40 deg F or when temperature of air or wall is predicted to be below 40 deg F in Project location within 48 hours of work by the National Weather Service without Contracting Officer's prior written approval. No work shall begin when any part of wall or materials in use are frozen or subject to freezing temperatures.

C. Hot Weather Brick Masonry Restoration: Protect fresh mortar from premature drying when temperature, humidity, and wind conditions result in rapid drying of mortar. Provide and maintain tarps against wind and direct sun. Protect masonry for 72 hours after using mortar by one of the following procedures:

1. Water-Soaked Cover: Provide and maintain damp burlap or other damp cloths over masonry to protect mortars from pre-mature drying. Install, maintain, and remove coverings using materials and methods that do not damage or alter masonry.

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2. Fog Spray: Fog spray newly constructed masonry until damp at least three times a day using water without iron or other contaminants that might adversely affect masonry. Do not use water stream or pressure that might wash binder from surface of mortar or cause rundown on masonry.

D. Damage from Work in Cold Weather or in Hot Weather: Remove work of this Section damaged by freezing during cold weather masonry work and/or damaged by premature or too-rapid drying during hot weather masonry work and replace with new masonry work complying with the requirements of this Section at no additional cost to Government.

PART 2 – PRODUCTS

2.1 BRICK

A. Salvaged Face Brick: Sound, whole, salvaged brick cleaned free of mortar, grout, dirt, and other contaminants.

1. Brick Salvaged: Existing brick removed from building that match adjacent brick.
2. Brick Salvaged from Another Source: Brick that has been salvaged from another building that matches existing face brick in size, color, surface texture and reflectance, and weatherability.

B. New Face Brick: Replacement face brick shall comply with requirements of ASTM C 216, Grade SW, shall have a minimum compressive strength of 6,000 psi, and shall match existing original face brick in hardness and weatherability, size, color, and surface texture and reflectance.

1. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated “not effloresced.”

2.2 MORTAR MATERIALS, GENERAL

A. Grade and Quality: Materials shall conform to requirements of this Section and shall be new, free from defects, and of recent manufacture.

B. Manufacturer's Instructions: Comply with material manufacturer’s instructions for use of products (including surface preparation, mixing, applying, drying, etc.). In case of conflict with requirements of this Section, the more stringent requirements shall govern.

C. Prohibited Materials: The following materials are strictly prohibited in mortar and grout:

1. Masonry cements, masonry mortars, and other components that include ingredients other than Portland cement, lime, and approved aggregates.

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2. Additives and admixtures other than those specified and approved in writing by Contracting Officer.

2.3 MORTAR AND PATCHING MATERIALS

A. Portland Cement: ASTM C 150, Type I or Type II. Do not use masonry cement.

B. White Portland Cement: ASTM C 150, Type I.

C. Hydrated Lime: ASTM C 207, Type S.

D. Sand: Clean sharp sand, free of loam, silt, soluble salts, organic matter, and other substances that might adversely affect mortar, masonry units, or embedded elements and graded in compliance with ASTM C 144. Where mortar or patching mortar is to match existing original mortar or patching mortar, sand or other aggregate shall be selected to provide mortar matching color and texture of original mortar (with minimum addition of pigment). Sieve and mix sand and aggregates from individual sources and from more than one source to provide mortar matching original mortar.

E. Water: Clean and free of substances that might adversely affect mortar, masonry, and embedded elements.

F. Pigments: Stable, light-fast, alkali-resistant, water-soluble mineral oxide pigments without fillers or extenders complying with ASTM C 979. Provide one of the following, or approved equal:

1. SGS Concentrated Mortar Colors by Solomon Color, Inc., 4050 Color Plant Road, Springfield, IL 62702 (800-624-0261).
2. Lanxess Bayferrox Iron Oxide Pigments by Lanxess Corporation, Business Unit Inorganic Pigments, 111 RIDC Park West Drive, Pittsburgh, PA 15275 (412-809-1000).
3. Powder Pigments by Davis Colors, 3700 East Olympic Blvd., Los Angeles, CA 90023 (323-265-8323).

2.4 PREFORMULATED MORTARS AND GROUTS

A. Composite Patching Mortar for Granite: Single-component, cementitious, mineral-based mortar specifically manufactured for the restoration of natural stone. Provide custom colors to match colors of clean stone. Provide one of the following, or approved equal:

1. Jahn M100 Terra Cotta and Brick Repair Mortar, available from Cathedral Stone Products, Inc., 7266 Park Circle Dr., Hanover, MD 21076 (800-684-0901)
2. Custom System 45, available from Edison Coatings, Inc., 3 Northwest Drive, Plainville, CT 06062 (800-341-6621).
3. Matrix, available from Conproco, (800-258-3500).

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2.5 MORTAR MIXES

A. General

1. Mortars specified hereinafter shall comply with ASTM C 1713, Standard Specification for Mortars for the Repair of Historic Masonry.
2. Mix mortars using proportions specified herein as adjusted, if necessary, by the amount of moisture in the ingredients. The proportions specified are for dry cements and limes and damp, loose (saturated, surface-dry) sand. If ingredients with different moisture contents are used (for example, lime putty is used in place of lime or dry sand is used in place of damp, loose sand), adjust quantities so that the proportions of ingredients in the mixes equal the proportions specified as approved by Contracting Officer.

B. Mortars for Setting Masonry

1. Mortar for Setting Brick Masonry: Cement, lime, sand mortar. Proportion mortar by volume as follows to achieve a mortar with a minimum compressive strength of 415 psi at 7 days and 540 psi at 28 days.

    a. 1 part by volume white Portland cement, gray Portland cement, or a combination of white and gray Portland cement as required to produce mortar matching color of original mortar.
    b. 2 part by volume hydrated lime (Type S).
    c. 7 parts “00” sand (Selected to match sand in original mortar).
    d. Oxide pigments as needed to match color of the original mortar in the brownstone masonry and in the brick masonry, respectively, but not to exceed 7 percent of the weight of the cement.
    e. Mortar for Pointing Joints in Brick Masonry: Provide the following mortars. Mortar mixes may change and may require adjustment before and during construction in accordance with preconstruction conformance testing, field-testing, and Contracting Officer’s evaluation thereof.

2. Mortar for Brick Masonry: Cement, lime, sand mortar. Proportion mortar by volume as follows to achieve a mortar with a minimum compressive strength of 540 psi at 28 days.

    a. 1 part by volume white Portland cement, gray Portland cement, or a combination of white and gray Portland cement as required to produce mortar matching color of original mortar, if possible.
    b. 2 part by volume hydrated lime (Type S).
    c. 7 parts sand (selected to match sand in original mortar of masonry being pointed)
    d. Oxide pigments as required to adjust color of mortar mixed to as close a match to original mortar as possible using appropriate colored aggregates to match original

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color of mortar in brick being pointed but not to exceed 7 percent of the weight of the cement and lime.

2.6 MIXING OF MORTARS AND GROUTS

A. Measuring: Measure mortar and grout ingredients carefully using containers with fixed volumes so that proportions are controlled and maintained throughout the work of this Section.

B. Mixing Portland Cement Mortars and Grouts: Mix mortars and grouts in an approved type of power-operated batch mixer. Mix for time necessary to produce a homogeneous plastic mortar but not be less than five minutes: approximately two minutes for mixing dry materials and not less than three minutes for mixing after water has been added.

C. Water: Use a minimum amount of water to produce a workable consistency for mortar's intended purpose.

1. Mortar for Pointing: As dry a consistency as will produce a mortar sufficiently plastic to be worked into joints.
2. Grout for Injection: Consistency that can be injected to fill voids and losses.

D. After mixing, mortars for pointing or setting shall sit for 20 minutes prior to use to allow for initial shrinkage. Mortar shall be placed in final position within two hours of mixing. Retempering of partially hardened material is not permitted.

E. Mortar for grout shall be placed in final position within two hours of mixing or within period recommended by manufacturer of custom products, whichever is less. Retempering of partially hardened material is not permitted.

F. Custom Patching Mortars and Grouts: Mix in strict accordance with manufacturer's written instructions.

2.7 TOOLS FOR JOINT PREPARATION

A. Hand Tools: Chisels, hammers, and mallets.

1. Thickness of Chisels: Maximum thickness of 5/8 times joint width extending from tip at least three times depth at which chisel will be inserted into joint.

B. Power Tools: Standard tools and equipment, modified tools and equipment, and custom designed and fabricated tools and equipment as necessary to remove mortar from narrow joints without damaging masonry units. Use power tools only under conditions described in Part 3, below, and only if specifically approved by Contracting Officer.

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1. Electric Grinders: Small, hand-held electric grinders with blades no greater than 1/16 inch thick and a maximum of 4-1/2-inch diameter.
2. Pneumatic Grinders: Specially modified pneumatic die grinders with thin diamond abrasive blades (0.060 inch thick). Subject to compliance with requirements, provide wafer blades.

C. Tools for Preparation of Joints Containing Sealant: Small wire bristle brushes, metal scrapers, small grinders, low-pressure, airborne, micro-abrasive blasting equipment, or other tools and equipment for removing remains of sealant and sealant residue from joint as described in approved Work Description.

D. Brushes for Removing Dust and Dirt from Joints: Stiff, natural- or synthetic-fiber bristle brushes. No metal bristle brushes are acceptable.

2.8 MISCELLANEOUS MATERIALS

A. Pointing Trowels: Long, thin pointing trowels narrower than joints being pointed.

1. Fabricate special custom trowels for masonry pointing as necessary to ensure proper insertion and optimum compaction of mortar in thin joints.

B. Scrapers for Removing Mortar: Wood scrapers with rounded corners.

C. Brushes for Removing Dirt and Debris from Joints: Stiff natural bristle or fiber bristle brushes. No metal bristle brushes are permitted.

PART 3 – EXECUTION

3.1 GENERAL

A. Examination: Examine areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of work. Do not proceed until unsatisfactory conditions have been corrected.

B. Wetting Bricks and Existing Masonry: Thoroughly wet brick and existing masonry prior to installation to ensure that brick and masonry are nearly saturated but free of surface water (saturated, surface dry) when mortar is applied.

C. Full Shoved Joints: Ensure that bed, head, and collar joints in masonry are shoved full so that mortar fully contacts all surfaces of masonry units in joints and there are no voids in brickwork. Do not slush joints.

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3.2 BRICK MASONRY

A. General: Lay brick plumb, level, and true to line in full beds of mortar with bond pattern matching original bond pattern and courses and joints meeting those of adjacent brick masonry. Provide anchors and ties as indicated on approved shop drawings to ensure solid, stable construction.

B. Cutting Masonry Units: Where brick are to be cut to size, make cuts neatly with a power-driven saw. Do not expose cut face to weather.

C. Jointing: Jointing of rebuilt masonry shall match that of existing masonry. Each course shall align with and be flush with existing work. Joints shall be uniform, matching widths of existing joints.

D. Joints: Fill joints in brickwork completely full with mortar as each course is laid.

1. Bed Joints: Form bed joints in one of the following ways:

a. Apply a thick layer of smooth or slightly furrowed mortar on top of units previously laid and shove brick in place.
b. Apply a full coat of mortar to bottom of brick and shove it into place.

2. Head and Collar Joints: Form head and collar joints by applying a full coat of mortar to entire end or entire side as case requires and then shoving mortar covered end and/or side of brick tightly against bricks previously laid. Apply 3/8-inch-thick coat of mortar to back of facing brick before brick is installed.
3. Preparation for Pointing Joints in Brick Masonry: Rake joints in exposed brick masonry to prepare for pointing as specified in Section 3.6 “Joint Preparation”, below.

E. Damaged Masonry Units: Remove and replace brick that are loose, chipped, broken, stained or damaged by freezing or for any other reason, and units that do not match adjoining units as intended. Furnish new units to match adjoining units and install in fresh mortar, pointed to eliminate evidence of replacement.

3.3 REPLACING DAMAGED AND DETERIORATED BRICK

A. General: Replace damaged and deteriorated brick with salvaged brick or new brick where salvaged brick is not available to match original in size, color, surface texture, light reflectance, and other physical properties.

B. Removal: Carefully remove brick to be replaced and mortar from joints around it. Do not disturb adjacent brick. In each case where bond of brick is broken, remove brick and mortar around brick and reset brick.

C. Cleaning: Thoroughly remove dirt and dust from hole. Use care to ensure debris is not deposited

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in holes previously cleaned.

D. Wetting: Thoroughly wet brick to be inserted and surfaces at hole in masonry to receive brick to ensure that masonry is nearly saturated but surface dry at time of installation.

E. Inserting Brick: Apply mortar to all surfaces in hole to receive replacement brick and to all surfaces of brick to be inserted, except for surfaces to be exposed, to ensure that voids are filled with mortar. Excess mortar shall be squeezed out of joints around brick as it is inserted.

F. Preparation and Pointing: Rake joints to prepare for pointing. Point joints following requirements of Articles “Mortar Application” and “Joint Tooling,” below.

3.4 PREPARING AND POINTING JOINTS

A. Preparing Joints Containing Mortar

1. General: Remove mortar from joints to a depth of 3/4 inch, to 2-1/2 times width of joint, or to sound mortar, whichever is deepest. In all cases remove deteriorated, weathered, and loose material to sound mortar.

a. Completely remove mortar from surfaces of masonry units adjoining joint to allow new mortar to bond directly with masonry units.
b. Cut surface of mortar at rear of joint at a uniform depth from and parallel to wall surface.
c. Do not damage faces or arrises of masonry units during joint preparation. Cease joint preparation work if, in Contracting Officer’s judgment, masonry units are damaged by methods being used to prepare joints. Do not resume work until tools, workers, and methodology have been corrected to ensure that masonry units are not damaged and that work meets standard set by approved mock-up.

2. Mortar Removal Using Power Tools

a. Rotary Power Tools: With Contracting Officer’s specific prior approval following successful demonstrations of skill by mechanics, power grinders and/or pneumatic grinders may be used to partially remove mortar from horizontal (bed) joints in brick masonry and from joints longer than 6 inches in stone masonry where there is no danger of cutting into adjacent masonry units.

1) Limitations on Use of Electric Power Grinders: Do not use electric power grinders on joints less than 3/16-inch wide or less than 6 inches long or where ornament, elaborate profile, or other surface irregularity might make damage to masonry units likely.

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2) Extent of Mortar Removal Using Power Grinders: Use power grinder only to score one kerf cut in center of each joint to depth of mortar removal required. Remove remaining mortar from sides of joint using hand tools or, if approved, pneumatically powered chisels.

a) Stop kerf at least 4 inches from inside corners and projecting elements. Remove remaining mortar using hand tools or pneumatically powered chisels.

3. Cleaning: Remove loose mortar and foreign material from raked joints using a fine, stiff natural- or synthetic-fiber bristle brush. Remove remaining particles, dust, and dirt. Ensure that dust and dirt are not blown back into previously cleaned joints.
4. Restoration and Replacement of Damaged Units: Repair and/or replace masonry units damaged during joint preparation to provide units in at least as good a condition as before joint preparation was begun to Contracting Officer's satisfaction at no additional cost to Government.

B. Preparing Joints Containing Sealant

1. General: Remove sealant and sealant residue from joints using mechanical methods, solvent cleaner, and abrasive methods as required to provide clean masonry substrates suitable for optimum adhesion and performance of mortar without damaging faces of masonry units.
2. Mechanical and Chemical Removal of Sealant and Sealant Residue: Remove as much of the sealant as possible using mechanical means and remove remaining sealant and sealant residue from joint substrates using approved chemical remover following requirements of Section 04 01 10 – "Masonry Cleaning."
3. Abrasive Treatment of Substrate: Following protection of surfaces of masonry units to be exposed in completed work sufficient to prevent them from being damaged by abrasive removal of material from joints, use wire bristle brushes, metal scrapers, small grinders, low-pressure, airborne-abrasive blasting, or other approved method to remove remaining traces of sealant from joint substrates and to prepare joint substrates for optimum installation of mortar. Do not damage surfaces of masonry units to be exposed in finished work in any way. Do not widen joints.
4. Cleaning: Thoroughly remove dust and debris. Use care to ensure debris is not deposited in joints previously cleaned.
5. Removal of Mortar Behind Sealant: If removal of sealant leaves a joint with mortar closer than 3/4 inch or 2-1/2 times joint width, whichever is greater, to the face of the masonry or with loose or deteriorated mortar, remove mortar to comply with requirements of Paragraph "Preparing Joints Containing Mortar," above.

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C. Pointing Joints

1. Wetting: Thoroughly drench masonry with water 24 hours prior to pointing joints. Thoroughly wet masonry again immediately before pointing joints and allow surfaces to dry slightly. At time of masonry pointing, surfaces shall be damp, so that they do not rapidly absorb moisture, but free of standing water (saturated, surface dry).

    a. Failure to Properly Wet Substrate: Evidence that masonry to be pointed has not been properly dampened to prevent water in the mortar from being too rapidly absorbed by the masonry will be cause for Contracting Officer to reject pointing work. Remove rejected pointing, properly prepare joints for pointing, and provide new mortar to meet requirements of this Section at no additional cost to Government.

2. Masonry Pointing: Point joints as follows.

    a. Using a long, thin masonry pointing trowel, tightly pack mortar into joints in layers not exceeding 1/4-inch thick to fill joint to match original sound joints.
    b. Begin by filling areas from which mortar is missing to a depth greater than 3/4 inch in 3/8-inch-thick layers to within 3/4 inch of finished joint surface to provide a uniform substrate for final masonry pointing. Fill final 3/4-inch depth of joint continuously and uniformly in 1/4-inch-thick layers.
    c. Firmly iron each layer to compact mortar and ensure full bond between mortar and masonry units and a firm, solid joint.
    d. Allow each layer to reach leather hardness before applying succeeding layer. Do not let previous layer dry out before applying succeeding layer. Construct uniform joints.
    e. Do not spread mortar over edges onto exposed surfaces of masonry units. Do not featheredge mortar.
    f. When stopping work at end of each day or for other reasons, stagger layers of mortar so that there will be no through joints in mortar inserted into joints. Stagger joints in layers so that they are at least 3 inches from each other.
    g. Where applying new work to that of a prior day, dampen previous work to ensure good bond.

3. Joint Tooling

    a. Tooling: After final layer of mortar is “leather hard,” tool joints with a flat rule jointer, or as directed by Contracting Officer.
    b. Profile: Tool joints to profile as shown on Drawings or to match original joint profiles as directed by Contracting Officer. Solidly compress mortar so that it adheres well to masonry on both sides and forms a dense surface. Premature or late tooling will result in unacceptable finishes, which will be rejected.

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4. Curing

   a. Keep newly pointed joints damp for at least 72 hours after mortar has been inserted. Do not apply a direct stream of water to joints for at least 7 days after mortar has been placed.
   b. Ensure masonry temperature remains as required by specifications until mortar is thoroughly cured.

3.5 CORRECTIVE MEASURES

A. Correcting Unacceptable Joints: Should a crack occur in any joint surface, should mortar separate from a masonry unit, indicating that it did not form a strong mechanical and chemical bond with the unit, or should Contracting Officer determine that for another reason masonry pointing work does not equal or exceed the minimum standard established by the approved mock-up, remove mortar to a minimum depth of 3/4 inch, properly prepare joint substrates, and repoint following requirements of this Section to Contracting Officer's satisfaction at no additional cost. At completion of work of this Section, joints shall be full of mortar soundly adhered to surfaces of masonry units at sides of joints and without defects.

B. Repairing Damage: Repair damaged and deteriorated masonry resulting from work of this Section by patching damaged masonry units and/or replacing damaged masonry units to match original units to the satisfaction of the Contracting Officer at no additional cost to Government.

3.6 ADJUST AND CLEAN

A. Clean masonry prior to final setting of mortar. Remove mortar and stains from face of brickwork with dry, stiff bristle brushes. Contracting Officer may require additional cleaning procedures, if masonry staining occurs. Keep walls clean as work progresses. After mortar has cured, perform final cleaning, using only clean water and stiff fiber bristle brushes.

B. Clean mortar joints as specified in Paragraph "Cleaning and Repair of Mortar Joints," above.

C. Remove work of this Section that does not comply with requirements of this Section or does not match approved mock-up as determined by Contracting Officer. Provide new work matching requirements of this Section at no additional cost to Government.

END OF SECTION

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SECTION 04 01 40 - STONE MASONRY RESTORATION

PART 1 – GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION

A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the work of stone masonry restoration as shown on the Drawings and/or as specified herein and as may be required by conditions and authorities having jurisdiction, including, but not necessarily limited to, the following:

1. Routing out existing cracks and filling cracks with new composite mortar patches at crack surface.
2. Repairing cracked stone units by inserting stainless steel rods in epoxy adhesive to secure portions of stone units and providing composite patching mortar crack repairs.
3. Repairing cracked stone lintel units by inserting threaded rods in epoxy, injecting crack with epoxy and providing composite patching mortar crack repairs.
4. Patching holes and losses in stone units using stone dutchmen matching adjacent existing stone, including parallel grooved surface texture.
5. Removing failed patches and providing new stone dutchman repairs.
6. Preparing and pointing joints in granite masonry. Joints shall match existing in profile, color, and dimension. Repointing includes all door and window returns, sills, and horizontal ledges and projections.
7. Removing anchors for scaffold tiebacks and patching holes remaining following anchor removal to match adjacent surface and to comply with requirements of this Section as scaffolding is dismantled.

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B. Related Work Specified Elsewhere

1. Asbestos Remediation – Section 02 82 00
2. Brick Masonry Restoration – Section 04 01 20
3. Cast Stone Restoration – Section 04 72 00
4. Architectural Woodwork Restoration – Section 06 01 40
5. Exterior Joint Sealants – Section 07 92 00
6. Wood Door Restoration – Section 08 01 14
7. Wood Window Restoration – Section 08 01 52
8. New Wood Windows – Section 08 52 00
9. Paint Removal – Section 09 01 10
10. Exterior Painting – Section 09 91 00

1.3 DEFINITIONS

A. "Dutchman" as used herein refers to a portion of new or salvaged stone fitted into an existing stone to produce an intact contiguous surface.

B. "Plug" as used here refers to a circular dutchman cored out of stone matching stone to be repaired.

C. "Cold Weather Stone Masonry Restoration" as used herein refers to work of this Section when temperature is below 40 deg F or predicted to go below 40 deg F within 48 hours of use of mortar by AccuWeather the National Weather Service.

D. "Hot Weather Stone Masonry Restoration" as used herein refers to work of this Section when temperature is above 100 deg F or when temperature is above 90 deg F and wind is above 8 mpg or when either of these conditions is predicted within 48 hours of use of mortar.

1.4 QUALITY ASSURANCE

A. Stone Masonry Restoration:

1. Foreman: Stone masonry restoration shall be directly supervised by a full-time foreman who has successfully completed at least five years' experience with work on historic buildings similar to that required by this Section. Foreman shall be on site daily for duration of work of this Section. Same foreman shall remain on Project throughout work unless his performance is deemed unacceptable.
2. Mechanics: Stone masonry restoration shall be carried out by a steady crew of skilled stone masons who are thoroughly experienced with restoration of historic stone masonry using materials and methods specified and have a minimum of three years' experience with work on historic buildings similar to that required by this Section. In acceptance or

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rejection of work of this Section, no allowance will be made for workers' inattention or lack of skill.

3. Laws, Codes, and Regulations: Work of this Section shall comply with applicable federal, state, and local laws, codes, and regulations.

B. Referenced Standards: Comply with applicable requirements and recommendations of the latest editions of the referenced standards listed herein, except as modified by more stringent requirements of the Contract Documents and of applicable laws, codes, and regulations. In each case in which there is conflict between requirements of referenced standards; requirements of laws, codes, and regulations; and requirements of this Section, the most stringent or restrictive requirement shall govern.

1. ASTM International (ASTM)

   a. ASTM C 144, Standard Specification for Aggregate for Masonry Mortar.
   b. ASTM C 150, Standard Specification for Portland Cement.
   c. ASTM C 207, Standard Specification for Hydrated Lime for Masonry Purposes.
   d. ASTM C 270, Standard Specification for Mortar for Unit Masonry.
   e. ASTM C 615, Standard Specification for Granite Dimension Stone.
   f. ASTM C 1713, Standard Specification for Mortars for the Repair of Historic Masonry.

2. National Building Granite Quarries Association (NBGQA), Specifications for Building Granite.

C. Preparation of Mortar under Controlled Conditions: Mortars and grouts shall be batched and packaged in factory or shop under controlled conditions that ensure consistency of ingredients, proportions, and mixing of dry ingredients as described in approved Work Description. Mortars and grouts shall be delivered packaged to Project site ready for mixing with water. No mortar or grout mixes shall be proportioned on site.

D. Sources of Materials: Obtain each type of material for stone masonry restoration from a single source to ensure a match in quality, performance, and appearance.

E. Access for Observation and Approvals: Provide Contracting Officer access on a continuing basis to locations on which mock-ups are being carried out, on which work is ongoing, and where work has been completed to allow for observation and approvals. Provide access to facilitate observation and approvals.

F. Restoration of Damaged Masonry: Repair or replace broken, lost, and damaged masonry resulting from work of this Section to configuration and condition existing before work began to Contracting Officer's satisfaction at no additional cost to Government.

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1.5 SUBMITTALS

A. General: Submit the following in compliance with the requirements of the Contract Documents. Revise and resubmit each item as required to obtain Contracting Officer's approval.

B. Qualification Data: Qualification data for firm and personnel specified in "Quality Assurance" Article that demonstrates that both firm and personnel have capabilities and experience complying with requirements specified. For firm and foreman, provide a list of at least three completed projects similar in size and scope to the work required on this Project. For each project list project name, address, architect, conservator, supervising preservation agency, scope of contractor's work, and other relevant information. Submit this information with the bid.

C. Work Description: Detailed description for each type of stone masonry restoration work to be performed. Do not begin work on site until Contracting Officer has approved Work Description in writing. Submit new written descriptive information. Description for each type of restoration on each material shall include, but not be limited to:

1. Materials and Procedures: Materials, methods, tools, and equipment to be used for each phase and task of stone masonry restoration work.
2. Protection: Description, including drawings and diagrams, of proposed materials and methods of protection for preventing harm, damage, and deterioration caused by work of this Section to persons (whether involved in the Work or not); building elements, materials, and finishes; surrounding landscape and site; and the environment (including air and water).
3. Alternate Methods and Materials (If Any): Proposed alternate methods and materials (if any) to those specified for stone masonry restoration work. Provide evidence of successful use on comparable projects and demonstrate effectiveness for use on this Project.

D. Product Data: Manufacturer's published technical data for each product to be used in work of this Section including material description, chemical composition (ingredients and proportions), physical properties, recommendations for application and use, test reports and certificates verifying that product complies with specified requirements, and Safety Data Sheets (SDS). SDS submitted for record only.

E. Samples

1. Granite to Match Existing Granite: 12-inch x 12-inch x 1-inch pieces, finished to match existing.

F. Prepare mock-ups following requirements of Article "Mock-ups," below.

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1.6 MOCK-UPS

A. General: Before beginning general stone masonry restoration work, prepare mock-ups to provide standards for work of this Section. Do not proceed with stone masonry restoration until Contracting Officer has approved mock-ups.

1. Locate mock-ups as directed by Contracting Officer.
2. Notify Contracting Officer 48 hours prior to start of each mock-up.
3. Contracting Officer will monitor mock-ups. Mock-ups not performed in presence of Contracting Officer will be rejected.
4. Use crew that will execute the work and follow requirements of this Section.
5. Allow mock-ups with mortar, composite patching mortar, cementitious grout, and other products containing cements and/or limes to dry for five days to allow material to reach final color and allow potential problems to appear. Notify Contracting Officer when mock-ups are ready for review.
6. Repeat mock-ups as necessary to obtain Contracting Officer's approval.
7. Protect approved mock-ups to ensure that they are without damage, deterioration, or alteration at time of Substantial Completion.
8. Approved mock-ups in undamaged condition at time of Substantial Completion may be incorporated into the Work.
9. Approved mock-ups will represent minimum standards for stone masonry restoration. Subsequent stone masonry restoration work that does not meet standards of approved mock-ups will be rejected.

B. Prepare the Following Mock-Ups

1. Routing Existing Cracks, Grouting Cracks, and Providing New Composite Mortar Patches at Crack Surfaces: Three locations.
2. Repairing Cracked Stone Units by Pinning with Stainless Steel Rods in Epoxy Adhesive and Providing Composite Patching Mortar Crack Repairs: One stone unit.
3. Patching Holes and Losses in Stone Units Using Stone Dutchmen: Three dutchman repairs.
4. Removing Failed Patches and Providing New Dutchman Repair: One location.
5. Securing Detached Sections of Stone Units Using Epoxy Adhesive and Stainless Steel Pins: One stone unit.
6. Preparing Joints in Granite Masonry: One panel, including at least 16 linear feet of joint.
7. Pointing Joints in Granite Masonry: One panel including at least 16 linear feet of joint.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products and materials to prevent damage, deterioration, degradation, and intrusion of foreign material.

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B. Discard and remove from site deteriorated materials, contaminated materials, and products that have exceeded their expiration dates. Replace with fresh materials.

C. Handling Stone: Handle stone to prevent chipping, breakage, soiling, and other damage.

1.8 PROJECT CONDITIONS

A. Safety: Protect all persons, whether or not involved in work of this Section, from harm caused by or resulting from work of this Section.

1. Protection from Hazardous Materials: Protect workers and other persons from contact with hazardous materials resulting from work of this Section.

a. Silica: Use procedures necessary to protect workers and other persons from exposure to respirable crystalline silica. All work should be performed in compliance with applicable OSHA regulations, including but not limited to “Respirable Crystalline Silica Standard” (Title 29, Code of Federal Regulations (CFR) Section 1926.1153) and with other applicable state and local laws and regulations.

2. Protection from Noise: Limit noise generated by work of this Section to an absolute minimum. Prevent all persons, whether or not involved with the work of this Section, from noise that might adversely affect them.

B. Protection of Building: Protect building elements and finishes from damage and from deterioration caused by work of this Section. Repair materials and finishes damaged as a result of work of this Section to Contracting Officer’s satisfaction at no additional cost to Government.

1. Exclusion of Water: Cover open joints and areas from which sections of masonry, masonry units, and/or portions of units have been removed during periods when work is suspended to ensure materials and finishes are not damaged by water penetration.
2. Prevention of Staining: Prevent grout, mortar, and adhesives from staining face of masonry to be left exposed. Protect sills, ledges, and projections from mortar droppings. Immediately remove grout, mortar, and adhesive in contact with masonry. Protect base of walls from rain splashed mud and mortar splatter by means of coverings spread on ground and over wall surface.
3. Protection from Fire: Take precautions necessary to prevent fire and spread of fire.

a. Covers: Membranes, insulation blankets, and other materials used to cover masonry shall be flame retardant and fire resistant.
b. Warming Devices: Heating blankets, infrared heaters, and other warming devices shall be UL approved and inspected for damage before use.

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c. Open Flame Heaters: No open flame heaters shall be used to protect finished masonry. Heaters used to warm water or sand for mortar or grout shall be well away from building and from flammable substances.

C. Surfaces To Receive Work: The Drawings are two-dimensional representations of three-dimensional objects and do not show all surfaces of building components on which work is to be performed, including surfaces concealed from view behind objects shown; surfaces of projections, reveals, returns, and other elements perpendicular to or at an oblique angle to surfaces shown; concealed surfaces of profiled members and of ornament; and surfaces of profiled members and of ornament not drawn in detail. Perform work on surfaces of projections, reveals, returns, profiled members, and ornaments associated with surfaces indicated to receive work and on surfaces of building components concealed behind building components shown. It is the specific intent of the Contract Documents to include work on all surfaces within Project area, whether or not shown on the Drawings, except as specifically indicated otherwise.

D. Coordination: Coordinate work of this Section with work of other sections as necessary to ensure optimum performance of work of this Contract.

1.9 ENVIRONMENTAL REQUIREMENTS

A. General

1. Manufacturer's Recommendations: Perform work only when temperature of products being used, temperatures of existing and new materials and surfaces, and temperature and humidity of air at Project site comply with manufacturer's requirements and recommendations.

B. Cold Weather Stone Masonry Restoration: Cold weather stone masonry restoration shall adhere to following requirements for work, performed in ambient temperatures indicated. Work shall not be permitted when temperature of air or wall is below 40 deg F or when temperature of air or wall is predicted to be below 40 deg F in Project location within 48 hours of work by AccuWeather the National Weather Service without Contracting Officer's prior written approval. No work shall begin when any part of wall or materials in use are frozen or subject to freezing temperatures. See Section 015000 Temporary Facilities Requirements.

C. Hot Weather Stone Masonry Restoration: Protect fresh mortar from premature drying when temperature, humidity, and wind conditions result in rapid drying of mortar. Provide and maintain tarps against wind and direct sun. Protect masonry for 72 hours after using mortar by one of the following procedures:

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1. Water-Soaked Cover: Provide and maintain damp burlap or other damp cloths over masonry to protect mortars from pre-mature drying. Install, maintain, and remove coverings using materials and methods that do not damage or alter masonry.
2. Fog Spray: Fog spray newly constructed masonry until damp at least three times a day using water without iron or other contaminants that might adversely affect masonry. Do not use water stream or pressure that might wash binder from surface of mortar or cause rundown on masonry.

D. Damage from Work in Cold Weather or in Hot Weather: Remove work of this Section damaged by freezing during cold weather masonry work and/or damaged by premature or too-rapid drying during hot weather masonry work and replace with new masonry work complying with the requirements of this Section at no additional cost to Government.

PART 2 – PRODUCTS

2.1 STONE

A. Granite

1. Salvaged Granite: Salvaged sound stone cleaned free of mortar, grout, dirt, and other contaminants and matching existing cleaned granite in physical and chemical properties and in color, texture, and other surface characteristics.
2. New Granite: New sound stone complying with ASTM C 615 and matching existing cleaned granite in physical and chemical properties and in color, texture, and other surface characteristics for each type of granite to be replaced.

2.2 MORTAR AND PATCHING MATERIALS

A. Portland Cement: ASTM C 150, Type I or Type II. Do not use masonry cement.

B. White Portland Cement: ASTM C 150, Type I.

C. Hydrated Lime: ASTM C 207, Type S.

D. Sand: Clean sharp sand, free of loam, silt, soluble salts, organic matter, and other substances that might adversely affect mortar, masonry units, or embedded elements and graded in compliance with ASTM C 144. Where mortar or patching mortar is to match existing original mortar or patching mortar, sand or other aggregate shall be selected to provide mortar matching color and texture of original mortar (with minimum addition of pigment). Sieve and mix sand and aggregates from individual sources and from more than one source to provide mortar matching original mortar.

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E. Water: Clean and free of substances that might adversely affect mortar, masonry, and embedded elements.

F. Pigments: Stable, light-fast, alkali-resistant, water-soluble mineral oxide pigments without fillers or extenders complying with ASTM C 979. Provide one of the following, or approved equal:

1. SGS Concentrated Mortar Colors by Solomon Color, Inc., 4050 Color Plant Road, Springfield, IL 62702 (800-624-0261).
2. Lanxess Bayferrox Iron Oxide Pigments by Lanxess Corporation, Business Unit Inorganic Pigments, 111 RIDC Park West Drive, Pittsburgh, PA 15275 (412-809-1000).
3. Powder Pigments by Davis Colors, 3700 East Olympic Blvd., Los Angeles, CA 90023 (323-265-8323).

2.3 PREFORMULATED MORTARS

A. Composite Patching Mortar for Granite: Single-component, cementitious, mineral-based mortar specifically manufactured for the restoration of natural stone. Provide custom colors to match colors of clean stone. Provide one of the following, or approved equal:

1. Jahn M160 Granite and Bluestone Repair Mortar, available from Cathedral Stone Products, Inc., 7266 Park Circle Dr., Hanover, MD 21076 (800-684-0901)
2. Custom System 45, available from Edison Coatings, Inc., 3 Northwest Drive, Plainville, CT 06062 (800-341-6621).
3. Matrix, available from Conproco, (800-258-3500).

B. Surface Aggregate for Granite Patches: Sound particles of ground stone with grains matching sizes, size distribution, colors, and color distribution of surface particles in existing granite to be patched.

2.4 ANCHORS AND FASTENERS

A. General: Provide anchors, dowels, attachments, and fasteners as shown on approved shop drawings and of size and configuration suitable for use intended to secure sound, secure anchorage.

1. Material

a. Anchors and Fasteners Not Being Welded: Stainless steel complying with ASTM A 276 or ASTM A 666 Type 302, 304, 304L, 316, or 316L.
b. Anchors and Fasteners Being Welded: Stainless steel complying with ASTM A 276 or ASTM A 666 Type 316L.

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2. Prohibited Types of Anchors and Fasteners: Expansion bolts, cinch bolts, and plugs are not acceptable.

B. Anchors and Fasteners for Securing Stone Dutchmen

1. Small Veneers: 1/8-inch-diameter stainless steel wire with turned up ends.
2. Direct Pinning: 1/4-inch- or 3/8-inch-diameter threaded stainless steel rod.
3. Drop Dowels: 3/8-inch- or 1/2-inch-diameter threaded stainless steel rod.
4. Blocks over 1 Cubic Foot: 1-inch wide by 1/8-inch thick stainless steel strap anchors in configuration necessary to securely anchor block and shown on approved shop drawings.

C. Anchors and Fasteners for Pinning and Securing Loose and Cracked Units

1. Pins: 1/4-inch-, 3/8-inch-, or 1/2-inch-diameter threaded stainless steel rod.
2. Micro-Pins: Orthopedic surgical bone screws of ASTM A 276 or ASTM A 666 Type 316 stainless steel or titanium (grade 2), 4 mm diameter, head no larger than 6 mm diameter with a recessed hex mortise.

2.5 ADHESIVES

A. Epoxy Adhesive for Pinning and Installing Pins: High modulus, high strength, moisture-insensitive, high-viscosity epoxy adhesive complying with ASTM C 881, Types I, II &IV, Grade 3, Classes B & C. Provide one of the following, or approved equal:

1. Sikadur 31, Hi-Mod Gel, as manufactured by Sika Corp., 201 Polito Ave., Lyndhurst, NJ, 07071 (800-933-7452).
2. Flex Weld 520, available from Edison Coatings, Inc., 3 Northwest Drive, Plainville, CT 06062, (800-341-6621).
3. Crack Pac, available from Simpson Strong Tie, (800-999-5099).

2.6 EQUIPMENT AND TOOLS FOR CLEANING ANCHOR HOLES, CRACKS, LOSSES, AND JOINTS

A. Brushes for Cleaning Anchor Holes: Stiff wire bristle or nylon bristle brushes of diameter to ensure full cleaning of dust and debris from masonry substrate at sides and bottom of hole. Brushes shall be sized appropriately for holes in which they are to be used so that they firmly contact entire circumference of hole at the same time. Use sizes recommended by anchor manufacturer and approved by Contracting Officer.

B. Brushes for Cleaning Cracks and Losses: Stiff nylon bristle brushes of shape and dimension to provide optimum removal of contaminants from stone surface and approved by Contracting Officer.

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2.7 TOOLS FOR JOINT PREPARATION

A. Hand Tools: Chisels, hammers, and mallets.

1. Thickness of Chisels: Maximum thickness of 5/8 times joint width extending from tip at least three times depth at which chisel will be inserted into joint.

B. Power Tools: Standard tools and equipment, modified tools and equipment, and custom designed and fabricated tools and equipment as necessary to remove mortar from narrow joints without damaging masonry units. Use power tools only under conditions described in Part 3, below, and only if specifically approved by Contracting Officer.

1. Electric Grinders: Small, hand-held electric grinders with blades no greater than 1/16 inch thick and a maximum of 4-1/2-inch diameter.
2. Pneumatic Grinders: Specially modified pneumatic die grinders with thin diamond abrasive blades (0.060 inch thick). Subject to compliance with requirements, provide wafer blades.

C. Tools for Preparation of Joints Containing Sealant: Small wire bristle brushes, metal scrapers, small grinders, low-pressure, airborne, micro-abrasive blasting equipment, or other tools and equipment for removing remains of sealant and sealant residue from joint as described in approved Work Description.

D. Brushes for Removing Dust and Dirt from Joints: Stiff, natural- or synthetic-fiber bristle brushes. No metal bristle brushes are acceptable.

2.8 MISCELLANEOUS MATERIALS AND EQUIPMENT

A. Pins to Secure Composite Patching over 2 Inches Deep: 1/8-inch-diameter threaded stainless steel rods.

B. Tape for Protecting Masonry Surfaces: Masking tape or other approved tape that will protect masonry surface from contact with repair materials being used and that can be applied to and removed completely from masonry surface without damaging, deteriorating, or altering the appearance of the masonry surface.

C. Pointing Trowels: Long, thin pointing trowels narrower than joints being pointed. Pointing trowel shall have raised bead profile to match original joint profile.

1. Custom fabricate special trowels for masonry pointing if necessary to ensure proper insertion and optimum compaction of mortar.

D. Scrapers for Removing Mortar: Wood scrapers with rounded corners.

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E. Brushes for Removing Dirt and Debris from Joints: Stiff natural bristle or fiber bristle brushes. No metal bristle brushes are permitted.

F. Sand for Removing Mortar: Clean, washed fine sand.

G. Cloths for Removing Mortar: Clean, white terry cloth or similar rough-textured cloth.

2.9 MORTAR AND GROUT MIXES

A. General

1. Mortars specified hereinafter shall comply with ASTM C 1713, Standard Specification for Mortars for the Repair of Historic Masonry.
2. Mix mortars using proportions specified herein as adjusted, if necessary, by the amount of moisture in the ingredients. The proportions specified are for dry cements and limes and damp, loose (saturated, surface-dry) sand. If ingredients with different moisture contents are used (for example, lime putty is used in place of lime or dry sand is used in place of damp, loose sand), adjust quantities so that the proportions of ingredients in the mixes equal the proportions specified as approved by Contracting Officer.

B. Mortars for Setting Stone Masonry: Mortar mixes may change and may require adjustment before and during construction in accordance with pre-construction conformance testing, field-testing, and Contracting Officer's evaluation of testing and test results.

1. Mortar for Pointing Granite Masonry: Cement, lime, sand mortar. Proportion mortar by volume as follows to achieve a mortar with a minimum compressive strength of 1300 psi at 28 days.

a. 1 part by volume white Portland cement (Type I)
b. 1 part by volume hydrated lime (Type S)
c. 6 parts sand (Selected to match sand in original mortar)
d. Oxide pigments as needed to match color of the original mortar, but not to exceed 7 percent of the weight of the cement.

C. Mortars for Setting Dutchmen: Mortar mixes may change and may require adjustment before and during construction in accordance with pre-construction conformance testing, field-testing, and Contracting Officer's evaluation of testing and test results.

1. "Thin Set" Mortar for Setting Stone Dutchmen: Use when mortar bed is less than 3/8 inch thick to produce an initially tacky mortar exhibiting high strength properties when set.

a. 1 part by volume white Portland cement (Type I)
b. 3 parts fine "00" sand (selected to match color of existing clean stone)

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c. Temper to workable consistency with Laticrete 4237 polymer admixture, or approved equal, mixed in accordance with manufacturer's recommendations for high strength, "thin set" mortar.
d. Oxide pigments as necessary to adjust color of mortar mixed to as close a match to adjacent stone surface as possible using appropriate colored cements and aggregates to match color of adjacent stone surface but not to exceed 7 percent of the weight of the cement.

D. Grout for Injecting Cracks: Dispersed hydrated lime with up to five percent water by weight. Mix with an electrically powered mixer for two to three minutes.

2.10 MIXING OF MORTARS AND GROUTS

A. Measuring: Measure mortar and grout ingredients carefully using containers with fixed volumes so that proportions are controlled and maintained throughout the work of this Section.

B. Mixing Portland Cement Mortars and Grouts: Mix mortars and grouts in an approved type of power-operated batch mixer. Mix for time necessary to produce a homogeneous plastic mortar but not be less than five minutes: approximately two minutes for mixing dry materials and not less than three minutes for mixing after water has been added.

C. Water: Use minimum amount of water to produce a workable consistency for mortar's intended purpose.

1. Mortar for Pointing: As dry a consistency as will produce a mortar sufficiently plastic to be worked into joints.
2. Grout for Injection: Consistency that can be injected to fill voids and losses.

D. After mixing, mortars for pointing or setting shall sit for 20 minutes prior to use to allow for initial shrinkage. Mortar shall be placed in final position within two hours of mixing. Retempering of partially hardened material is not permitted.

E. Mortar for grout shall be placed in final position within two hours of mixing or within period recommended by manufacturer of custom products, whichever is less. Retempering of partially hardened material is not permitted.

F. Custom Patching Mortars and Grouts: Mix in strict accordance with manufacturer's written instructions.

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PART 3 – EXECUTION

3.1 ROUTING AND FILLING CRACKS

A. General: In locations indicated, rout out cracks at surface and fill with custom patching mortar to match color and texture of adjacent stone surface.

B. Preparation for Patching Crack: Rout out cracks to a depth of 5/8 inch and a width of 1/8 inch. Do not damage adjacent stone surface.

1. Removing Previous Repairs: Where previous crack repair is to be replaced, rout out crack to width and depth of previous repair to remove previous patching material and expose stone substrate.

C. Cleaning: Clean stone at sides and rear of routed cracks thoroughly using fine, stiff, fiber-bristle brush to remove particles and dust.

D. Wetting: Thoroughly rinse surfaces to ensure that substrate will not rapidly absorb water from patching mortar.

E. Application: Brush crack with a mortar slurry coat and fill with specified composite patching mortar matching color of adjacent cleaned stone.

F. Finishing: Strike surface of filled crack flush with face of adjacent stone. Finish surface of patching material to match texture and finish of adjacent cleaned stone.

G. Curing: Protect installed patching mortar from too rapid drying and from contact with water that might wash binder from surface.

3.2 PATCHING CRACKED STONE UNITS USING CEMENTITIOUS GROUT AND PATCHING CRACK REPAIR

A. General: Prepare and inject cracks with cementitious grout. Rout out cracks at surface and fill with custom patching mortar to match color and texture of adjacent stone surface.

B. Preparation: Drill 1/4-inch-diameter injection ports into crack approximately 6 inches on center. Remove dust, dirt, loose particles, and other contaminants that might adversely affect adhesion of grout or durability of grout from crack. Install injection ports over holes. Seal surface of crack and adhere injection ports to stone with temporary crack sealer. Protect adjacent masonry surfaces from contact with grout using approved methods.

C. Prewetting Substrates: Immediately before injecting grout, flush crack with clean water. If grout is not installed immediately, flush crack again with water to ensure that stone surfaces at sides of

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crack are wet at time of grout injection.

D. Injection of Grout: Inject cementitious grout using gravity flow or other approved equipment and methods to ensure that crack is filled as approved by Contracting Officer.

E. Preparation for Patching Crack at Surface: Remove temporary sealer and injection ports and clean stone surface. Rout out cracks to a depth of 5/8 inch and a width of 1/8 inch. Remove grout from front 5/8-inch depth of injection ports exposing clean stone surface. Do not damage adjacent stone surfaces.

F. Cleaning: Clean stone at sides and rear of routed cracks and at injection ports thoroughly using fine, stiff fiber-bristle brush to remove particles and dust.

G. Wetting: Thoroughly rinse surfaces to ensure that substrate will not rapidly absorb water from patching mortar.

H. Application of Patching Mortar: Brush stone substrates with a mortar slurry coat and fill holes with specified composite patching mortar matching color of adjacent cleaned stone following manufacturer's directions.

I. Finishing: Strike surface of repaired crack flush with face of adjacent stone. Finish surface of filled crack to match texture and finish of adjacent cleaned stone.

J. Curing: Protect installed mortar from too rapid drying and from contact with water that might wash binder from surface.

3.3 PINNING STONE UNITS USING THREADED RODS SET IN EPOXY ADHESIVE AND PATCHING CRACKS USING CEMENTITIOUS PATCHING MORTAR

A. General: Pin broken pieces of stone to sound pieces of stone and pin loose stone units to sound units or to sound backup masonry as indicated on Drawings.

B. Drilling: Drill holes in loose stone units and in cracked stone units indicated to be pinned using rotary drill with sharp masonry bit. Do not use hammer drill or other percussive tools. Extend holes at least 3 inches into solid masonry backup or into solid and securely anchored adjacent portion of stone unit.

C. Cleaning Holes: Use specified stiff bristle brushes through specially designed nozzles to thoroughly remove dust and debris from holes to receive pins.

D. Protection of Substrate to Be Patched: Protect outer portions of stone surface within holes to receive composite patching mortar patches using masking tape or other means to prevent contact with adhesive.

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E. Pinning: Inject epoxy adhesive and insert threaded dowels, pushing until dowel ends are below stone surface to extent shown on Drawings but not less than 1/2 inch to allow for composite patching mortar patches.

F. Patching Holes: Patch holes in exposed surfaces using composite patching mortar following requirements of Article “Patching Stone Units Using Composite Patching Mortar,” below. Patches shall match color, texture, and surface of adjacent stone. Cure patches to comply with composite patching mortar manufacturer’s recommendations to ensure optimum performance of patching mortar.

G. Filling Cracks: Rout out and fill cracks with composite patching mortar as specified in Article “Routing and Filling Cracks,” below.

3.4 PINNING STONE UNITS USING THREADED RODS SET IN EPOXY ADHESIVE AND INJECTING CRACKS WITH EPOXY ADHESIVE

A. General: Pin broken pieces of stone to sound pieces of stone and pin loose stone units to sound stone units or to sound backup masonry as indicated on Drawings and inject cracks with epoxy adhesive.

B. Drilling: Drill holes in loose stone units and in cracked stone units indicated to be pinned using rotary drill with sharp masonry bit. Do not use hammer drill or other percussive tools. Extend holes at least 3 inches into solid masonry backup or into solid and securely anchored adjacent portion of stone unit.

C. Cleaning Holes: Use specified stiff bristle brushes to thoroughly remove dust and debris from holes to receive pins.

D. Protection of Substrate to Be Patched: Protect outer portions of stone surface within holes to receive composite patches using masking tape or other means to prevent contact with adhesive.

E. Pinning: Inject epoxy adhesive and insert threaded dowels, pushing until dowel ends are below stone surface to extent shown on Drawings but not less than 1/2 inch.

F. Patching Holes: Patch holes in exposed surfaces using composite patching mortar following requirements of Article “Patching Stone Units Using Composite Patching Mortar,” below. Patches shall match color, texture, and surface of adjacent stone. Cure patches to comply with composite patching mortar manufacturer’s recommendations to ensure optimum performance of patching mortar.

G. Injecting Cracks with Epoxy Adhesive: Fill cracks by injecting epoxy adhesive as specified in Article “Repairing Cracked Stone Units by Injecting Epoxy Adhesive,” below.

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3.5 PATCHING STONE UNITS USING DUTCHMEN

A. General: Remove existing damaged and deteriorated stone from stone units. Prepare holes and provide stone dutchmen matching adjacent stone to restore unit to original configuration and appearance as indicated on Drawings.

1. In locations indicated on Drawings, remove existing patch, prepare substrate, and provide new dutchman.

B. Anchors

1. Secure each dutchman using at least two metal attachments with one additional attachment for every two additional square feet of configuration and location as shown on approved shop drawings.
2. Attach anchors using epoxy adhesive and mechanical fastening.

C. General Method for Dutchman Repair

1. Stone Preparation: Cut away portions of deteriorated or damaged stone and edges of losses in stone to sound stone. Cut sides of area to receive dutchman parallel to edges of stone block. Cut sides perpendicular to stone face. Do not weaken stone.
2. Attachment: Fasten dutchman with stainless steel wire, pins, and anchors as necessary to provide mechanical locking and to prevent possible slippage of stone and as shown on approved shop drawings. Position metal anchors without weakening stone in any way.
3. Dutchman Preparation: Dress stone dutchman on all sides and carefully fit to opening in stone, with an allowance of not more than 1/16-inch-wide buttered joints at face. Dress surface of dutchman to match appearance, tooling, and texture of adjacent stone using an approved method. Complete surface dressing of dutchman before installing dutchman.
4. Cleaning Anchor Holes and Substrate: Use stiff bristle brushes to thoroughly remove dust and debris from anchor holes and from stone surfaces to receive mortar.
5. Wetting Stone Surfaces: Wet surfaces to receive mortar to ensure that surfaces are damp but free of standing water at time of mortar application (saturated, surface dry) unless specifically instructed otherwise by mortar admixture manufacturer.
6. Installation: Install dutchman using specified mortar matching adjacent stone. Install anchors with specified adhesive.
7. Joint Surfaces: Finish joints between new and old work to match color and texture of stone.
8. Protection: Protect adjacent surfaces during dutchman repair. Wipe and rinse mortar accidentally splashed onto adjacent surfaces immediately. Remove uncured epoxy adhesive immediately with acetone.
    a. Repair damage to stone and damage to other materials to remain resulting from adhesive and mortar spills to Contracting Officer’s satisfaction at no additional cost.

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9. Cleaning: Clean faces of patched stone units following completion of dutchman installation. Clean mortar splashes, smears, etc. with wood scrapers or by vigorously brushing with stiff fiber bristle brushes and clean, potable water. If necessary to remove mortar, add clean white sand to water.

3.6 REPAIRING CRACKED STONE UNITS BY INJECTING EPOXY ADHESIVE

A. General: Prepare cracks and inject cracks with epoxy adhesive. If width of crack at surface is not greater than 1/32 inch, drill out front portions of injection ports and fill with custom patching mortar to match color and texture of adjacent stone surface. If width of crack at surface is greater than 1/32 inch, drill out front portions of injection ports and rout out cracks at surface and fill with custom patching mortar to match color and texture of adjacent stone surfaces.

B. Preparation: Drill 1/4-inch-diameter injection ports into crack approximately 6 inches on center. Remove dust, dirt, and loose particles from crack. Install injection ports over holes. Seal surface of crack and adhere injection ports to stone with temporary crack sealer. Protect adjacent stone from contact with epoxy adhesive using approved methods.

C. Epoxy Injection: Match viscosity of epoxy to width of crack so that crack will be completely filled. Inject epoxy using specified equipment and methods to ensure that crack is filled as approved by Contracting Officer.

D. Preparing Injection Ports at Cracks Not Exceeding 1/32-Inch in Width: At cracks not exceeding 1/32-inch in width, drill out surface of injection ports to a depth of 5/8 inch to remove adhesive and provide sound, clean stone substrate. Do not damage adjacent stone surface.

E. Preparing Stone Surface at Cracks Exceeding 1/32-Inch in Width: At cracks exceeding 1/32-inch in width, drill out surface of injection ports to a depth of 5/8 inch and rout out surface of crack to a width of 1/8 inch and a depth of 5/8 inch to remove adhesive and provide sound, clean stone substrate. Do not damage adjacent stone surface.

F. Cleaning: Clean stone at injection ports and at sides and rear of routed cracks thoroughly using fine, stiff, fiber-bristle brush to remove particles and dust.

G. Wetting: Thoroughly rinse surfaces to ensure that substrate will not rapidly absorb water from patching mortar.

H. Application of Patching Mortar: Brush stone substrates with a mortar slurry coat. Fill injection ports and/or cracks fill with specified composite patching mortar matching color of adjacent cleaned stone.

I. Finishing: Strike surfaces of repaired crack and injection ports flush with face of adjacent stone. Finish surfaces of filled crack and injection ports to match texture and finish of adjacent cleaned

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stone.

J. Curing: Protect installed mortar from too rapid drying and from contact with water that might wash binder from surface.

3.7 PREPARING AND POINTING JOINTS

A. Preparing Joints Containing Mortar

1. General: Remove mortar from joints to a depth of 3/4 inch, to 2-1/2 times width of joint, or to sound mortar, whichever is deepest. In all cases remove deteriorated, weathered, and loose material to sound mortar.

    a. Completely remove mortar from surfaces of masonry units adjoining joint to allow new mortar to bond directly with masonry units.
    b. Cut surface of mortar at rear of joint at a uniform depth from and parallel to wall surface.
    c. Do not damage faces or arrises of masonry units during joint preparation. Cease joint preparation work if, in Contracting Officer's judgment, masonry units are damaged by methods being used to prepare joints. Do not resume work until tools, workers, and methodology have been corrected to ensure that masonry units are not damaged and that work meets standard set by approved mock-up.

2. Mortar Removal Using Hand Tools: Use hand tools for removal of mortar from joints in masonry that are less than 6 inches long and from other joints in which use of power tools might damage masonry units. Use hand tools to complete mortar removal from joints where power tools have been used to partially remove mortar.

    a. For narrow joints of 1/8-inch or less in width, rake mortar from joints manually with a sharp knife blade or cutter made for this purpose. Cutter may be used with or without aid of a hammer.
    b. Sharpen chisels as often as necessary to provide for optimum cutting of mortar and to minimize chipping but at least hourly.

3. Mortar Removal Using Power Tools

    a. Demonstrated Ability of Mechanics: Prior to beginning work, demonstrate that workers using power tools are proficient in use of power tools for joint preparation. Failure to demonstrate to Contracting Officer's satisfaction that each worker is proficient in the use of each type of power tool proposed for use and that power tool joint preparation does not result in damage to masonry units shall result in prohibition of use of power tools for joint preparation. If proficiency is not demonstrated, or if work in progress results in damage to masonry to remain, power

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tool work shall cease, and joints shall be prepared for pointing using only hand-powered tools.

b. Rotary Power Tools: With Contracting Officer's specific prior approval following successful demonstrations of skill by mechanics, power grinders and/or pneumatic grinders may be used to partially remove mortar from joints longer than 6 inches in masonry where there is no danger of cutting into adjacent stone units.

1) Limitations on Use of Electric Power Grinders: Do not use electric power grinders on joints less than 3/16-inch wide or less than 6 inches long or where ornament, elaborate profile, or other surface irregularity might make damage to masonry units likely.

2) Extent of Mortar Removal Using Power Grinders: Use power grinder only to score one kerf cut in center of each joint to depth of mortar removal indicated. Remove remaining mortar from sides of joint using hand tools or, if approved, pneumatically powered chisels.

a) Stop kerf at least 4 inches from inside corners and projecting elements. Remove remaining mortar using hand tools or pneumatically powered chisels.

4. Cleaning: Remove loose mortar and foreign material from raked joints using a fine, stiff natural- or synthetic-fiber bristle brush. Remove remaining particles, dust, and dirt. Ensure that dust and dirt are not blown back into previously cleaned joints.
5. Restoration and Replacement of Damaged Units: Repair and/or replace masonry units damaged during joint preparation to provide units in at least as good a condition as before joint preparation was begun to Contracting Officer's satisfaction at no additional cost to Government.

B. Pointing Joints

1. Wetting: Thoroughly drench masonry with water 24 hours prior to pointing joints to saturate masonry. Thoroughly wet masonry again immediately before pointing joints and allow surfaces to dry slightly. At time of masonry pointing, surfaces shall be damp, so that they do not rapidly absorb moisture, but free of standing water (saturated, surface dry).

a. Failure to Properly Wet Substrate: Evidence that masonry to be pointed has not been properly dampened to prevent water in the mortar from being too rapidly absorbed by the masonry will be cause for Contracting Officer to reject pointing work. Remove rejected pointing, properly prepare joints for pointing, and provide new mortar to meet requirements of this Section at no additional cost to Government.

2. Installing Mortar: Install mortar in joints as follows.

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a. Using a long, thin masonry pointing trowel, tightly pack mortar into joints in layers not exceeding 1/4-inch thick to fill joint to match original sound joints.
b. Begin by filling areas from which mortar is missing to a depth greater than 3/4 inch in 3/8-inch-thick layers to within 3/4 inch of finished joint surface to provide a uniform substrate for final masonry pointing. Fill final 3/4-inch depth of joint continuously and uniformly in 1/4-inch-thick layers.
c. Firmly iron each layer to compact mortar and ensure full bond between mortar and masonry units and a firm, solid joint.
d. Allow each layer to reach thumbprint hardness before applying succeeding layer. Do not let previous layer dry out before applying succeeding layer. Construct uniform joints.
e. Do not spread mortar over edges onto exposed surfaces of masonry units. Do not featheredge mortar.
f. When stopping work at end of each day or for other reasons, stagger layers of mortar so that there will be no through joints in mortar inserted into joints. Stagger joints in layers so that they are at least 3 inches from each other.
g. Where applying new work to that of a prior day, dampen previous work to ensure good bond.

3. Tooling Joints: After final layer of mortar is “leather hard,” tool joints with a flat rule jointer, or as directed by Contracting Officer.

a. Profile: Tool joints to profile as shown on Drawings or to match original joint profiles as directed by Contracting Officer. Solidly compress mortar so that it adheres well to masonry on both sides and forms a dense surface. Premature or late tooling will result in unacceptable finishes, which will be rejected.

4. Curing

a. Keep newly pointed joints damp for at least 72 hours after mortar has been inserted. Do not apply a direct stream of water to joints for at least 7 days after mortar has been placed.
b. Ensure masonry temperature remains as required by specifications until mortar is thoroughly cured.

C. Repairing Mortar Joints

1. Repairing Pointed Joints: As cleaning progresses, examine joints to locate cracks, holes, and other defects. Carefully point up and fill such defects with mortar. Where joints are defective in opinion of Contracting Officer cut out joints to minimum depth of 3/4 inch or two-and-one-half times joint width, whichever is greater, properly prepare joint substrates, and provide new pointing mortar exercising extreme care to ensure that color matches that

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of adjacent masonry pointing work. Exposed joint surfaces shall be free from protruding mortar, holes, pits, depressions, and other defects.

D. Correcting Unacceptable Joints: Should a crack occur in any joint surface, should mortar separate from a masonry unit, indicating that it did not form a strong mechanical and chemical bond with the unit, or should Contracting Officer determine that for another reason masonry pointing work does not equal or exceed the minimum standard established by the approved mock-up and comply with requirements of this Section, remove mortar to a minimum depth of 3/4 inch, properly prepare joint substrates, and repoint following requirements of this Section to Contracting Officer's satisfaction at no additional cost to Government. At completion of work of this Section, joints shall be full of mortar soundly adhered to surfaces of masonry units at sides of joints and without defects.

3.8 ADJUSTMENT AND CLEANING

A. Adjustment: Correct work of this Section that does not meet requirements of this Specification to Contracting Officer's satisfaction at no additional cost to Government.

B. Cleaning Restored Stone Masonry: Clean stone masonry affected by work of this Section to remove mortar, grout, adhesive, and other contaminants using approved methods to provide clean surfaces matching the condition of the surfaces cleaned to comply with requirements of Section 04 01 10 – "Masonry Cleaning" before work of this Section was begun.

C. Site Cleaning: At completion of stone masonry restoration work, remove debris and left over materials from site and leave site broom clean.

END OF SECTION

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SECTION 04 72 00 - CAST STONE RESTORATION

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION

A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the work of stone masonry restoration as shown on the Drawings and/or as specified herein and as may be required by conditions and authorities having jurisdiction, including, but not necessarily limited to, the following:

1. Replace damaged cast stone units where indicated on the Drawings. New cast stone units shall match adjacent cast stone units in size, profile, color and texture.
2. Patch spalls and losses in cast stone using composite patching material to match profile, color, and texture of adjacent cast stone where indicated on the Drawings.
3. Remove deteriorated cast stone at spalls where embedded reinforcing steel is exposed. Remove cast stone around entire perimeter of embedded steel. Clean and treat all exposed reinforcing bars prior to patching.
4. Prepare and grout cracks in cast stone. Patch surface of cracks with composite patching material to match profile, color, and texture of adjacent cast stone where indicated on the Drawings.
5. Prepare and point mortar joints in cast stone where indicated on the Drawings.
6. Provide all shoring and bracing required to maintain stability of cast stone and masonry during work of this Section.

B. Related Work Specified Elsewhere

1. Asbestos Remediation – Section 02 82 00
2. Brick Masonry Restoration – Section 04 01 20
3. Stone Restoration – Section 04 01 40
4. Architectural Woodwork Restoration – Section 06 01 40
5. Exterior Joint Sealants – Section 07 92 00
6. Wood Door Restoration – Section 08 01 14
7. Wood Window Restoration – Section 08 01 52

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8. New Wood Windows – Section 08 52 00
9. Paint Removal – Section 09 01 10
10. Exterior Painting – Section 09 91 00

1.3 DEFINITIONS

A. "Dutchman" as used herein refers to a portion of new cast stone fitted into an existing cast stone unit to produce an intact contiguous surface.

B. "Cold Weather Masonry Restoration" as used herein refers to work of this Section when temperature is below 40 deg F or predicted to go below 40 deg F within 48 hours of use of mortar by National Weather Service.

C. "Hot Weather Masonry Restoration" as used herein refers to work of this Section when temperature is above 100 deg F or when temperature is above 90 deg F and wind is above 8 mpg or when either of these conditions is predicted within 48 hours of use of mortar by the National Weather Service.

1.4 QUALITY ASSURANCE

A. Cast Stone Restoration:

1. Foreman: Cast stone masonry restoration shall be directly supervised by a full-time foreman who has successfully completed at least five years' experience with work on historic buildings similar to that required by this Section. Foreman shall be on site daily for duration of work of this Section. Same foreman shall remain on Project throughout work unless his performance is deemed unacceptable.
2. Mechanics: Cast stone masonry restoration shall be carried out by a steady crew of skilled cast stone masons who are thoroughly experienced with restoration of historic cast stone masonry using materials and methods specified and have a minimum of three years' experience with work on historic buildings similar to that required by this Section. In acceptance or rejection of work of this Section, no allowance will be made for workers' inattention or lack of skill.

B. Laws, Codes, and Regulations: Work of this Section shall comply with applicable federal, state, and local laws, codes, and regulations.

C. Referenced Standards: Comply with applicable requirements and recommendations of the latest editions of the referenced standards listed herein, except as modified by more stringent requirements of the Contract Documents and of applicable laws, codes, and regulations. In each case in which there is conflict between requirements of referenced standards; requirements of laws, codes, and regulations; and requirements of this Section, the most stringent or restrictive

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requirement shall govern.

D. Sources of Materials: Obtain each type of material for masonry restoration from a single source to ensure a match in quality, performance, and appearance.

E. Access for Observation and Approvals: Provide Contracting Officer access on a continuing basis to locations on which mock-ups are being carried out, on which work is ongoing, and where work has been completed to allow for observation and approvals. Provide access to facilitate observation and approvals.

F. Manufacturers' Technical Representatives: Technical representatives of manufacturers whose products have been selected for use shall visit site at request of Contracting Officer to advise on proper use and installation of products at no additional cost to Government.

G. Restoration of Damaged Masonry: Repair or replace broken, lost, and damaged masonry resulting from work of this Section to configuration and condition existing before work began to Contracting Officer's satisfaction at no additional cost to Government.

1.5 SUBMITTALS

A. General: Submit the following in compliance with the requirements of the Contract Documents. Revise and resubmit each item as required to obtain Contracting Officer approval.

B. Product Data: Manufacturer's published technical data for each product to be used in work of this Section including material description, chemical composition (ingredients and proportions), physical properties, recommendations for application and use, test reports and certificates verifying that product complies with specified requirements, and Safety Data Sheets (SDS). SDS submitted for record only.

C. Samples

1. New cast Stone to Match Existing Cast Stone: 12-inch x 12-inch x 1-inch pieces, finished to match existing.

D. Prepare mock-ups following requirements of Article "Mock-ups," below.

1.6 TESTING

A. General: Before beginning mock-ups determine final color and application ratios of mineral coating on sample areas for aesthetic evaluation. Do not proceed with mock-ups Contracting Officer has approved results of testing in writing.

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1. Perform tests in locations directed by Contracting Officer.
2. Notify Contracting Officer 48 hours prior to start of testing.
3. Contracting Officer will monitor testing. No testing done in absence of Contracting Officer will be accepted.
4. Use crew that will perform the work and follow requirements of this Section.
5. All materials and dilutions are subject to modification by Contracting Officer during testing process. Contracting Officer will choose final application ratio based on results of test panels. Modifications of dilution shall be executed at no additional cost.

    a. Do not apply products to masonry surfaces without verifying color and dilution with Contracting Officer.
    b. After test panels are complete, allow seven days for thorough drying prior to final evaluation.
    c. Perform additional testing as necessary to determine colors and dilutions to Contracting Officer's satisfaction.

1.7 MOCK-UPS

A. General: Before beginning general masonry restoration work, prepare mock-ups to provide standards for work of this Section. Do not proceed with masonry restoration until Contracting Officer has approved mock-ups.

1. Locate mock-ups as directed by Contracting Officer.
2. Notify Contracting Officer 48 hours prior to start of each mock-up.
3. Contracting Officer will monitor mock-ups. Mock-ups not performed in presence of Contracting Officer will be rejected.
4. Use crew that will execute the work and follow requirements of this Section.
5. Allow mock-ups with mortar, composite patching mortar, cementitious grout, and other products containing cements and/or limes to dry for five days to allow material to reach final color and allow potential problems to appear. Notify Contracting Officer when mock-ups are ready for review.
6. Repeat mock-ups as necessary to obtain Contracting Officer's approval.
7. Protect approved mock-ups to ensure that they are without damage, deterioration, or alteration at time of Substantial Completion.
8. Approved mock-ups in undamaged condition at time of Substantial Completion may be incorporated into the Work.
9. Approved mock-ups will represent minimum standards for stone masonry restoration. Subsequent stone masonry restoration work that does not meet standards of approved mock-ups will be rejected.

B. Prepare the Following Mock-Ups

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1. Installing New Cast Stone Units to Match Original Cast Stone Units: One representative unit.
2. Patching to Replace Damaged Portions of Cast Stone Units: One location.
3. Preparing and Grouting Cracks in Cast Stone Units: Three units.
4. Preparing and Patching Cracks in Cast Stone Units: Three units.
5. Patching Holes and Losses in Cast Stone Units Using Composite Mortar Patching: One unit.
6. Preparing and pointing cast stone joints: One panel, including at least 8 linear feet of joint.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products and materials to prevent damage, deterioration, degradation, and intrusion of foreign material.

B. Discard and remove from site deteriorated materials, contaminated materials, and products that have exceeded their expiration dates. Replace with fresh materials.

1.9 PROJECT CONDITIONS

A. Safety: Protect all persons, whether or not involved in work of this Section, from harm caused by or resulting from work of this Section.

1. Protection from Hazardous Materials: Protect workers and other persons from contact with hazardous materials resulting from work of this Section.

a. Silica: Use procedures necessary to protect workers and other persons from exposure to respirable crystalline silica. All work should be performed in compliance with applicable OSHA regulations, including but not limited to “Respirable Crystalline Silica Standard” (Title 29, Code of Federal Regulations (CFR) Section 1926.1153) and with other applicable state and local laws and regulations.

2. Protection from Noise: Limit noise generated by work of this Section to an absolute minimum. Prevent persons, whether or not involved with the work of this Section, from noise that might adversely affect them.

B. Protection of Building: Protect building elements and finishes from damage and from deterioration caused by work of this Section. Repair materials and finishes damaged as a result of work of this Section to Contracting Officer’s satisfaction at no additional cost to Government.

1. Exclusion of Water: Cover open joints and areas from which sections of masonry, masonry units, and/or portions of units have been removed during periods when work is suspended to ensure materials and finishes are not damaged by water penetration.

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2. Prevention of Staining: Prevent grout, mortar, and patching materials from staining exposed faces of masonry and other adjacent materials. Protect sills, ledges, and projections from mortar droppings. Immediately remove mortar in contact with masonry. Protect base of walls from rain splashed mud and mortar splatter by means of coverings spread on ground and over wall surface.
3. Protection from Fire: Take precautions necessary to prevent fire and spread of fire.

    a. Covers: Membranes, insulation blankets, and other materials used to cover masonry shall be flame retardant and fire resistant.
    b. Warming Devices: Heating blankets, infrared heaters, and other warming devices shall be UL approved and inspected for damage before use.
    c. Open Flame Heaters: No open flame heaters shall be used to protect finished masonry. Heaters used to warm water or sand for mortar or grout shall be well away from building and from flammable substances.

C. Support: Provide shoring, bracing, reinforcement, and enclosures necessary to prevent damage or deterioration prior to removing stone units.

D. Surfaces To Receive Work: The Drawings are two-dimensional representations of three-dimensional objects and do not show all surfaces of building components on which work is to be performed, including surfaces concealed from view behind objects shown; surfaces of projections, reveals, returns, and other elements perpendicular to or at an oblique angle to surfaces shown; concealed surfaces of profiled members; and surfaces of profiled members not drawn in detail. Perform work on surfaces of projections, reveals, returns, and profiled members associated with surfaces indicated to receive work and on surfaces of building components concealed behind building components shown. It is the specific intent of the Contract Documents to include work on all surfaces within Project area, whether or not shown on the Drawings, except as specifically indicated otherwise

1.10 ENVIRONMENTAL REQUIREMENTS

A. General

1. Manufacturer’s Recommendations: Perform work only when temperature of products being used, temperatures of existing and new materials and surfaces, and temperature and humidity of air at Project site comply with manufacturer’s requirements and
2. Conflicting Requirements: In each case in which there is a conflict between manufacturer’s recommendations, recommendations of referenced standards, and other requirements specified in this Section, the most stringent and restrictive requirement shall govern.

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B. Cold Weather Construction: Work shall not be permitted when temperature of air or wall is at or below 40 deg F or is expected to go below 40 deg F within 48 hours as predicted by the National Weather Service without Contracting Officer prior written approval. No work shall begin when any part of wall or materials in use are frozen or subject to freezing temperatures. See Section 015000 Temporary Facilities requirements.

C. Hot Weather Construction: Work shall not be permitted when temperature of air or wall is at or above 100 deg F or when temperature of air is 90 deg F or above and the wind speed is 8 mph or greater without Contracting Officer prior written approval.

D. Damage from Work in Cold Weather or in Hot Weather: Remove work of this Section damaged by freezing during cold weather masonry work and/or damaged by premature or too-rapid drying during hot weather masonry work and replace with new masonry work complying with the requirements of this Section at no additional cost to Government.

PART 2 - MATERIALS

2.1 MORTAR AND PATCHING MATERIALS

A. Portland Cement: ASTM C 150, Type I or Type II. Do not use masonry cement.

B. White Portland Cement: ASTM C 150, Type I.

C. Hydrated Lime: ASTM C 207, Type S.

D. Sand: Clean sharp sand, free of loam, silt, soluble salts, organic matter, and other substances that might adversely affect mortar, masonry units, or embedded elements and graded in compliance with ASTM C 144. Where mortar or patching mortar is to match existing original mortar or patching mortar, sand or other aggregate shall be selected to provide mortar matching color and texture of original mortar (with minimum addition of pigment). Sieve and mix sand and aggregates from individual sources and from more than one source to provide mortar matching original mortar.

E. Water: Clean and free of substances that might adversely affect mortar, masonry, and embedded elements.

F. Pigments: Stable, light-fast, alkali-resistant, water-soluble mineral oxide pigments without fillers or extenders complying with ASTM C 979. Provide one of the following, or approved equal:

1. SGS Concentrated Mortar Colors by Solomon Color, Inc., 4050 Color Plant Road, Springfield, IL 62702 (800-624-0261).

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2. Lanxess Bayferrox Iron Oxide Pigments by Lanxess Corporation, Business Unit Inorganic Pigments, 111 RIDC Park West Drive, Pittsburgh, PA 15275 (412-809-1000).
3. Powder Pigments by Davis Colors, 3700 East Olympic Blvd., Los Angeles, CA 90023 (323-265-8323).

2.2 PREFORMULATED MORTARS

A. Composite Patching Mortar for Granite: Single-component, cementitious, mineral-based mortar specifically manufactured for the restoration of natural stone. Provide custom colors to match colors of clean stone. Provide one of the following, or approved equal:

1. Jahn M90 Concrete and Precast Repair Mortar, available from Cathedral Stone Products, Inc., 7266 Park Circle Dr., Hanover, MD 21076 (800-684-0901)
2. Custom System 45, available from Edison Coatings, Inc., 3 Northwest Drive, Plainville, CT 06062 (800-341-6621).
3. Matrix, available from Conproco, (800-258-3500).

2.3 PREFORMULATED GROUTS

A. Cementitious Injection Grout Restoration of Cracked and Broken Masonry: Single-component, water-vapor-permeable, cementitious grout formulated specifically for injecting cracks and voids in masonry in custom colors to match color of cleaned existing cast stone masonry units being reinforced. Provide one of the following, or approved equal:

1. Jahn M31 Micro-Injection Grout Formulation 32 for cracks less than 3/16 Inch in Width.
2. Jahn M40 Crack Injection Grout for Cracks Exceeding 3/16 Inch in Width, available from Cathedral Stone Products, Inc., 7266 Park Circle Drive, Hanover, MD 21076 (800-684-0901)
3. Spec Joint 46, available from Edison Coatings, Inc., 3 Northwest Drive, Plainville, CT 06062, (800-341-6621).
4. Injection Grout, available from Conproco, (800-258-3500).

2.4 TREATMENT OF REINFORCING STEEL

A. Epoxy for Coating Exposed Reinforcing: High high-solids, rust-inhibitive, surface-tolerant epoxy mastic compatible with patching manufacturer's system. Provide one of the following, or approved equal:

1. Corotech V160 Surface Tolerant Epoxy Mastic by Benjamin Moore.
2. Macropoxy 985 by Sherwin Williams.
3. 9100 DTM Epoxy Mastic by Rust-Oleum

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2.5 ANCHORS AND FASTENERS:

A. Provide anchors, dowels, attachments, and fasteners as shown on Drawings and approved shop drawings and of size and configuration suitable for use intended to secure sound, secure anchorage.

1. Material

a. Anchors and Fasteners Not Being Welded: Stainless steel complying with ASTM A 276 or ASTM A 666 Type 302, 304, 304L, 316, or 316L.
b. Anchors and Fasteners Being Welded: Stainless steel complying with ASTM A 276 or ASTM A 666 Type 316L.

2. Prohibited Types of Anchors and Fasteners: Expansion bolts, cinch bolts, and plugs are not acceptable.

B. Anchors and Fasteners for Securing Cast Stone Units

1. Anchors for Stone Units: 1-inch wide by 1/8-inch thick stainless steel strap anchors and/or strap anchors with stainless steel pins at least 1/4-inch in diameter in configuration shown on approved shop drawings.
2. Fasteners for Securing Anchors to Backup Masonry: Adhesive-fastening systems specifically designed to anchor elements to masonry and of size indicated on Drawings and approved shop drawings. Provide fasteners using stainless steel bolts and washers or threaded stainless steel rods and nuts and washers, screen tubes, appropriate structural adhesive, and accessories specifically designed for anchoring to masonry. Provide one of the following, or approved equal:

a. HIT HY 200, HIT HY 70 Adhesive Anchors by Hilti, P.O. Box 21148, Tulsa, OK (800-879-8000) Hilti, P.O. Box 21148, Tulsa, OK (800-879-8000);
b. Ramset/Red Head, 1300 N. Michael Dr., Wood Dale, IL, 60191 (630-350-0370);
c. Simpson Strong-Tie, 26 International Street, Columbus, OH 43228 (614-876-8060); or approved equal. Furnish accessories for mixing and installation as recommended by manufacturer for optimum performance.

3. Anchors for Setting Individual Cast Stone Units in Existing Masonry: One of the following as shown and dimensioned on approved shop drawings:

a. Concealed Front Anchors: Split anchor specifically designed to secure individual masonry units inserted into existing masonry with plates and sleeves of Type 304 stainless steel complying with ASTM A 666 and dowels of Type 304 stainless steel complying with ASTM A 580.

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b. Draw Pins: 3/8-inch-diameter stainless steel pins designed and installed to provide secure attachment when drawn into position after stone block is inserted.

C. Chemical Anchor Adhesive: Adhesive specifically designed for anchoring to masonry substrates.

2.6 ADHESIVES

A. Epoxy Adhesive for Pinning and Installing Pins: High modulus, high strength, moisture-insensitive, high-viscosity epoxy adhesive complying with ASTM C 881, Types I, II &IV, Grade 3, Classes B & C.

2.7 EQUIPMENT AND TOOLS FOR CLEANING ANCHOR HOLES, CRACKS, LOSSES, AND JOINTS

A. Brushes for Cleaning Anchor Holes: Stiff wire bristle or nylon bristle brushes of diameter to ensure full cleaning of dust and debris from masonry substrate at sides and bottom of hole. Furnish brushes specifically manufactured for cleaning anchor holes in masonry substrates. Brushes shall be sized appropriately for holes in which they are to be used so that they firmly contact entire circumference of hole at the same time. Use sizes recommended by anchor manufacturer and approved by Contracting Officer.

B. Brushes for Cleaning Cracks and Losses: Stiff nylon bristle brushes of shape and dimension to provide optimum removal of contaminants from stone surface and approved by Contracting Officer.

2.8 TOOLS FOR JOINT PREPARATION

A. Hand Tools: Chisels, hammers, and mallets.

1. Thickness of Chisels: Maximum thickness of 5/8 times joint width extending from tip at least three times depth at which chisel will be inserted into joint.

B. Power Tools: Standard tools and equipment, modified tools and equipment, and custom designed and fabricated tools and equipment as necessary to remove mortar from narrow joints without damaging masonry units. Use power tools only under conditions described in Part 3, below, and only if specifically approved by Contracting Officer.

1. Electric Grinders: Small, hand-held electric grinders with blades no greater than 1/16 inch thick and a maximum of 4-1/2-inch diameter.

C. Tools for Preparation of Joints Containing Sealant: Small wire bristle brushes, metal scrapers, small grinders, low-pressure, airborne, micro-abrasive blasting equipment, or other tools and

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equipment for removing remains of sealant and sealant residue from joint as described in approved Work Description.

D. Brushes for Removing Dust and Dirt from Joints: Stiff, natural- or synthetic-fiber bristle brushes. No metal bristle brushes are acceptable.

2.9 MISCELLANEOUS MATERIALS AND EQUIPMENT

A. Pins to Secure Composite Patching over 2 Inches Deep: 1/8-inch-diameter threaded stainless steel rods.

B. Tape for Protecting Masonry Surfaces: Masking tape or other approved tape that will protect masonry surface from contact with repair materials being used and that can be applied to and removed completely from masonry surface without damaging, deteriorating, or altering the appearance of the masonry surface.

C. Pointing Trowels: Long, thin pointing trowels narrower than joints being pointed.

1. Custom fabricate special trowels for masonry pointing if necessary to ensure proper insertion and optimum compaction of mortar.

D. Scrapers for Removing Mortar: Wood scrapers with rounded corners.

E. Brushes for Removing Dirt and Debris from Joints: Stiff natural bristle or fiber bristle brushes. No metal bristle brushes are permitted.

F. Sand for Removing Mortar: Clean, washed fine sand.

G. Cloths for Removing Mortar: Clean, white terry cloth or similar rough-textured cloth.

2.10 MORTAR AND GROUT MIXES

A. General

1. Mortars specified hereinafter shall comply with ASTM C 1713, Standard Specification for Mortars for the Repair of Historic Masonry.
2. Mix mortars using proportions specified herein as adjusted, if necessary, by the amount of moisture in the ingredients. The proportions specified are for dry cements and limes and damp, loose (saturated, surface-dry) sand. If ingredients with different moisture contents are used (for example, lime putty is used in place of lime or dry sand is used in place of damp, loose sand), adjust quantities so that the proportions of ingredients in the mixes equal the proportions specified as approved by Contracting Officer.

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B. Mortars for Pointing Cast Stone Masonry: Mortar mixes may change and may require adjustment before and during construction in accordance with pre-construction conformance testing, field-testing, and Contracting Officer's evaluation of testing and test results.

1. Mortar for Pointing Cast Stone Masonry: Cement, lime, sand mortar. Proportion mortar by volume as follows to achieve a mortar with a minimum compressive strength of 415 psi at 7 days and 3 psi at 28 days.

   a. 1 part by volume white Portland cement (Type I)
   b. 2 part by volume hydrated lime (Type S)
   c. 7 parts "00" sand (Selected to match sand in original mortar)
   d. Oxide pigments as needed to match color of the original mortar, but not to exceed 7 percent of the weight of the cement.

2. Mortars for Setting Dutchmen: Mortar mixes may change and may require adjustment before and during construction in accordance with pre-construction conformance testing, field-testing, and Contracting Officer's evaluation of testing and test results.
3. "Thin Set" Mortar for Setting Stone Dutchmen: Use when mortar bed is less than 3/8 inch thick to produce an initially tacky mortar exhibiting high strength properties when set.

   a. 1 part by volume white Portland cement (Type I)
   b. 3 parts fine "00" sand (selected to match color of existing clean stone)
   c. Temper to workable consistency with polymer admixture, or approved equal, mixed in accordance with manufacturer's recommendations for high strength, "thin set" mortar.
   d. Oxide pigments as necessary to adjust color of mortar mixed to as close a match to adjacent stone surface as possible using appropriate colored cements and aggregates to match color of adjacent stone surface but not to exceed 7 percent of the weight of the cement.

4. Grout for Injecting Cracks: Dispersed hydrated lime with up to five percent water by weight. Mix with an electrically powered mixer for two to three minutes.

2.11 MIXING OF MORTARS AND GROUTS

A. Measuring: Measure mortar and grout ingredients carefully using containers with fixed volumes so that proportions are controlled and maintained throughout the work of this Section.

B. Mixing Portland Cement Mortars and Grouts: Mix mortars and grouts in an approved type of power-operated batch mixer. Mix for time necessary to produce a homogeneous plastic mortar but not be less than five minutes: approximately two minutes for mixing dry materials and not less than three minutes for mixing after water has been added.

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C. Mixing Lime Mortars and Grouts: Mix lime mortars and grouts using a helical paddle mixer, a pan mixer (in which the mortar is mixed by rotating paddles) or a traditional roller mixer as approved by lime supplier and Contracting Officer.

D. Water: Use minimum amount of water to produce a workable consistency for mortar's intended purpose.

1. Mortar for Pointing: As dry a consistency as will produce a mortar sufficiently plastic to be worked into joints.
2. Grout for Injection: Consistency that can be injected to fill voids and losses.

E. After mixing, mortars for pointing or setting shall sit for 20 minutes prior to use to allow for initial shrinkage. Mortar shall be placed in final position within two hours of mixing. Retempering of partially hardened material is not permitted.

F. Mortar for grout shall be placed in final position within two hours of mixing or within period recommended by manufacturer of custom products, whichever is less. Retempering of partially hardened material is not permitted.

G. Custom Patching Mortars and Grouts: Mix in strict accordance with manufacturer's written instructions.

PART 3 - EXECUTION

3.1 INSTALLING NEW CAST STONE UNITS

A. General: Install cast stone units in their original locations as indicated on Drawings. Do not damage masonry units. Repair and replace units damaged during work of this Section as directed by Contracting Officer and to Contracting Officer's satisfaction at no additional cost to Government.

B. Cleaning: Clean masonry units before setting. Remove old mortar from salvaged units and scrub units with detergent and water using natural or synthetic fiber bristle brushes. Thoroughly rinse units with clean water.

C. Anchor Holes: Where indicated on Drawings, necessitated by conditions, and as shown on approved shop drawings, drill new holes and mortises to receive anchors, cramps, dowels, and other attachment elements. Use rotary drills, masonry saws, and other methods that do not damage stone. Do not use hammer drills or other percussive tools.

D. Cleaning Holes: Thoroughly remove dust and debris from holes to receive pins.

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E. Setting: Set stone units accurately with new stainless steel anchors and fresh mortar to match configuration of original masonry. Set true to line and level and fill joints and anchor holes completely with mortar.

1. Joint Widths: Set stone units with joints of uniform width not exceeding width of existing joints.
2. Wedges: Use nylon wedges to secure proper setting of stone. Pack bed joints tightly with mortar. Clean wedges before using them and remove wedges before mortar has set hard. Do not break mortar bond while removing wedges. Fill holes left by removing wedges with mortar.

F. Defects: Patching of defects in masonry units shall not be permitted. Replace cast stone units with chips on faces; and clean cast stone units with stains on faces. No acid-leaching agent shall be permitted.

G. Preparation for Pointing: Upon completion of setting stone and cast stone units, rake joints to prepare them for pointing.

3.2 PATCHING CAST STONE UNITS USING COMPOSITE PATCHING MORTAR

A. General: Remove deteriorated cast stone to sound substrate, prepare substrate, and provide new patches to provide cast stone units of original configuration with patches matching profile, color, and texture of cast stone units into which they are inserted.

B. Removal of Loose and Deteriorated Cast Stone

1. Remove to Sound Substrate: Remove deteriorated cast stone to minimum depth necessary to reach sound material or substrate. Remove sound material to a minimum of 1/4 inch and a maximum of 1/2 inch beyond deteriorated material. Remove sound material to a depth of at least 1/2 inch behind finished surface of patch to provide for a minimum patch depth of 1/2 inch. Do not damage or disturb sound material further than 1/2 inch below the surface. Do not chip edges of cast stone units.
2. Edges: Cut edges of areas where cast stone has been removed straight and parallel or perpendicular to joints in facade. Use jigs as necessary to ensure that cuts are straight and that ends of cuts do not cut into sound material to remain.
3. Dovetail Mechanical Bond: Where surface of damaged cast stone is greater than 1/2 inch behind plane of adjacent block, slightly undercut edges of area to be patched to provide a slight dovetail.

C. Treatment of Exposed Ferrous Metal Wires and Reinforcing: Where ferrous metal wires or reinforcing are exposed during removal of deteriorated cast stone, clean metal thoroughly free of

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rust and corrosion to bare metal using wire brushes, metal wool, abrasive papers, or other approved method. Wipe wires clean of oil, grease, and other contaminants using approved solvent. Paint wires with two coats of epoxy mastic.

D. Additional Mechanical Bond for Patches over 2 Inches Deep: Where the surface of sound cast stone is more than 2 inches below plane of facade, provide threaded rod anchors for mechanical bond of composite patching mortar.

1. Drilling Anchor Holes: Drill holes 1 inch deep by 1/8 inch larger in diameter than threaded rods, 2 inches on center horizontally and vertically. Drill holes at slightly varying angles within 10 degrees of perpendicular to facade plane.
2. Cleaning Anchor Holes: Clean anchor holes using as recommended by adhesive manufacturer.
3. Installing Threaded Rods: Anchor threaded rods in holes using structural adhesive. Rods should extend to a point 1 inch behind finished surface of patch.

E. Preparation

1. Cleaning: Clean surfaces to be patched and filled free from dust, dirt, oils, grease, and other contaminants and coatings that might adversely affect adhesion of patching mortar. Brush surfaces with stiff, fiber-bristle brushes and blow clean with clean, oil-free compressed air to make certain that loose materials. Wash surfaces of prepared cast stone with clean water and specified detergent. Rinse thoroughly with clean water and soft, fiber bristle brushes.
2. Protection: Protect surrounding surfaces as necessary to prevent contact with patching materials.
3. Wetting: Wet surface of prepared stone with clean water and soft fiber-bristle brushes to ensure that at time of patching vertical surfaces are glistening wet and horizontal surfaces are dampened without pooling water. If surfaces dry out before applying cementitious patching mortar, repeat the wetting process.

F. Application of Patching Mortar: Prepare and apply patching mortar in strict accordance with manufacturer's written instructions and recommendations to match adjacent planes and profiles and texture of adjacent surface. The responsibility for producing patches of quality, consistency, and color to match adjacent surfaces shall rest solely with the Contractor.

1. Application of "Peanut Butter" Coat: Apply patching mortar mixed with water to the consistency of wet putty to the wet substrate to a thickness of approximately 1/8 inch. Do not allow "Peanut Butter" coat to dry out before applying patching mortar of standard consistency with water content as certified by manufacturer.

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2. Application of Patching Mortar: Apply patching mortar to fill voids. Trowel mortar onto wet "peanut butter" coat. Fill entire void in one steady lift, building material up to the plane of the adjacent surfaces. Compress material as it is installed to ensure entire void is filled without gaps.
3. Application of Aggregate: Trowel aggregate into surface to provide surface with uniform aggregate matching color and texture of adjacent weathered cast stone surface. Do not over trowel.
4. Brushing to Expose Aggregate: After the patching mixture has partially set, brush surface with clean fiber bristle brush to remove laitance and expose surface aggregate.

G. Cleaning: Remove uncured patching mortar from the perimeter of the repair areas before it dries using methods that provide uniformly clean surfaces without streaks or stains and without damage or deterioration to cast stone or to cementitious patching mortar patches.

H. Curing: Periodically mist cementitious patching mortar gently using clean water at intervals determined in accordance with the manufacturer's written instructions but at least several times a day for a period of at least 72 hours following installation. Begin misting at appropriate time depending on temperature, humidity, and wind conditions as recommended by manufacturer. Should access to the repairs be impossible over a period of time, plastic may be used to cover them temporarily. The application of plastic, however, does not remove the need for normal curing techniques.

I. Corrective Measures

1. Unacceptable Conditions: Patches exhibiting cracks in patch surface, separation at sides of crack, debonded areas (hollow to sounding test), and/or surface defects (including, but not limited to, out-of alignment, exposed aggregate not matching adjacent aggregate, embedded debris, or uneven surface finish) shall be considered unacceptable. Remove unacceptable patches, properly prepare substrates, and provide new patches to comply with the requirements of this Section as directed by and to the satisfaction of the Contracting Officer at no additional cost to Government.
2. Rejected Work: Should Contracting Officer determine that any of the work does not equal or exceed minimum standard established by approved mock-up, Contractor shall cut out patch and reapply following requirements of this Section to Contracting Officer's satisfaction at no additional cost to Government.

3.3 PATCHING CRACKED CAST STONE UNITS USING CEMENTITIOUS GROUT AND PATCHING CRACK REPAIR

A. General: Prepare and inject cracks with cementitious grout. Rout out cracks at surface and fill with custom patching mortar to match color and texture of adjacent stone surface.

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B. Preparation: Drill 1/4-inch-diameter holes for injection ports into crack approximately 6 inches on center. Remove dust, dirt, loose particles, and other contaminants that might adversely affect adhesion of grout or durability of grout from crack and injection port holes using mechanical means followed by clean, oil-free compressed air. Install injection ports over holes. Seal surface of crack and adhere injection ports to stone with temporary crack sealer. Protect adjacent masonry surfaces from contact with grout using approved methods.

C. Prewetting Substrates: Immediately before injecting grout, flush crack with clean water. If grout is not installed immediately, flush crack again with water to ensure that stone surfaces at sides of crack are wet at time of grout injection.

D. Injection of Grout: Inject cementitious grout using gravity flow or other approved equipment and methods to ensure that crack is filled as approved by Contracting Officer.

E. Preparation for Patching Crack at Surface: Remove temporary sealer and injection ports and clean cast stone surface. Rout out cracks to a depth of 5/8 inch and a width of 1/8 inch. Remove grout from front 5/8-inch depth of injection ports exposing clean stone surface. Do not damage adjacent stone surfaces.

F. Cleaning: Clean cast stone at sides and rear of routed cracks and at injection ports thoroughly using fine, stiff fiber-bristle brush followed by clean, oil-free compressed air to remove particles and dust.

G. Wetting: Thoroughly rinse surfaces to ensure that substrate will not rapidly absorb water from patching mortar.

H. Application of Patching Mortar: Brush stone substrates with a mortar slurry coat and fill holes with specified composite patching mortar matching color of adjacent cleaned stone following manufacturer’s directions.

I. Finishing: Strike surface of repaired crack flush with face of adjacent stone. Finish surface of filled crack to match texture and finish of adjacent cleaned stone.

J. Curing: Protect installed mortar from too rapid drying and from contact with water that might wash binder from surface.

3.4 PINNING CAST STONE UNITS USING THREADED RODS SET IN EPOXY ADHESIVE AND INJECTING CRACKS WITH CEMENTITIOUS GROUT

A. General: Pin broken pieces of stone to sound pieces of stone and pin loose stone units to sound stone units or to sound backup masonry as indicated on Drawings and inject cracks with cementitious grout.

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B. Drilling: Drill holes in loose stone units and in cracked stone units indicated to be pinned using rotary drill with sharp masonry bit. Do not use hammer drill or other percussive tools. Extend holes at least 3 inches into solid masonry backup or into solid and securely anchored adjacent portion of stone unit.

C. Cleaning Holes: Use specified stiff bristle brushes and filtered, oil-free compressed air applied through specially designed nozzles to thoroughly remove dust and debris from holes to receive pins.

D. Protection of Substrate to Be Patched: Protect outer portions of stone surface within holes to receive composite patching mortar patches using masking tape or other means to prevent contact with adhesive.

E. Pinning: Inject epoxy adhesive and insert threaded dowels, pushing until dowel ends are below stone surface to extent shown on Drawings but not less than 1/2 inch.

F. Patching Holes: Patch holes in exposed surfaces using composite patching mortar following requirements of Article “Patching Stone Units Using Composite Patching Mortar,” above. Patches shall match color, texture, and surface of adjacent stone. Cure patches to comply with composite patching mortar manufacturer’s recommendations to ensure optimum performance of patching mortar.

G. Injecting Cracks with Cementitious Grout:

1. General: Prepare cracks and inject cracks with cementitious grout. If width of crack at surface is not greater than 1/32 inch, drill out front portions of injection ports and fill with custom patching mortar to match color and texture of adjacent stone surface. If width of crack at surface is greater than 1/32 inch, drill out front portions of injection ports and rout out cracks at surface and fill with custom patching mortar to match color and texture of adjacent stone surfaces.
2. Preparation: Drill 1/4-inch-diameter injection ports into crack approximately 6 inches on center. Remove dust, dirt, and loose particles from crack using mechanical means followed by clean, oil-free compressed air. Install injection ports over holes. Seal surface of crack and adhere injection ports to stone with temporary crack sealer. Protect adjacent stone from contact with cementitious grout using approved methods.
3. Grout Injection: Match viscosity of cementitious grout to width of crack so that crack will be completely filled. Inject cementitious grout using specified equipment and methods to ensure that crack is filled as approved by Contracting Officer.
4. Preparing Injection Ports at Cracks Not Exceeding 1/32-Inch in Width: At cracks not exceeding 1/32-inch in width, drill out surface of injection ports to a depth of 5/8 inch to

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remove adhesive and provide sound, clean stone substrate. Do not damage adjacent stone surface.

5. Preparing Stone Surface at Cracks Exceeding 1/32-Inch in Width: At cracks exceeding 1/32-inch in width, drill out surface of injection ports to a depth of 5/8 inch and rout out surface of crack to a width of 1/8 inch and a depth of 5/8 inch to provide sound, clean stone substrate free of adhesive. Do not damage adjacent stone surface.
6. Cleaning: Clean stone at injection ports and at sides and rear of routed cracks thoroughly using fine, stiff, fiber-bristle brush followed by clean, oil-free compressed air to remove particles and dust.
7. Wetting: Thoroughly rinse surfaces to ensure that substrate will not rapidly absorb water from patching mortar.
8. Application of Patching Mortar: Brush stone substrates with a mortar slurry coat. Fill injection ports and/or cracks fill with specified composite patching mortar matching color of adjacent cleaned stone.
9. Finishing: Strike surfaces of repaired crack and injection ports flush with face of adjacent stone. Finish surfaces of filled crack and injection ports to match texture and finish of adjacent cleaned stone.
10. Curing: Protect installed mortar from too rapid drying and from contact with water that might wash binder from surface.

3.5 ROUTING AND FILLING CRACKS

A. General: In locations indicated, rout out cracks at surface and fill with custom patching mortar to match color and texture of adjacent cast stone surface.

B. Preparation for Patching Crack: Rout out cracks to a depth of 5/8 inch and a width of 1/8 inch. Do not damage adjacent stone surface.

1. Removing Previous Repairs: Where previous crack repair is to be replaced, rout out crack to width and depth of previous repair to remove previous patching material and expose stone substrate free of contaminants.

C. Cleaning: Clean stone at sides and rear of routed cracks thoroughly to remove particles and dust.

D. Wetting: Thoroughly rinse surfaces to ensure that substrate will not rapidly absorb water from patching mortar.

E. Application: Brush crack with a mortar slurry coat and fill with specified composite patching mortar matching color of adjacent cleaned stone.

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F. Finishing: Strike surface of filled crack flush with face of adjacent stone. Finish surface of patching mortar to match texture and finish of adjacent cleaned stone.

G. Curing: Protect installed patching mortar from too rapid drying and from contact with water that might wash binder from surface.

3.6 PREPARING AND POINTING JOINTS

A. Preparing Joints Containing Mortar

1. General: Remove mortar from joints to a depth of 3/4 inch, to 2-1/2 times width of joint, or to sound mortar, whichever is deepest. In all cases remove deteriorated, weathered, and loose material to sound mortar.

    a. Completely remove mortar from surfaces of masonry units adjoining joint to allow new mortar to bond directly with masonry units.
    b. Cut surface of mortar at rear of joint at a uniform depth from and parallel to wall surface.
    c. Do not damage faces or arrises of masonry units during joint preparation. Cease joint preparation work if, in Contracting Officer's judgment, masonry units are damaged by methods being used to prepare joints. Do not resume work until tools, workers, and methodology have been corrected to ensure that masonry units are not damaged and that work meets standard set by approved mock-up.

2. Mortar Removal Using Hand Tools: Use hand tools for removal of mortar from joints in masonry that are less than 6 inches long and from other joints in which use of power tools might damage masonry units. Use hand tools to complete mortar removal from joints where power tools have been used to partially remove mortar.

    a. For narrow joints of 1/8-inch or less in width, rake mortar from joints manually with a sharp knife blade or cutter made for this purpose. Cutter may be used with or without aid of a hammer.
    b. Sharpen chisels as often as necessary to provide for optimum cutting of mortar and to minimize chipping but at least hourly.

3. Mortar Removal Using Power Tools

    a. Demonstrated Ability of Mechanics: Prior to beginning work, demonstrate that workers using power tools are proficient in use of power tools for joint preparation. Failure to demonstrate to Contracting Officer's satisfaction that each worker is proficient in the use of each type of power tool proposed for use and that power tool joint preparation does not result in damage to masonry units shall result in prohibition of use of power

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tools for joint preparation. If proficiency is not demonstrated, or if work in progress results in damage to masonry to remain, power tool work shall cease, and joints shall be prepared for pointing using only hand-powered tools.

b. Rotary Power Tools: With Contracting Officer's specific prior approval following successful demonstrations of skill by mechanics, power grinders and/or pneumatic grinders may be used to partially remove mortar from joints longer than 6 inches in masonry where there is no danger of cutting into adjacent stone units.

1) Limitations on Use of Electric Power Grinders: Do not use electric power grinders on joints less than 3/16-inch wide or less than 6 inches long or where ornament, elaborate profile, or other surface irregularity might make damage to masonry units likely.

2) Extent of Mortar Removal Using Power Grinders: Use power grinder only to score one kerf cut in center of each joint to depth of mortar removal indicated. Remove remaining mortar from sides of joint using hand tools or, if approved, pneumatically powered chisels.

a) Stop kerf at least 4 inches from inside corners and projecting elements. Remove remaining mortar using hand tools or pneumatically powered chisels.

4. Cleaning: Remove loose mortar and foreign material from raked joints using a fine, stiff natural- or synthetic-fiber bristle brush. Remove remaining particles, dust, and dirt. Ensure that dust and dirt are not blown back into previously cleaned joints.
5. Restoration and Replacement of Damaged Units: Repair and/or replace masonry units damaged during joint preparation to provide units in at least as good a condition as before joint preparation was begun to Contracting Officer's satisfaction at no additional cost to Government.

B. Pointing Joints

1. Wetting: Thoroughly drench masonry with water 24 hours prior to pointing joints to saturate masonry. Thoroughly wet masonry again immediately before pointing joints and allow surfaces to dry slightly. At time of masonry pointing, surfaces shall be damp, so that they do not rapidly absorb moisture, but free of standing water (saturated, surface dry).

a. Failure to Properly Wet Substrate: Evidence that masonry to be pointed has not been properly dampened to prevent water in the mortar from being too rapidly absorbed by the masonry will be cause for Contracting Officer to reject pointing work. Remove rejected pointing, properly prepare joints for pointing, and provide new mortar to meet requirements of this Section at no additional cost to Government.

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2. Installing Mortar: Install mortar in joints as follows.

    a. Using a long, thin masonry pointing trowel, tightly pack mortar into joints in layers not exceeding 1/4-inch thick to fill joint to match original sound joints.
    b. Begin by filling areas from which mortar is missing to a depth greater than 3/4 inch in 3/8-inch-thick layers to within 3/4 inch of finished joint surface to provide a uniform substrate for final masonry pointing. Fill final 3/4-inch depth of joint continuously and uniformly in 1/4-inch-thick layers.
    c. Firmly iron each layer to compact mortar and ensure full bond between mortar and masonry units and a firm, solid joint.
    d. Allow each layer to reach thumbprint hardness before applying succeeding layer. Do not let previous layer dry out before applying succeeding layer. Construct uniform joints.
    e. Do not spread mortar over edges onto exposed surfaces of masonry units. Do not featheredge mortar.
    f. When stopping work at end of each day or for other reasons, stagger layers of mortar so that there will be no through joints in mortar inserted into joints. Stagger joints in layers so that they are at least 3 inches from each other.
    g. Where applying new work to that of a prior day, dampen previous work to ensure good bond.

3. Tooling Joints: After final layer of mortar is “leather hard,” tool joints with a flat rule jointer, or as directed by Contracting Officer.

    a. Profile: Tool joints to profile as shown on Drawings or to match original joint profiles as directed by Contracting Officer. Solidly compress mortar so that it adheres well to masonry on both sides and forms a dense surface. Premature or late tooling will result in unacceptable finishes, which will be rejected.

4. Curing

    a. Keep newly pointed joints damp for at least 72 hours after mortar has been inserted. Do not apply a direct stream of water to joints for at least 7 days after mortar has been placed.
    b. Ensure masonry temperature remains as required by specifications until mortar is thoroughly cured.

C. Repairing Mortar Joints

1. Repairing Pointed Joints: As cleaning progresses, examine joints to locate cracks, holes, and other defects. Carefully point up and fill such defects with mortar. Where joints are

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defective in opinion of Contracting Officer cut out joints to minimum depth of 3/4 inch or two-and-one-half times joint width, whichever is greater, properly prepare joint substrates, and provide new pointing mortar exercising extreme care to ensure that color matches that of adjacent masonry pointing work. Exposed joint surfaces shall be free from protruding mortar, holes, pits, depressions, and other defects.

D. Correcting Unacceptable Joints: Should a crack occur in any joint surface, should mortar separate from a masonry unit, indicating that it did not form a strong mechanical and chemical bond with the unit, or should Contracting Officer determine that for another reason masonry pointing work does not equal or exceed the minimum standard established by the approved mock-up and comply with requirements of this Section, remove mortar to a minimum depth of 3/4 inch, properly prepare joint substrates, and repoint following requirements of this Section to Contracting Officer's satisfaction at no additional cost to Government. At completion of work of this Section, joints shall be full of mortar soundly adhered to surfaces of masonry units at sides of joints and without defects.

3.7 ADJUSTMENT AND CLEANING

A. Adjustment: Correct work of this Section that does not meet requirements of this Specification to Contracting Officer's satisfaction at no additional cost to Government.

B. Site Cleaning: At completion of masonry restoration work, remove from site debris and left over materials and leave site broom clean.

END OF SECTION

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SECTION 06 01 40 - ARCHITECTURAL WOODWORK RESTORATION

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 DESCRIPTION

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the work of architectural woodwork restoration as shown on the Drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:

1. Providing new wood elements matching original elements to replace missing wood elements and damaged wood elements.
2. Providing dutchman patches matching adjacent wood to repair damaged and deteriorated wood elements.
3. Removing embedded hardware and providing dutchman patches matching adjacent wood.
4. Removing inappropriate and abandoned fasteners and anchors and patching holes with wood filler.
5. Patching holes and losses with wood filler.
6. Filling open joints with wood filler.

B. Related Work Specified Elsewhere

1. Asbestos Remediation – Section 02 82 00
2. Brick Masonry Restoration – Section 04 01 20
3. Stone Restoration – Section 04 01 40
4. Cast Stone Restoration – Section 04 72 00
5. Exterior Joint Sealants – Section 07 92 00
6. Wood Door Restoration – Section 08 01 14
7. Wood Window Restoration – Section 08 01 52
8. New Wood Windows – Section 08 52 00
9. Paint Removal – Section 09 01 10
10. Exterior Painting – Section 09 91 00

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C. Intent: It is the specific intent of this Section to provide for the restoration of architectural woodwork to a complete, fully intact, structurally sound, and securely anchored condition matching appearance of original woodwork, except as specifically indicated otherwise, through modification, repair, replacement, additions, finish restoration, and finish removal and replication without damaging or deteriorating remaining original elements. All work required to fulfill this intent shall be included as work of this Section.

1.3 QUALITY ASSURANCE

A. Architectural Woodwork Restoration Specialist: Award architectural woodwork restoration to a firm regularly engaged in restoring architectural woodwork and installing architectural woodwork in historic buildings similar to the work required by this Section that can demonstrate to Government's satisfaction that, within previous five years, the firm has successfully performed and completed in a timely manner at least three projects similar in scope and type to work required on this Project involving buildings designated as Landmarks by local governmental authorities, buildings listed in the National Register of Historic Places, or buildings listed in a State Register of Historic Places under the direction of preservation authorities.

1. Foreman: Architectural woodwork restoration work shall be directly supervised by a full-time foreman with experience equal to or greater than that required of Architectural Woodwork Restoration Specialist. Foreman shall be on site and in shop daily when work of this Section is being performed in either location for duration of work of this Section. Same foreman shall remain on Project throughout work of this Section unless Government deems foreman's performance unacceptable.
2. Carpenters: Architectural woodwork restoration work shall be carried out by a steady crew of skilled carpenters who are thoroughly experienced in the restoration and replication of historic architectural woodwork and who have a minimum of three years' experience restoring and installing architectural woodwork on historic buildings similar to work required by this Section. In acceptance or rejection of work of this Section, no allowance will be made for workers' inattention or lack of skill.

B. Laws, Codes, and Regulations: Work of this Section shall comply with applicable federal, state, and local laws, codes, and regulations.

C. Referenced Standards: Work of this Section shall comply with applicable requirements and recommendations of latest editions of the documents listed herein, except as modified by more stringent requirements of the Contract Documents and of applicable laws, codes, and regulations of authorities having jurisdiction. Where the language in any of the documents referred to herein is in the form of a recommendation or suggestion, such recommendations or suggestions shall be deemed to be mandatory under this Contract unless specifically indicated otherwise in the Contract Documents. Provide a reference copy of each of the following standards at Project site and at shop

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when work of this Section is being performed. In each case in which there is a conflict between requirements of referenced standards; requirements of laws, codes, and regulations; and requirements of this Section, the most stringent or restrictive requirement shall govern.

1. United States Secretary of the Interior, Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings.
2. Architectural Woodwork Institute (AWI), Architectural Woodwork Standards. Architectural woodwork restoration shall comply with requirements for “Premium Grade” work as defined in Architectural Woodwork Standards, unless specifically indicated otherwise.

D. Documentation of Existing Conditions: Document configurations and conditions of architectural woodwork indicated to be restored before beginning restoration with photographs showing overall areas of woodwork and with additional detail photographs showing areas of damage and deterioration to be repaired if such areas are not clearly visible and understandable in the overall photographs of the woodwork. Key detailed photographs to overall photographs and to drawings. Clearly show all existing conditions, including conditions that might be misconstrued as damage resulting from work of this Section.

1. Images: Clear, sharp, color images. Unclear images, out-of-focus images, underexposed images, and overexposed images will not be accepted.
2. Digital Images Format: Digital images with minimum resolution of 5”X7” @ 300 DPI, JPEG images on CDROM, portable USB drive or secure access cloud storage system (e.g., Dropbox, OneDrive, Google Drive, etc.).
3. Identification and Keying: Key overall photographs to drawings and key detail photographs to overall photographs and to drawings so that area depicted in photograph is easily identifiable.

E. Sources of Materials: Obtain each type of material to be used for work of this Section from a single source to ensure a match in quality, performance, and appearance.

F. Knowledge of Site and Project Conditions: Before submitting bid, Bidders shall make themselves thoroughly familiar with the Drawings and Specifications, with the scope of this Project, and with conditions at the Project site relating to requirements of this Section and limitations under which the work will be performed and shall determine or verify dimensions and quantities. Submission of a bid shall be considered conclusive evidence that Contractor is thoroughly familiar with Project requirements and site conditions and limitations.

G. Access for Inspection and Approvals: Provide Contracting Officer access on a regular basis to locations on which mock-ups are being carried out, on which work is ongoing, and where work has been completed to allow for inspections and approvals. Provide means of access and safety precautions required to facilitate inspections and approvals.

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1.4 SUBMITTALS

A. General: Submit the following in compliance with the requirements of the Contract Documents. Revise and resubmit each item as required to obtain Contracting Officer's approval.

B. Qualification Data: Submit qualification data for firm and personnel specified in "Quality Assurance" Article that demonstrates that both firm and personnel have capabilities and experience complying with requirements specified. For firm and foreman, provide a list of at least three completed projects similar in size and scope to work required on this Project. For each project list project name, address, architect, conservator, supervising preservation agency, scope of contractor's work, and other relevant information. Submit this information with the bid.

C. Product Data: Manufacturer's published technical data for each product to be used in work of this Section including material description, chemical composition (ingredients and proportions), physical properties, recommendations for application and use, test reports and certificates verifying that product complies with specified requirements.

D. Documentation: Pre- and post-restoration of configuration and condition of architectural woodwork as specified in "Quality Assurance" Article, above.

E. Work Description: Prior to beginning architectural woodwork restoration on site or in the shop, submit detailed written description of proposed restoration materials and procedures for each phase of work required for architectural woodwork restoration. Do not begin work on site until Contracting Officer has approved Work Description in writing. Submit new written descriptive information. Photocopies of Contract Documents, excerpts from Contract Documents, and/or duplication of text in Contract Documents will not be accepted for Work Description. Description shall include, but not be limited to:

1. Materials and Procedures: Materials, methods, tools, and equipment for each type of work to be performed in restoring architectural woodwork.
2. Protection: Description, including drawings and diagrams, of proposed materials and methods of protection for preventing harm, damage, and deterioration caused by work of this Section to all persons (whether involved in the Work or not), building elements, materials, and finishes, surrounding landscape and site, and the environment (including air and water).
3. Handling Elements and Materials To Be Removed and Reinstalled: Describe procedures for handling elements and materials to be removed and reinstalled, including, but not limited to, removal, crating, labeling, tracking chain of custody, handling, and transportation.
4. Alternate Restoration Materials and Methods (If Any): Contractor proposed alternate materials and methods (if any) to those specified for architectural woodwork restoration.

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Provide evidence of successful use on comparable projects and demonstrate effectiveness for use on this Project.

F. Shop Drawings: Dimensioned, scale drawings of architectural woodwork to be restored and recreated, including elements to be restored in place and new elements to replace damaged elements and deteriorated elements, as necessary to completely describe construction. Submit newly prepared drawings showing site-verified conditions and materials. Photocopies of Contract Documents and/or electronic scans of Contract Documents will not be accepted for Shop Drawing submittals.

1. Elements To Be Drawn

   a. Woodwork to be restored in place.
   b. New woodwork to replace damaged woodwork and to replace deteriorated woodwork.

2. Drawings: Elevations and sections at scales that clearly show work required to restore woodwork. Include full-size details of typical repairs, members, and joinery. Profiles of elements for repair and replacement shall be full size. Show methods of securing and fastening members. Indicate finishes.
3. Certified Dimensions: Certify that dimensions on shop drawings have been field or shop measured.
4. Certified Profiles: Certify that profiles have been carefully duplicated from original elements.

G. Samples

1. Wood: Sets of samples of each type (specie, grain pattern, color, etc.) of new wood for repair or replacement. Each set shall contain two 6-inch by 12-inch by 1-inch samples, one without finish and one with finish. If finish will vary, provide additional samples to demonstrate full range of color to be found in final finished woodwork.
2. Wood Elements for Repair and Replacement: Each profile, 8-inch length.
3. Fasteners: Each type to be used in work of this Section.

1.5 MOCK-UPS

A. General: Before beginning general architectural woodwork restoration work, prepare mock-ups to provide standards for work of this Section. Do not proceed with architectural woodwork restoration work until Architect has approved mock-ups.

1. Locate mock-ups as directed by Contracting Officer.
2. Notify Contracting Officer 5 business days prior to start of each mock-up.
3. Use crew that will execute the work and follow requirements of this Section.

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4. Repeat mock-ups as necessary to obtain Contracting Officer's approval.
5. Protect approved mock-ups to ensure that they are without damage, deterioration, or alteration at time of Substantial Completion.
6. Approved mock-ups in undamaged condition at time of Substantial Completion may be incorporated into the Work.
7. Approved mock-ups will represent minimum standards for the architectural woodwork restoration work. Subsequent architectural woodwork restoration work that does not meet standards of approved mock-ups will be rejected.

B. Prepare the Following Mock-Ups

1. Providing New Wood Elements to Match Original Elements: One element of each type of new element to be provided where more than one element is to be provided.
2. Providing Dutchman Patches: One dutchman patch in each species of wood to be repaired.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products and materials to prevent damage, deterioration, degradation and intrusion of foreign material.

B. Discard and remove from site deteriorated materials, contaminated materials, and products that have exceeded their expiration dates. Replace with fresh materials.

1.7 PROJECT CONDITIONS

A. Safety: Take measures necessary to protect all persons, whether or not involved with work of this Section, from harm caused by work of this Section.

B. Protection of Building: Protect building elements and finishes from damage and from deterioration caused by work of this Section. Repair damage to materials and damage to finishes to Contracting Officer's satisfaction at no additional cost to Government.

1. Take precautions necessary to prevent fire and spread of fire. Do not use torches, heat guns, or other heat generating equipment to remove paint or finishes. Place paint or solvent soaked rags, waste, overalls, or other material that might constitute a fire hazard in metal containers and remove from premises daily in coordination with Project's requirements for waste removal.

C. Surfaces To Receive Work: The Drawings are two-dimensional representations of three-dimensional objects and do not show all surfaces of building components on which work is to be performed, including surfaces concealed from view behind objects shown; surfaces of projections,

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reveals, returns, and other elements perpendicular to or at an oblique angle to surfaces shown; concealed surfaces of profiled members and of ornament; and surfaces of profiled members and of ornament not drawn in detail. Perform work on surfaces of projections, reveals, returns, profiled members, and ornaments associated with surfaces indicated to receive work and on surfaces of building components concealed behind building components shown. It is the specific intent of the Contract Documents to include work on all surfaces within Project area, whether or not shown on the Drawings, except as specifically indicated otherwise.

D. Responsibility for Dimensions: Dimensions of existing elements and conditions in Contract Documents, whether numerical, tabular, or graphic, are provided for bidding purposes and for Contractor's information and are not guaranteed. Contractor shall measure existing elements and conditions in field and in shop before preparing shop drawings, ordering materials, or starting construction and shall certify on shop drawings that dimensions have been field verified. Contractor is responsible for verifying dimensions of existing construction and for preparation of new work and replacement work fitting into and aligning with existing construction.

E. Preconstruction Meeting for Architectural Woodwork Restoration: Convene a preconstruction meeting to discuss architectural woodwork restoration and its effect on adjacent elements, materials, and finishes. Attendees shall include Government's Representatives, Architect, Construction Manager, firm(s) that will perform architectural woodwork restoration, and other entities that might be affected by architectural woodwork restoration work.

1.8 ENVIRONMENTAL CONDITIONS

A. Temperature and Humidity: Comply with requirements of this Section, with requirements of referenced standards, and with recommendations of material manufacturers concerning temperature and humidity requirements for materials installation and application.

PART 2 – PRODUCTS

2.1 WOOD

A. Wood Characteristics:

1. Wood shall be of sound stock, solid wood without finger joints or other joints within members, thoroughly seasoned, and dried to a moisture content not exceeding 11 percent.
2. Wood shall be free from defects or blemishes on surfaces exposed to view that will show after paints and finishes have been applied. Materials that do not comply with specifications for quality and grade, are in any way defective, or are otherwise not in

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proper condition will be rejected.

3. Wood for new exterior brick mold and sill components as necessary, Other New Elements, and Repairs of Existing Elements shall match profile and grade of existing doors in species, quality, cut, and grain pattern in kind. Wood should be 100% heartwood, quarter sawn or rift sawn.

2.2 ADHESIVES, CONSOLIDANTS AND FILLERS

B. Adhesive for Dutchman Repairs and Component Replacement: Epoxy resin glue designed for use with wood and slightly flexible when dry. Follow manufacturer's written instructions for use in low ambient temperatures.

C. Wood Consolidation: Epoxy designed for consolidating deteriorated wood to slow or cease ongoing deterioration and provide surface for appropriate bonding of epoxy adhesive and paint.

D. Wood Filler: Epoxy designed for flexible fill of voids and cracks.

2.3 SHOP FABRICATION

A. General: Fabricate new woodwork to match existing forms and profiles. Restore existing millwork to exactly match existing original work in form, dimension, profile, and joinery, unless otherwise indicated.

B. Fabricate millwork to comply with requirements of AWI, Architectural Woodwork Standards, Section 1000, for "Premium Grade" work except where more stringent requirements are specified herein.

PART 3 - EXECUTION

3.1 RESTORING ARCHITECTURAL WOODWORK, GENERAL

A. Restore woodwork. Restoration work includes all repair and finishing work necessary to return architectural woodwork to a fully intact and structurally sound condition and original appearance as acceptable to Contracting Officer.

B. Procedure

1. Where elements are thoroughly sealed and paint film 100% intact, architectural woodwork to

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be restored in place.
2. Remove existing wood brick mold elements where not sealed and paint film has eroded. Removals shall be done with care, assuming each element will be restored and reinstalled.
3. Label all elements to correspond with window schedule on project drawings.
4. Protect adjacent materials and finishes from damage and from deterioration resulting from restoration of architectural woodwork in place.
5. Provide new architectural woodwork elements as indicated or where existing element exhibits loss greater than 50%.
6. Replace missing woodwork elements as indicated.
7. Restore damaged woodwork elements.
8. Reinstall restored salvaged woodwork and install new woodwork to match original woodwork.

3.2 PAINT REMOVAL

A. Refer to Paint Removal – Section 09 01 10

B. All paint removal shall be executed in compliance with all applicable federal, state, and local regulations.

C. Full paint stripping will be accomplished by use of an infrared heater or steam heating system. Infrared heat and steam will be used according to manufacturer's instructions and with care never to overheat wood.

D. If steam heat is used for paint removal, doors are to be air dried to a moisture content no greater than 11% prior to repainting efforts.

3.3 FILLING SMALL LOSSES WITH EPOXY WOOD FILLER

A. General: Fill small losses and holes less than one (1) square inch flexible epoxy wood filler and finish surface to match adjacent wood surface.

B. Preparation: Thoroughly clean area to be filled free of dirt, debris, and other contaminants to bare wood.

C. Mixing Epoxy Filler: Thoroughly mix epoxy filler following manufacturer's directions.

D. Application: Work epoxy filler into substrate to ensure strong bond. Extend filler slightly proud of adjacent wood surfaces.

E. Surfacing: Finish cured wood filler to match planes and profiles of adjacent wood surfaces. Sand to provide finish matching adjacent surface.

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3.4 DUTCHMAN REPAIRS

A. General: Provide dutchman repairs in locations indicated on Drawings and as specified herein. Dutchman repairs shall provide continuous smooth surfaces matching planes and profiles of wood members being repaired with grain pattern matching pattern of grain in wood into which dutchman is inserted.

B. Preparation: Neatly cut out defective material and enough sound wood to allow dutchman to bond to sound substrate. Form a prismatic void with square corners and edges.

C. Dutchman: Cut dutchman to exactly fit void, with exposed portion matching original profile of woodwork and just slightly proud of original surface. Orient grain of dutchman parallel to original wood grain.

1. Where deterioration or loss at end of component requires dutchman repair, use a diagonal scarf joint for end-to-end joint between dutchman and remaining portion of component.

D. Installation: Insert dutchman using specified adhesive and clamp in place until glue is set. Where clamping is not feasible, use small brads; remove brads and fill holes after adhesive has set.

E. Surfacing: Plane or scrape dutchman to provide smooth continuous surface coplanar with adjacent wood. Do not damage or alter profile or finish of adjacent wood.

3.5 PAINTING

A. General: Paint and finish new and restored elements of frames and trim to match original finishes and/or as specified by contract documents and paint specifications. Prime and paint wood elements in controlled environment according to manufacturer’s instructions.

B. Prepare substrates for painting by hand sanding with 100 grit paper.

C. After substrate is sanded, vacuum all surfaces and remove remaining dust with barely damp dust-free cloth. Allow surfaces to dry completely before priming.

D. Apply one coat of thinned linseed oil paint (30% linseed oil paint to 70% raw linseed oil) as an initial primer coat to all surfaces wood element.

E. Lightly sand surfaces after the primer has dried and clean of all dust.

F. Apply two topcoats of premium quality linseed oil paint to all surfaces. Color to match existing exactly unless otherwise specified.

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3.6 INSTALLING SALVAGED AND NEW ARCHITECTURAL WOODWORK

A. General: Install wood elements to match original configuration as shown on approved shop drawings. Install work plumb, level, true, and straight with no distortions and to meet lines and planes of adjacent work. Shim as required using concealed shims. Install to a tolerance of 1/8 inch in 8 feet for plumb and level work; and with 1/32-inch maximum offset in flush adjoining surfaces and 1/16-inch maximum offset in revealed adjoining surfaces.

B. Unacceptable Material: Discard material that does not meet requirements of this Section, of referenced standards, and of best museum-quality architectural woodwork restoration. Furnish new material complying with requirements of this Section.

C. Attachment: Fasten architectural woodwork to anchorage devices or blocking built-in or directly attached to substrates. Secure units of work to substrate in same manner as original woodwork and as shown on approved shop drawings. Use fine finishing nails where nails are exposed, countersink heads, and fill holes flush with finished surface with putty matching color of finish.

3.7 PROTECTION, ADJUSTMENT, AND CLEANING

A. Protection: Protect restored woodwork to prevent damage and deterioration until Project completion.

B. Adjustment: Prior to inspection for Substantial Completion, examine all work of this Section. Repair work that has been damaged or deteriorated. Where work cannot be repaired to comply with requirements of this Section, remove work and provide new work complying with requirements of this Section to the satisfaction of the Contracting Officer at no additional cost to Government.

C. Touch up paint: Touch up all areas of paint loss associated with reinstallation of element.

D. Cleaning: Clean architectural woodwork to remove dirt and dust. Leave woodwork in clean condition.

END OF SECTION

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SECTION 07 92 00 - JOINT SEALANTS

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 DESCRIPTION

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the work of joint sealants as shown on the Drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:

1. Preparing and sealing joints between masonry openings, window frames, and door frames.
2. Preparing and sealing other joints as indicated on Drawings.

B. Related Work Specified Elsewhere

1. Asbestos Remediation – Section 02 82 00
2. Brick Masonry Restoration – Section 04 01 20
3. Stone Restoration – Section 04 01 40
4. Cast Stone Restoration – Section 04 72 00
5. Architectural Woodwork Restoration – Section 06 01 40
6. Wood Door Restoration – Section 08 01 14
7. Wood Window Restoration – Section 08 01 52
8. New Wood Windows – Section 08 52 00
9. Paint Removal – Section 09 01 10
10. Exterior Painting – Section 09 91 00

1.3 SYSTEM PERFORMANCE REQUIREMENTS

A. Joint Sealant Performance: Provide elastomeric joint sealants that have been produced and installed to establish and to maintain watertight and airtight continuous seals without causing staining or deterioration of joint substrates.

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1.4 QUALITY ASSURANCE

A. Sealant Installer: Award joint sealants work to an experienced Installer with a minimum of ten years' experience preparing joints and installing sealant who has completed joint sealant applications similar in material, design, and scope to the joint sealant work required on this Project that have resulted in sealant joints with a record of successful in-service performance.

1. Foreman: Joint sealant work shall be directly supervised by a full-time foreman with experience equal to or greater than that required of Sealant Installer. Foreman shall read and speak English fluently. Foreman shall be on site daily for duration of work of this Section. Same foreman shall remain on Project throughout work unless Government deems foreman's performance unacceptable.
2. Technicians: Joint sealant work shall be performed by workers skilled in techniques of joint preparation and sealant installation with a minimum of three years' experience installing sealants similar to the work required on this Project and completely familiar with current published recommendations of manufacturers of sealants being used.
3. Indication of Lack of Skill: Indication of lack of skill on part of sealant installers shall be sufficient grounds for Contracting Officer to reject all installed sealant and to require Contractor to remove all installed sealants, provide proper joint preparation acceptable to sealant manufacturer, and furnish and install new sealants meeting the requirements of this Section at no additional cost to Government. Contracting Officer's decision shall be final.

B. Laws, Codes, and Regulations: Work of this Section shall comply with applicable federal, state, and local laws, codes, and regulations.

C. Referenced Standards: Comply with applicable requirements and recommendations of the latest editions of the referenced standards listed herein, except as modified by more stringent requirements of the Contract Documents and of applicable laws, codes, and regulations. Where these standards make recommendations or suggestions, such recommendations or suggestions shall be considered mandatory for work of this Contract unless specifically indicated otherwise in Contract Documents. Provide a reference copy of each of the following standards at Project site during periods when work of this Section is being performed. In each case in which there is a conflict between requirements of referenced standards; requirements of laws, codes, and regulations; and requirements of this Section, the most stringent or restrictive requirement shall govern.

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1. ASTM International (ASTM)

    a. ASTM C 509, Standard Specification for Elastomeric Cellular Preformed Gasket and Sealing Material.
    b. ASTM C 920, Standard Specification for Elastomeric Joint Sealants.
    c. ASTM C 717, Standard Terminology of Building Seals and Sealants.
    d. ASTM C 719, Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle).
    e. ASTM C 1021, Standard Practice for Laboratories Engaged in Testing of Building Sealants.
    f. ASTM C 1193, Standard Guide for Use of Joint Sealants.
    g. ASTM C 1521, Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints.
    h. ASTM D 1752, Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.

D. Testing Laboratory Qualifications: An independent testing laboratory qualified in compliance with ASTM C 1021.

E. Sources of Materials: Obtain each type of material required for joint sealant work from a single source to ensure a match in quality, performance, and appearance.

F. Product Testing: Provide comprehensive test data for each type of joint sealant based on tests conducted by a qualified independent testing laboratory on current product formulations within a 24-month period preceding date of Contractor's submittal of test results to Contracting Officer.

1. Compliance with Requirements: Test elastomeric sealants for compliance with requirements specified by reference to ASTM C 920. Include test results for hardness, stain resistance, adhesion and cohesion under cyclic movement (per ASTM C 719), low-temperature flexibility, modulus of elasticity at 100 percent strain, effects of heat aging, and effects of accelerated weathering.

    a. Include test results performed on joint sealants after they have cured for one (1) year.

2. Preconstruction Field-Adhesion Testing: Before installing sealants, field test adhesion of each type of sealant to each joint substrate condition (material and surface) as follows:

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a. Locate test joints as directed by Contracting Officer for each joint substrate condition.
b. Notify Contracting Officer seven days in advance of dates and times when test joints will be erected.
c. Arrange for tests to take place with joint sealant manufacturer's technical representative present.

1) Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

a) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

d. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, modify substrate conditions and retest until satisfactory adhesion is obtained.
e. Evaluation of Preconstruction Field-Adhesion Test Results: Sealants not evidencing adhesion failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory.

G. Joint Substrate Preparation: Prepare joint substrates as required to obtain optimum sealant adhesion and performance. Substrate preparation and priming to ensure sealant adhesion and performance shall be included as work of this Section.

1. Cleaning: Clean joint substrates as necessary for optimum sealant adhesion and performance. Remove contaminants, including, but not limited to, dust, dirt, oil, grease, cleaning residues, previous coatings, and previous sealants and sealant residues.
2. Priming: Prime all surfaces of joint substrates as necessary for optimum sealant adhesion and performance. Prime all substrate surfaces using primer furnished by or approved by sealant manufacturer unless sealant manufacturer certifies in writing that installing sealant into joints whose surfaces have not been primed will result in adhesion and performance of sealant superior to those that would be achieved on primed surfaces.

H. Access for Observation and Approvals: Provide Contracting Officer access on a continuing basis to locations on which mock-ups are being carried out, on which work is ongoing, and where work has been completed to allow for observation and approvals. Provide pipe

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scaffolding and manpower to move and reconfigure scaffolding and planking, personnel lift and manpower to operate lift, or other means of access complying with laws and regulations regarding safety and acceptable to Contracting Officer. Provide manpower and equipment to facilitate observation and approvals.

1. Extent of Access: Provide Contracting Officer with hands-on access to each and every joint into which sealants have been installed. No approval of joint sealants work will be given before Contracting Officer is provided hands-on access to all joints into which sealant has been installed. Provide access for reinspection of areas where joint sealants work was not approved on first or subsequent inspections until Contracting Officer approves work.
2. Relocation of Means of Access: If Contractor moves scaffolding, lift, or other means of access before providing Contracting Officer with hands-on access to each and every location in which joint sealants have been installed and to each and every location in which joint sealants have been installed after previous joint sealant installation was rejected, Contractor shall reinstall means of access to provide for close-up inspection by Contracting Officer at no additional cost to Government.

I. Knowledge of Site and Project Conditions: Before submitting bid, Bidders shall make themselves thoroughly familiar with the Drawings and Specifications, with the scope of this Project, and with conditions at the Project site relating to requirements of this Section and limitations under which the work will be performed and shall determine or verify dimensions and quantities. Submission of a bid shall be considered conclusive evidence that Contractor is thoroughly familiar with Project requirements and site conditions and limitations.

1.5 SUBMITTALS

A. General: Submit the following in compliance with the requirements of the Contract Documents. Revise and resubmit each item as required to obtain Contracting Officer's approval.

B. Qualification Data: Qualification data for Installer and personnel specified in "Quality Assurance" Article that demonstrates that both firm and personnel have capabilities and experience complying with requirements specified. For firm and foreman, provide a list of at least three completed projects similar in size and scope to the work required on this Project. For each project list project name, address, architect, conservator, supervising preservation agency, scope of contractor's work, and other relevant information. Submit this information with the bid.

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C. Product Literature: Manufacturer's published technical data for each product to be used in work of this Section including material description, chemical composition (ingredients and proportions), physical properties, recommendations for application and use, test reports and certificates verifying that product complies with specified requirements, and Material Safety Data Sheets (MSDS).

D. Compatibility and Adhesion Test Reports: Reports from each elastomeric sealant manufacturer indicating that materials forming joint substrates and joint sealant backings have been tested for compatibility and adhesion with joint sealants proposed for use. Include sealant manufacturer's interpretation of test results relative to sealant performance and recommendations for primers and substrate preparation needed to obtain optimum adhesion.

E. Certifications from Sealant Manufacturer: Certifications for each of the following from manufacture of each sealant to be used, signed by an authorized representative of the manufacturer and notarized.

1. Certification that Sealant is Non-staining: Certification that sealant will not stain masonry adjacent to joint surfaces, that it will not stain sheet metal adjacent to joint surfaces, and that it will not stain other materials adjacent to joint surfaces.
2. Certification of Recommended Primers: Certification that primers furnished by or recommended by sealant manufacturer will provide optimum surface for sealant installation.

F. Samples for Initial Selection: Manufacturer's standard bead samples, consisting of strips of actual products showing full range of colors available, for each product exposed to view.

G. Samples for Verification

1. Sealants: Each type and color of joint sealant. Install joint sealant samples in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching appearance of exposed surfaces adjacent to joint sealants.
2. Backer Rods, Bond Breakers, and Other Accessories: Each type, minimum 6 inches long.

H. Warranties: Signed and notarized warranties complying with requirements of Article "Special Project Warranties," below.

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1. Preliminary Submittal: Submit with the bid, a copy of the proposed warranties/guarantees, along with a signed and notarized statement that same will be provided on completion of the Work.
2. Final Submittal: Submit executed and notarized warranties on completion of the Work.

I. Mock-Ups: Perform mock-ups as specified in Article “Mock-Ups,” below.

1.6 MOCK-UPS

A. General: Before beginning general joint sealant work, prepare mock-ups to provide standards for work of this Section. Do not proceed with joint sealants until Contracting Officer has approved mock-ups.

1. Locate mock-ups as directed by Contracting Officer.
2. Notify Contracting Officer 48 hours prior to start of each mock-up.
3. Contracting Officer will monitor mock-ups. Mock-ups not performed in presence of Contracting Officer will be rejected.
4. Use crew that will execute the work and follow requirements of this Section.
5. Repeat mock-ups as necessary to obtain Contracting Officer’s approval.
6. Protect approved mock-ups to ensure that they are without damage, deterioration, or alteration at time of Substantial Completion.
7. Approved mock-ups in undamaged condition at time of Substantial Completion may be incorporated into the Work.
8. Approved mock-ups will represent minimum standards for joint sealants. Subsequent joint sealants work that does not meet standards of approved mock-ups will be rejected.

B. Prepare the Following Mock-Ups

1. Joints between Masonry Openings and Window Frames: Two windows.
2. Joints between Masonry Openings and Door Frames: Two doors.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, and curing time. Include mixing instructions for multi-component materials.

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B. Store and handle materials in compliance with manufacturer's recommendations to prevent deterioration and/or damage due to moisture, high or low temperatures, contamination, and other causes.

1. Temperature Range: Do not expose sealant materials to temperatures outside range permitted by sealant manufacturer or range of 40 deg F to 90 deg F, whichever is more restrictive.

1.8 PROJECT CONDITIONS

A. Safety: Use all means necessary to protect persons, whether or not involved in the work of this Section, from harm caused by or resulting from work of this Section.

1. Lead-Containing Material: Perform work with materials containing lead in compliance with applicable OSHA regulations, including but not limited to, Lead in Construction and Hazard Communication Standard (Title 29, Sections 1926.62 and 1910.1200, respectively, Code of Federal Regulations, OSHA, US Department of Labor) and with other applicable federal, state, and local laws and regulations.
2. Asbestos Containing Material: Perform work in accordance with Section 02 82 00 - Asbestos Remediation.

B. Protection of Building and Property: Use means necessary to protect adjacent building components and materials from damage and from deterioration resulting from work of this Section.

1. Protect building components and materials from damage by water infiltration through open joints.
2. Repair damage to components and materials resulting from work of this Section to Contracting Officer's satisfaction at no additional cost to Government.

C. Conditions for Sealant Installation

1. Temperature: Install joint sealants only when ambient temperature, temperature of substrate, and temperature of sealant are within the middle two-thirds of the range recommended for installation by sealant manufacturer or between 45 deg F and 85 deg F, whichever range is more restrictive.
2. Joint Widths: Install joint sealants only when joint widths are between minimum and maximum dimensions recommended by sealant manufacturer for application indicated.
3. Joint Substrates: Install joint sealants only under the following conditions:

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a. Joint substrates are free of contaminants that might adversely affect adhesion or performance of sealant.
b. Joint substrates are completely dry.
c. Joint substrates are primed as recommended by sealant manufacturer for best sealant adhesion.

D. Contract Drawings: The Drawings are two-dimensional representations of three-dimensional objects and do not show all surfaces. Perform work on surfaces of projections, reveals, returns, and other elements and surfaces associated with areas on which work is indicated.

E. Coordination: Coordinate work of this Section with work of Division 4 sections, with work of Division 7 sections, and with work of other sections as required to ensure proper completion of the Work.

F. Preconstruction Meeting: Convene a preconstruction meeting to discuss joint sealant work and its effects on adjacent elements, materials, and finishes. Attendees shall include Government's Representatives, Architect, Construction Manager, firm(s) that will perform joint sealant work, and other entities that might be affected by joint sealant work.

1.9 SPECIAL PROJECT WARRANTIES

A. General: Provide warranties as specified below and complying with the requirements of Division I Section "Submittals" in a form acceptable to the Government, executed by a principal of the firm having authority to execute such documents, and notarized. Submit warranties to Contracting Officer. Warranties as specified herein shall be in addition to and not a limit on rights the Government may have under the Uniform Commercial Code and other applicable federal, state, and local laws, codes, and regulations.

B. Contractor's Warranty and Guarantee: The Contractor shall provide a full guarantee for joint sealant and fully warrant joint sealant installation for a period of five (5) years from the date of Substantial Completion. Contractor shall warrant joint sealants and joint sealant installations against faulty materials, poor workmanship, improper installation, adhesive and/or cohesive failure, reversion, and leakage of water. Contractor shall make repairs and replacements, including both labor and materials, promptly within the warranty period.

C. Sealant Manufacturer's Warranty and Guarantee: Sealant manufacturer's project-specific full warranty for a period of twenty (20) years from the date of Substantial Completion warranting sealant used in this Project and guaranteeing full replacement for sealant material used in this Project that fails because of faulty materials, poor workmanship, improper installation, adhesive and/or cohesive failure, reversion, and leakage of water.

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D. Submission: Comply with requirements under “Submittals” Article, above.

PART 2 – PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

2.2 JOINT SEALANTS

A. Elastomeric Sealant for General Use: Medium modulus, silicone sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Uses Related to Exposure NT, Uses Related to Joint Substrates M and O, complying with ASTM C 719 requirements for ±50 percent movement capability, designed to reduce residue rundown and substrate staining. Provide Dow Corning 756 SMS Silicone Building Sealant-H.P. as manufactured by Dow Corning Corporation, Corporate Center, P.O. Box 994, Midland, MI 48686 (989-496-4400), or approved equal.

1. Color: Provide color selected by Contracting Officer from full line of manufacturer’s standard colors. Colors will not necessarily be limited to manufacturer’s standard colors.

2.3 JOINT SEALANT BACKING

A. General: Provide sealant backings that are non-staining; are compatible with joint substrates, sealants, primers and other joint fillers; and are approved for applications indicated by sealant manufacturer in each case based on field experience and laboratory testing.

B. Cylindrical Plastic Foam Joint Fillers (Backer Rod): Preformed, compressible, resilient, non-staining, non-waxing, non-outgassing strips of flexible plastic foam complying with ASTM C 1330, Type B, of material recommended by sealant manufacturer and of size, shape, and density to control sealant depth and otherwise contribute to producing optimum sealant performance. Provide Sof Rod as manufactured by Nomaco Inc., 501 NMC Drive, Zebulon, NC 27597 (800-345-7279), or approved equal. Provide plastic foam joint filler with the following properties:

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PROPERTY	VALUE	TEST METHOD
Water absorption (g/cc)	<.03	ASTM C 1016 Procedure B
Density lb/ft3		ASTM D 1622
Outgassing (No. of bubbles)		ASTM C 1253
Compression recovery, %, min	> 90	ASTM D 5249
Compression deflection force, psi, max		ASTM D 5249
Tensile Strength psi, min		ASTM D 1623

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape as 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. Provide self-adhesive tape where applicable.

2.4 MISCELLANEOUS MATERIALS

A. Primers: Material recommended by joint sealant manufacturer for optimum adhesion of sealant to joint substrates indicated, as determined from preconstruction joint sealant-substrate tests and field tests.

1. All Substrates: Provide primers for all substrates unless sealant manufacturer certifies that unprimed substrate will provide for superior sealant adhesion.
2. Non-Staining: Provide primers that will not stain substrates and will not stain adjacent materials.

B. 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 in any way joint substrates and adjacent surfaces, and formulated to promote optimum adhesion of sealants with joint substrates.

C. Cork Joint Filler for Horizontal Joints: Resilient, non-extruding type pre-molded cork units complying with ASTM D 1752, Type II or Type III.

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

2.5 TOOLS AND EQUIPMENT

A. Tools for Removing Sealant Residue and Preparing Masonry Substrates: Nonferrous wire bristle brushes, nonferrous metal scrapers, small grinders with abrasive blades, and low-pressure, airborne-abrasive blasting equipment consisting of a complete system of air compressor, oil and water filters, valves, pressure regulators, nozzles, hoses, and other components for optimum removal of sealant and sealant residue to prepare masonry for installation of new sealant.

1. Use only nonferrous brushes and scrapers. Ferrous metal tools shall not be used in contact with stone.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint sealant performance. Do not proceed with installation of joint sealants until unsatisfactory conditions have been corrected.

3.2 PREPARATION FOR SEALANT INSTALLATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with recommendations of joint sealant manufacturer and with the following requirements:

1. General: Remove from joint substrates foreign material that could interfere with adhesion of joint sealant, including, but not limited to, dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, surface dirt, water, and frost.
2. Masonry and Similar Porous Joint Surfaces: Following proper protection of exposed surfaces adjacent to joints to prevent damage by cleaning, clean masonry and similar porous joint substrate surfaces by brushing using nonferrous wire bristle brushes and metal scrapers; grinding using small grinders with abrasive blades;

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low-pressure, airborne-abrasive cleaning; or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants.

a. Removal of Sealant and Sealant Residue: Remove sealant and sealant residue to provide clean, sound substrate capable of developing optimum bond with joint sealants and primers for joint sealants. Following mechanical removal of major portions of sealant and protection of exposed surfaces of masonry units, clean masonry and similar porous joint substrate surfaces using solvent removers and poultices containing solvent removers to remove sealant and sealant residue. Remove remaining contaminants at joint substrates using abrasive methods as indicated above.

    1) Do not spread sealant or sealant residue over surface or allow dissolved sealant residue to penetrate into pores of stone.

b. Exposed Surfaces and Joint Dimensions: Do not damage masonry surfaces to be exposed in finished work during preparation of masonry at sides of joints. Do not widen joints.

c. Removal of Loose Dirt, Dust, and Debris: Remove loose particles remaining from above cleaning operations by brushing with natural fiber bristle brushes followed by blowing out joints with clean, oil-free compressed air at a minimum pressure of 100 psi. Do not blow debris into joints that have previously been cleaned.

3. Metals and Similar Non-Porous Joint Surfaces: Clean metal and other nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

B. Joint Priming: Prime joint substrates to provide optimum conditions for sealant adhesion as recommended by sealant manufacturer. Apply primer to comply with joint sealant manufacturer's recommendations. Confine primers to areas of joint sealant bond; do not allow spillage or migration onto adjoining surfaces. Prime all surfaces to receive sealant unless sealant manufacturer specifically recommends in writing that a specific surface not be primed for optimum adhesion of sealant.

1. Apply primers prior to installation of backer rod or bond breaker tape.
2. Apply primers using brush or other approved method as required to reach all joint substrates.

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3. Apply primers to achieve a continuous, uniform, smooth, even coating as recommended by manufacturer. Avoid applying primer too thickly or too thinly. Allow primer to cure as recommended by sealant manufacturer before applying sealant.

C. Protection of Adjacent Surfaces To Be Exposed: Use masking tape where necessary to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint sealant manufacturer's printed installation instructions applicable to products and applications indicated, except where more stringent requirements are specified herein or in referenced standards.

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

C. Installation of Sealant Backings: Install sealant backings to comply with following requirements:

1. Install joint fillers of type indicated to provide support of sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that facilitate maximum sealant movement capability.

    a. Install backer rod to a uniform depth to create optimum sealant profile with a tolerance of plus or minus 1/8 inch.
    b. Do not leave gaps between ends of joint fillers.
    c. Do not stretch, twist, puncture, or tear joint fillers.
    d. Remove absorbent joint fillers that have become wet prior to sealant application and replace with dry material.

2. Install bond breaker tape between sealants and joint fillers or back of joints where backer rods are not used and take other measures necessary to prevent three-point adhesion of sealant.

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D. Installation of Sealants

1. General: Install sealants as recommended by sealant manufacturer using proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration without air pockets, and providing uniform, cross-sectional shapes and depths relative to joint widths that allow maximum sealant movement. Install sealants at same time sealant backings are installed.
2. Depths and Geometry: Install sealants with profiles as shown on Drawings and as recommended by sealant manufacturer and approved by Contracting Officer.

    a. Widths Not Exceeding 1/4 Inch: Sealant depth shall equal sealant width.
    b. Widths Over 1/4 Inch: Sealant depth shall be 1/2 width of joint up to 1/2 inch maximum depth at center of joint with sealant thickness at center of joint equal to approximately 1/2 of depth at adhesion surface.

E. Tooling of Nonsag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealant from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

1. Provide flush joint configuration as shown in Figure 5B in ASTM C 1193, unless otherwise indicated.

3.4 CLEANING

A. Clean off excess sealant and sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products adjacent to joints in which sealant is installed.

3.5 PROTECTION AND ADJUSTMENT

A. Protection: Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so that they are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged joint sealants and deteriorated joint sealants immediately, properly prepare joints, and provide new sealants so that installations with repaired areas are indistinguishable from original work.

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B. Adjustment: Remove joint sealant work that does not comply with requirements of this Section as determined by Contracting Officer and replace to meet requirements of this Section at no additional cost to Government.

END OF SECTION

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SECTION 08 01 14 - WOOD DOOR RESTORATION

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 DESCRIPTION

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the work of wood door restoration as shown on the Drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:

1. Restoring wood doors to sound condition and “as new” appearance.
2. Stripping existing painted finishes.
3. Repairing split wood panels to match original condition. Reassembling repaired doors if necessary.
4. Replacing damaged wood elements and deteriorated wood elements that are not restorable and missing wood elements with new wood elements to match original elements.
5. Repairing damaged areas of wood using dutchman repairs.
6. Reinstalling existing glass.
7. Reinstalling doors using restored original hardware and new hardware to match original hardware where original hardware is missing or not restorable.

B. Related Work Specified Elsewhere

1. Asbestos Remediation – Section 02 82 00
2. Brick Masonry Restoration – Section 04 01 20
3. Stone Restoration – Section 04 01 40
4. Cast Stone Restoration – Section 04 72 00
5. Exterior Joint Sealants – Section 07 92 00
6. Architectural Woodwork Restoration – Section 06 01 40

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7. Wood Window Restoration – Section 08 01 52
8. New Wood Windows – Section 08 52 00
9. Paint Removal – Section 09 01 10
10. Exterior Painting – Section 09 91 00

C. Intent: It is the specific intent of this Section that the restored wood doors shall be restored to first class appearance and operating condition. Restored doors shall include all wood, glass, and metal components, including hardware and weatherstripping. Restored doors shall be in excellent condition without evidence of repair or replacement observable to the naked eye at a distance of three feet. Doors shall be the equivalent of new elements in operation and appearance. All work to fulfill this intent shall be included as work of this Section.

1.3 QUALITY ASSURANCE

A. Wood Door Restoration Specialist: Award wood door restoration to a firm regularly engaged in restoring wood doors on historic buildings that can demonstrate to Government's satisfaction that, within previous five years, it has successfully performed and completed in a timely manner at least three projects similar in scope and type to work required on this Project involving buildings designated as landmarks by local governmental authorities, buildings listed on the National Register of Historic Places, or buildings listed on a State Register of Historic Places under the direction of preservation authorities.

B. Laws, Codes, and Regulations: Work of this Section shall comply with applicable federal, state, and local laws, codes, and regulations.

C. Access for Inspection, Documentation and Approvals: Provide Contracting Officer access on a regular basis to all locations on which mockups are being carried out, on which work is ongoing, and where work has been completed to allow for inspections, documentation, and approvals. Provide means of access and safety precautions required to facilitate inspections and approvals.

D. Site Visit: Bidders shall visit the site beforehand to make themselves familiar with specific conditions relating to this Section.

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1.4 SUBMITTALS

A. General: Submit the following in compliance with the requirements of the Contract Documents. Revise and resubmit each item as required to obtain Contracting Officer's approval.

B. Qualification Data: Submit qualification data for firm and personnel specified in "Quality Assurance" Article that demonstrates that both firm and personnel have capabilities and experience complying with requirements specified. For firm and foreman, provide a list of at least three completed projects similar in size and scope to work required on this Project. For each project list project name, address, architect, conservator, supervising preservation agency, scope of contractor's work, and other relevant information. Submit this information with the bid.

C. Product Data: Manufacturer's published technical data for each product to be used in work of this Section including material description, chemical composition (ingredients and proportions), physical properties, recommendations for application and use, test reports and certificates verifying that product complies with specified requirements.

D. Work Description: Prior to beginning door restoration on site or in the shop, submit detailed written description of proposed restoration materials and procedures for door restoration. Do not begin work on site until Contracting Officer has approved Work Description in writing. Description shall include, but not be limited to:

1. Materials and Procedures: Materials, methods, tools, and equipment for each type of work to be performed in restoring doors.
2. Protection: Description, including drawings and diagrams, of proposed materials and methods of protection for preventing harm, damage, and deterioration caused by work of this Section to all persons (whether involved in the Work or not), building elements, materials, and finishes, surrounding landscape and site, and the environment (including air and water). Details should include installation of temporary doors that will provide appropriate security for the building when existing doors have been removed for restoration work.
3. Handling Elements and Materials To Be Removed and Reinstalled: Describe procedures for handling elements and materials to be removed and reinstalled, including, but not limited to, removal, crating, labeling, tracking chain of custody,

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handling, and transportation.

4. Alternate Restoration Materials and Methods (If Any): Contractor may propose alternate materials and methods (if any) to those specified for door restoration. Provide evidence of successful use on comparable projects and demonstrate effectiveness for use on this Project.

E. Samples

1. Wood: Sets of samples of each type (specie, grain pattern, color, etc.) of new wood for repair or replacement. Each set shall contain two 6-inch by 12-inch by 1-inch samples, one without finish and one with finish. If finish will vary, provide additional samples to demonstrate full range of color to be found in final finished woodwork.
2. Wood Elements for Repair and Replacement: Each profile, 8-inch length.
3. Fasteners: Each type to be used in work of this Section.
4. Hardware: Each type of hardware recommended for replacement.

1.5 SHOP VISIT

A. Provide access to Contracting Officer to observe restoration process for sample door restoration.

B. Shop visit should minimally include opportunity to view paint removal process, dutchman repair process, and paint application process.

C. Coordinate timing of site visit at least 5 business days in advance.

1.6 DELIVERY, STORAGE, AND HANDLING

D. Deliver, store, and handle products and materials to prevent damage, deterioration, degradation and intrusion of foreign material.

E. Do not deliver restored doors on site until work that could damage restored doors has been completed in areas in which doors are located.

1.7 PROJECT CONDITIONS

A. Safety: Take measures necessary to protect all persons, whether or not involved with work of this Section, from harm caused by work of this Section.

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B. Protection of Building: Protect building elements and finishes from damage and from deterioration caused by work of this Section. Repair damage to materials and damage to finishes to Contracting Officer's satisfaction at no additional cost to Government.

1. Take precautions necessary to prevent fire and spread of fire. Do not use torches, heat guns, or other heat generating equipment to remove paint or finishes. Place paint or solvent soaked rags, waste, overalls, or other material that might constitute a fire hazard in metal containers and remove from premises daily in coordination with Project's requirements for waste removal.

C. Surfaces To Receive Work: The Drawings are two-dimensional representations of three-dimensional objects and do not show all surfaces of building components on which work is to be performed, including surfaces concealed from view behind objects shown. It is the specific intent of the Contract Documents to include work on all surfaces within Project area, whether or not shown on the Drawings, except as specifically indicated otherwise.

D. Preconstruction Meeting for Door Restoration: Convene a preconstruction meeting to discuss door restoration and its effect on adjacent elements, materials, and finishes. Attendees shall include Government's Representatives, Architect, Restoration Consultant Construction Manager, firm(s) that will perform door restoration, and other entities that might be affected by door restoration work.

PART 2 – PRODUCTS

2.1 MATERIALS, GENERAL

A. Grade and Quality: Materials shall conform to requirements of this Section and shall be new, free from defects, and of recent manufacture.

B. Manufacturer's Instructions: Comply with material manufacturers' instructions for use of products (including surface preparation, mixing, applying, drying, etc.). In case of conflict with requirements of this Section, the more stringent requirements shall govern.

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2.2 WOOD

A. Wood Characteristics:

1. Wood shall be of sound stock, solid wood without finger joints or other joints within members, thoroughly seasoned, and dried to a moisture content not exceeding 11 percent.
2. Wood shall be free from defects or blemishes on surfaces exposed to view that will show after paints and finishes have been applied. Materials that do not comply with specifications for quality and grade, are in any way defective, or are otherwise not in proper condition will be rejected.
3. Wood for New Door Components as necessary, Other New Elements, and Repairs of Existing Elements shall match profile and grade of existing doors in species, quality, cut, and grain pattern in kind. Wood should be 100% heartwood, quarter sawn or rift sawn.

2.3 ADHESIVES, CONSOLIDANTS, AND FILLERS

A. Adhesive for Dutchman Repairs and Member Replacement: Epoxy resin glue designed for use with wood and slightly flexible when dry. Follow manufacturer's written instructions for use in low ambient temperatures.

B. Wood Consolidation: Epoxy designed for consolidating deteriorated wood to slow or cease ongoing deterioration and provide surface for appropriate bonding of epoxy adhesive and paint.

C. Wood Filler: Epoxy designed for flexible fill of voids and cracks.

2.4 GLASS, GLAZING SEALANTS, AND GLAZING ACCESSORIES

A. Reused Glass: Return each pane of glass to its original opening.

B. New/Replacement Glass: Match the existing glass to be replaced with glass of the same visual character including any "imperfections" associated with the traditional manufacturing process.

C. Glazing Putty: Blend of calcium carbonate and plant based oil to provide a malleable putty of dough-like consistency that will bind to glass and wood. After curing, the putty will

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develop a surface skin that can be painted and retain its overall shape. Provide Sarco MultiGlaze Type M, as manufactured by Sarco Putty Company, 5959 S. Knox Ave., Chicago, IL 60629 (800-969-7889), or approved equal.

D. Glaziers' Points: Non-corroding metal anchors designed to secure glass lights in wood frames that do not project beyond glazing rabbet when installed and approved by Contracting Officer.

E. Glass Cleaner: Ammonia free glass cleaner.

2.5 FASTENERS

A. Fasteners for Installation of Hardware and Other Elements: Comply with standard industry practices for type and size.

1. Use original fasteners in good condition and new fasteners matching existing fasteners where salvaged original fasteners are not available. Do not replace slotted screws with Phillips screws.
2. Use brass screws for installing new hardware and accessories. Do not replace slotted screws with Phillips screws.

2.6 HARDWARE

A. General: Restored original hardware; new hardware matching original hardware where original hardware is missing or is not restorable.

2.7 PAINT

A. Paint: Paint shall be a premium quality linseed oil based paint and match existing color exactly unless otherwise specified and shall comply with requirements of contract document. Provide the following or approved equal.

1. Ottosson Linseed Oil Paint, Earth+Flax, earthandflax.com
2. Brouns Linseed Oil Paint, Brouns & Co North America LLC, Distribution Center, 20 North Wentworth Ave, Londonderry, New Hampshire, 03053
3. Allback Linseed Oil Paint, Earth+Flax, earthandflax.com

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2.8 WEATHERSTRIPPING

A. Install spring bronze weatherstripping in jambs.

PART 3 – EXECUTION

3.1 SAFETY

B. Protection: Protect people, adjoining building surfaces, collections and landscape elements, et al from injury resulting from door restoration work. Use drop cloths, protective floor pads, or other coverings as necessary to protect interior finishes, floor and collections and exterior landscape material from dust and debris, etc.

C. Erect temporary protection over pedestrian walkways and at those points of entry and exit that must remain operational during restoration.

3.2 INSPECTION AND DOCUMENTATION

A. General: Document all elements of doors to be restored for work of this Section, all elements adjacent to elements that are to be removed, and all other door elements that will be in any way affected by work of this Section. Show overall door elements and details of all damage or deterioration that might be considered as resulting from work of this Section. Key all notes to photographs, clearly identifying portions of existing elements included in each photograph.

B. Images: Digital images with minimum resolution of 5”X7” @ 300 DPI, JPEG images on CDROM, portable USB drive or secure access cloud storage system (e.g., Dropbox, OneDrive, Google Drive, etc.).

3.3 PROTECTION

A. After removal of door, protect opening using plywood or door blank.

1. Protection shall guard against all water infiltration.
2. Protection shall be installed so as to avoid any damage to adjacent trim elements.
3. Temporary door shall be operable and securable.

B. Protect removed and restored door from damage or deterioration until time of installation.

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3.4 REMOVALS

A. General: Remove all door components that require removal for restoration or for proper installation.

1. Identify and label each component that is to be removed and repaired for reinstallation with door opening designator (key to door schedule, as outlined in project drawings) and location in jamb. Record numbers and locations of components.
2. Store removed elements in a secure location safe from theft, damage, and deterioration.
3. Protect door openings to prevent water entry or human intrusion.

B. Glass Removal: All glass will be removed to accommodate door restoration.

1. Label each pane of glass with location and orientation within the door so that the historic glass can be returned to its original location and orientation. Use painter's tape, grease pencil, or marker to label glass and consistently label on either interior or exterior to avoid confusion at reinstallation. All evidence of marking of the glass shall be cleaned prior to re-installation of door.
2. Remove all face glazing compound from glass by a means that limits the amount of paint loss. A hand steamer or heat gun can only be used by staff with experience in the use of those devices and the surrounding surfaces and glass must be protected from damage.

C. Paint Removal: All paint will be removed from doors.

1. Refer to Section 090110 Paint Removal for additional details.
2. All paint removal shall be executed in compliance with all applicable federal, state, and local regulations.
3. Full paint stripping will be accomplished by use of an infrared heater or steam heating system. Infrared heat and steam will be used according to manufacturer's instructions and with care never to overheat wood.
4. If steam heat is used for paint removal, doors are to be air dried to a moisture content no greater than 11% prior to repainting efforts.

D. Hardware Removal: All hardware will be removed as needed in order to restore door and

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hardware.

1. Scribe paint around hardware so that removal of hardware does not splinter adjacent wood.
2. Remove paint from hardware so that any screws may be loosened.
3. Tag and retain all hardware and screws.
4. Allow Contracting Officer to review all hardware so that a determination may be made as to whether hardware will be reinstalled.

3.5 REPAIR OF DAMAGED COMPONENTS, GENERAL

A. General: Restore wood doors as indicated on Drawings and schedules and as specified below.

B. Holes, Indentations, and Losses Greater Than 3/8-Inch in Diameter: Provide wood dutchmen to match adjacent plane and profile following requirements of Article “Dutchman Repairs,” below.

C. Damages and Losses: Repair as indicated:

1. Losses Indicated To Receive Dutchman Repairs: Provide wood dutchmen to match adjacent plane and profile following requirements of Article “Dutchman Repairs,” below.
2. Gouges: Gently sand areas to decrease depth of gouges and blend surface with adjacent surface. Do not damage adjacent surfaces.
3. Losses (Holes and Indentations) Larger Than 3/8-Inch in Diameter: Provide wood dutchmen to match adjacent plane and profile following requirements of Article “Dutchman Repairs,” below.
4. Splits in door panels to be repaired with flexible epoxy based filler.

3.6 DUTCHMAN REPAIRS

A. General: Provide dutchman repairs where wood is structurally compromised. Wood repairs will not be made for aesthetic purposes. Dutchman repairs shall provide continuous smooth surfaces matching planes and profiles of wood members being repaired. dutchman shall match wood being repaired in species and cut. In wood for clear finish, grain pattern of dutchman shall match grain pattern of wood into which it is inserted.

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B. Preparation: Neatly cut out existing opening as required to provide a prismatic void. Wherever possible create voids that will provide mechanical attachments such as in dovetails. The amount of wood removed should be minimized but the amount should include all damaged wood and extend just past damaged wood to prevent spread of any deterioration contained therein. Cut away area will provide ample glue surface.

C. Dutchman: Cut dutchman to exactly fit void, with exposed portion matching original profile of woodwork and just slightly proud of original surface. Orient grain of dutchman parallel to grain of element being patched. Where deterioration or loss at end of component requires dutchman repair, use a diagonal scarf joint for end-to-end joint between dutchman and remaining portion of component.

D. Installation: Clean glue surfaces with acetone or denatured alcohol. Insert dutchman using specified adhesive and clamp in place until glue is set. Where clamping is not feasible, use small brads; remove brads and fill holes after adhesive has set.

E. Surfacing: Plane or scrape dutchman to provide smooth continuous surface coplanar with adjacent wood. Do not damage or alter profile or finish of adjacent wood.

3.7 COMPONENT REPLACEMENT

A. General: Fabricate new components for any components which are deteriorated in entirety and cannot be repaired with dutchmen and epoxy.

B. In kind replacement: Except as specifically indicated otherwise, provide replacement elements of same species with configurations, profiles, dimensions and joinery exactly matching those of existing elements.

1. Profiles: Remove coatings from profiles of existing elements before recording profiles.

C. Machining and Surfacing: Machine and surface all new and replacement wood elements to provide smooth even surfaces without saw marks or plane marks. Wood with surface irregularities, including but not limited to scratches, saw marks, and plane knife marks, visible after finish has been applied will be rejected and shall be replaced with properly finished wood elements at no additional cost.

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3.8 GLAZING

A. General: Re-glaze all glass lites using approved pure linseed oil or soybean oil glazing putty. Glazing points shall be used to set glass.

B. Clean glass prior to glazing with non-ammoniated formula before reinstallation.

C. Broken panes will be replaced in kind.

3.9 WEATHERSTRIPPING

A. Existing Weatherstripping: Remove and dispose of existing weatherstripping.

B. New Weatherstripping: Doors are to be weather stripped in the jambs using spring bronze weather stripping.

1. Weather stripping is to be ¼" less than the width of the jamb edge.
2. Weather stripping is to be secured with coppered nails at intervals not exceeding 2".
3. Weather stripping is to be installed to provide maximal sealing and not interfere with the door operation.
4. No door shall be irreversibly modified to support the installation of the weather stripping.

3.10 HARDWARE PREPARATION

A. General: New door hardware to be at same location as current hardware.

B. If new mortise lockset is smaller than existing mortise lockset, existing mortise to be filled and repaired following dutchman repair direction. Repair should also include dutchman repair of door face(s).

3.11 PAINTING

A. Refer to Section 099100 Exterior Painting for additional details.

B. General: Paint and finish new and restored elements of frames and trim to match original finishes and/or as specified by contract documents and paint specifications. Prime and paint doors in controlled environment according to manufacturer's instructions.

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C. Prepare substrates for painting by hand sanding with 100 grit paper.

D. After substrate is sanded, vacuum all surfaces and remove remaining dust with barely damp dust-free cloth. Allow surfaces to dry completely before priming.

E. Apply one coat of thinned linseed oil paint (30% linseed oil paint to 70% raw linseed oil) as an initial primer coat to all surfaces of the sash. Glazing rabbets shall be primed in this step.

F. The preferred glazing putty product (Sarco Multi-Glaze) is NOT to be primed. The putty will be coated with the finish paint only.

G. Lightly sand surfaces after the primer has dried and clean of all dust.

H. Apply two topcoats of premium quality linseed oil paint to all surfaces. Color to match existing exactly unless otherwise specified. On all window sash, extend paint no more than 1/16” onto glass to seal glazing.

I. Paint is NOT to be cleaned off glass with a razor as this will break the seal. Paint should be carefully applied to allow for the 1/16” lap onto glass.

J. The use of masking agents on the glass to protect from paint requires additional approvals.

3.12 RESTORATION OF EXISTING HARDWARE

A. General: Remove historic door hardware from existing door. Store hardware in plastic bags or containers identified with door number to ensure that each unit of hardware is reinstalled in its original location.

B. Strip paint coatings by chemical or steam methods.

C. After removal of paint and other coatings, thoroughly rinse in appropriate solvent and wipe dry with soft cloths.

D. Hardware is not to be polished to a brilliant sheen but left in a clean, yet naturally patinaed state.

E. Replacement Parts: Provide replacement parts, including operating parts and fasteners,

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matching original parts in metal and alloy, configuration, size, and finish for all missing and damaged parts.

F. Lubricate operating parts.

G. Store units in protective packaging.

H. Provide all missing fasteners for hardware. Fasteners must match all visual aspects of existing fasteners.

3.13 INSTALLATION

A. Standards: Install doors to comply with applicable requirements of AWI's Architectural Woodwork Standards and as indicated.

B. Operation: Align and fit door in frame with uniform clearances. Adjust hardware and weatherstripping for optimum sealing when closed and for optimum operation.

C. Immediately after installation touch-up any disturbed areas of paint.

3.14 ADJUST AND CLEAN

A. Condition: Work of this Section shall appear to be new at completion of the Work. Repair or refinish conditions that do not comply with requirements of this Section to comply with requirements of this Section to Contracting Officer's satisfaction.

B. Adjustment: Adjust doors and hardware to provide smooth operation. Lubricate hardware and moving parts. Doors shall be in excellent operating condition at conclusion of the Work.

C. Cleaning: Clean hardware and glass.

END OF SECTION

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SECTION 08 01 52 - WOOD WINDOW RESTORATION

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 DESCRIPTION

A. General: Provide all labor, materials, equipment, and services required to complete wood window restoration as specified herein and required by existing conditions and authorities having jurisdiction.

B. Intent: It is the specific intent of this Section that repairs will maximize the retention of historic fabric while making the windows weather resistant for long-term use and serviceable for cyclical maintenance.

C. Scope: Wood window restoration may include, but is not limited to, the following:

1. Restore and repair wood window sash while maintaining current profiles.
2. Restore existing window hardware and provide new, in-kind window hardware where existing hardware is missing or is too damaged or deteriorated to be restorable.
3. Restore all window trim disturbed for work of this Section to sound condition and appearance.
4. Consolidate and repair deteriorated wood sills, framing members, stops and trim, interior and exterior. Stripping and painting window assemblies that remain, including frames, sash, stops, and trim.
5. Remove all deteriorated glazing putty and replace with new.
6. Replace cracked, broken, or missing glass, matching existing in visual quality.
7. Replace all parting beads and sash cord during installation; existing weights to be reused. Replace window stops where missing, matching existing in dimension and profile.
8. Install spring bronze weather stripping in jambs so as not to obstruct function of sash.
9. Reinstall repaired window sash.

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10. Ensure operability of lower sash.
11. Secure upper sash with full length jacks screwed into jamb.
12. Paint and finish all wood elements as necessary to match original finishes.
13. Clean all glass.

D. Extent of Window Units: Extent of each window unit, except as otherwise indicated, includes frame, sashes, stops, wood sill (including undersill or nosing), exterior brick moldings, interior trim, hardware, and accessories.

E. Related Work Specified Elsewhere

1. Asbestos Remediation – Section 02 82 00
2. Brick Masonry Restoration – Section 04 01 20
3. Stone Restoration – Section 04 01 40
4. Cast Stone Restoration – Section 04 72 00
5. Exterior Joint Sealants – Section 07 92 00
6. Architectural Woodwork Restoration – Section 06 01 40
7. Wood Door Restoration – Section 08 01 14
8. New Wood Windows – Section 08 52 00
9. Paint Removal – Section 09 01 10
10. Exterior Painting – Section 09 91 00

1.3 QUALITY ASSURANCE

A. Window Restoration Specialist:

1. Contractor that performs wood window restoration work shall be regularly engaged in wood window restoration on historic buildings.
2. Contractor shall demonstrate to Contracting Officer's satisfaction that, within previous five (5) years, s/he has successfully performed and completed in a timely manner at least three (3) projects similar in scope and type to required work involving facilities designated as Landmarks by local landmark agencies or facilities listed on the National Register of Historic Places or on the State Register of Historic Places.
3. All Subcontractors are bound by the same requirements as the Contractor. Subcontractors shall not begin work unless approved by the Contracting Officer.

B. Laws, Codes, and Regulations: All work of this Section shall comply with all applicable federal, state, and local laws, codes, and regulations.

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C. Access for Inspection, Documentation and Approvals: Provide Contracting Officer access on a regular basis to all locations on which mockups are being carried out, on which work is ongoing, and where work has been completed to allow for inspections, documentation, and approvals. Provide means of access and safety precautions required to facilitate inspections and approvals.

D. Site Visit: Bidders shall visit the site beforehand to make themselves familiar with specific conditions relating to this Section.

1.4 SUBMITTALS

A. General: Submit the following in compliance with the requirements of the Contract Documents. Revise and resubmit each item as required to obtain Contracting Officer's approval.

B. Qualification Data: Submit qualification data for firm and personnel specified in "Quality Assurance" Article that demonstrates that both firm and personnel have capabilities and experience complying with requirements specified. For firm and foreman, provide a list of at least three completed projects similar in size and scope to work required on this Project. For each project list project name, address, architect, conservator, supervising preservation agency, scope of contractor's work, and other relevant information. Submit this information with the bid.

C. Product Data: Manufacturer's published technical data for each product to be used in work of this Section including material description, chemical composition (ingredients and proportions), physical properties, recommendations for application and use, test reports and certificates verifying that product complies with specified requirements.

D. Work Description: Prior to beginning window restoration on site or in the shop, submit detailed written description of proposed restoration materials and procedures for window restoration. Do not begin work on site until Contracting Officer has approved Work Description in writing. Description shall include, but not be limited to:

1. Materials and Procedures: Materials, methods, tools, and equipment for each type of work to be performed in restoring windows.
2. Protection: Description, including drawings and diagrams, of proposed materials and methods of protection for preventing harm, damage, and deterioration caused by

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work of this Section to all persons (whether involved in the Work or not), building elements, materials, and finishes, surrounding landscape and site, and the environment (including air and water).

3. Handling Elements and Materials To Be Removed and Reinstalled: Describe procedures for handling elements and materials to be removed and reinstalled, including, but not limited to, removal, crating, labeling, tracking chain of custody, handling, and transportation.
4. Alternate Restoration Materials and Methods (If Any): Contractor may propose alternate materials and methods (if any) to those specified for window restoration. Provide evidence of successful use on comparable projects and demonstrate effectiveness for use on this Project.

E. Samples

1. Wood: Sets of samples of each type (specie, grain pattern, color, etc.) of new wood for repair or replacement. Each set shall contain two 6-inch by 12-inch by 1-inch samples, without finish..
2. Wood Elements for Repair and Replacement: Each profile, 8-inch length by full dimension and profile of complete element.
3. Fasteners: Each type to be used in work of this Section.

1.5 SHOP VISIT

A. Provide access to Contracting Officer to observe restoration process for sample sash pair.

B. Shop visit should include opportunity to view paint removal process, dutchman repair process, and glass installation process. A finished example including all glazing and paint shall be available at shop visit.

C. Coordinate timing of site visit at least 5 business days in advance.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products and materials to prevent damage, deterioration, degradation and intrusion of foreign material.

B. Do not deliver restored windows on site until all work that could damage restored sash has been completed in areas in which windows are located.

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1.7 PROJECT CONDITIONS

A. Safety: Take measures necessary to protect all persons, whether or not involved with work of this Section, from harm caused by work of this Section.

B. Protection of Building: Protect building elements and finishes from damage and from deterioration caused by work of this Section. Repair damage to materials and damage to finishes to Contracting Officer's satisfaction at no additional cost to Government.

1. Take precautions necessary to prevent fire and spread of fire. Do not use torches, heat guns, or other heat generating equipment to remove paint or finishes. Place paint or solvent soaked rags, waste, overalls, or other material that might constitute a fire hazard in metal containers and remove from premises daily in coordination with Project's requirements for waste removal.

C. Surfaces To Receive Work: The Drawings are two-dimensional representations of three-dimensional objects and do not show all surfaces of building components on which work is to be performed, including surfaces concealed from view behind objects shown. It is the specific intent of the Contract Documents to include work on all surfaces within Project area, whether or not shown on the Drawings, except as specifically indicated otherwise.

D. Preconstruction Meeting for Window Restoration: Convene a preconstruction meeting to discuss window restoration and its effect on adjacent elements, materials, and finishes. Attendees shall include Government's Representatives, Architect, Restoration Consultant, Construction Manager, firm(s) that will perform window restoration, and other entities that might be affected by window restoration work.

PART 2 – PRODUCTS

2.1 MATERIALS, GENERAL

A. Grade and Quality: Materials shall conform to requirements of this Section and shall be new, free from defects, and of recent manufacture.

B. Manufacturer's Instructions: Comply with material manufacturers' instructions for use of products (including surface preparation, mixing, applying, drying, etc.). In case of conflict with requirements of this Section, the more stringent requirements shall govern.

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2.2 WOOD

A. Wood Characteristics:

1. Wood shall be of sound stock, solid wood without finger joints or other joints within members, thoroughly seasoned, and dried to a moisture content not exceeding 11 percent.
2. Wood shall be free from defects or blemishes on surfaces exposed to view that will show after paints and finishes have been applied. Materials that do not comply with specifications for quality and grade, are in any way defective, or are otherwise not in proper condition will be rejected.
3. Wood for New Sash Components as necessary, Other New Elements, and Repairs of Existing Elements shall match profile and grade of existing windows in species, quality, cut, and grain pattern in kind. Wood should be 100% heartwood, quarter or rift sawn.

2.3 ADHESIVES, CONSOLIDANTS, AND FILLERS

A. Adhesive for Dutchman Repairs, Member Replacement, and New Sash Fabrication: Epoxy resin glue designed for use with wood and slightly flexible when dry. Follow manufacturer's written instructions for use in low ambient temperatures.

B. Wood Consolidation: Epoxy designed for consolidating deteriorated wood to slow or cease ongoing deterioration and provide surface for appropriate bonding of epoxy adhesive and paint.

C. Wood Filler: Epoxy designed for flexible fill of voids and cracks.

2.4 GLASS, GLAZING SEALANTS, AND GLAZING ACCESSORIES

A. Reused Glass: Return each pane of glass to its original location.

B. New/Replacement Glass: Match the existing glass to be replaced with glass of the same visual character including any "imperfections" associated with the traditional manufacturing process.

C. Glazing Putty: Blend of calcium carbonate and plant based oil to provide a malleable putty of dough-like consistency that will bind to glass and wood. After curing, the putty will develop a surface skin that can be painted and retain its overall shape. Provide Sarco

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MultiGlaze Type M, as manufactured by Sarco Putty Company, 5959 S. Knox Ave., Chicago, IL 60629 (800-969-7889), or approved equal.

D. Glaziers' Points: Non-corroding metal anchors designed to secure glass lights in wood frames that do not project beyond glazing rabbet when installed and approved by Contracting Officer.

E. Glass Cleaner: Ammonia free glass cleaner.

2.5 HARDWARE

A. General: Provide each restored window with full complement of hardware and fasteners matching that on original windows, except where hardware is specifically indicated to be modified. Provide restored existing hardware insofar as possible and new hardware to match existing hardware where hardware is missing or existing hardware is damaged or deteriorated so as to be unusable.

1. Existing Hardware: Restore existing hardware
2. New Hardware: Provide new hardware and fasteners to match existing hardware and fasteners in all respects.

B. Sash Pulleys: Clean and lubricate sash pulleys and make operational. Replace sash pulleys too damaged or deteriorated to provide sound operation with new pulleys to match existing original pulleys.

C. Sash Cord: Replace sash cord with new cord, matching existing. New sash cord to be cotton.

D. Sash Weights: Reuse existing sash weights. Provide new sash weights matching existing original sash weights where sash weights are missing.

E. Latches: Clean latches, restore finish, replace missing fasteners, and lubricate for optimum operation. Provide new latches matching existing latches where existing latches are missing or too damaged to restore.

F. Screws for Attaching Hardware: Cleaned, existing screws insofar as possible. Where screws are missing or damaged so as to be unsalvageable or unrestorable, provide new

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screws to match existing screws. Do not replace slotted screws with Phillips screws.

2.6 WEATHERSTRIPPING

A. Install spring bronze weatherstripping in jambs and along underside of bottom rail of lower sash.

2.7 PAINT

A. Paint: Paint shall be a premium quality linseed oil based paint and match existing color exactly unless otherwise specified and shall comply with requirements of contract document. Provide the following or approved equal.

1. Ottosson Linseed Oil Paint, Earth+Flax, earthandflax.com
2. Brouns Linseed Oil Paint, Brouns & Co North America LLC, Distribution Center, 20 North Wentworth Ave, Londonderry, New Hampshire, 03053
3. Allback Linseed Oil Paint, Earth+Flax, earthandflax.com

2.8 TEMPORARY OPENING PROTECTION:

A. Polycarbonate sheet, 1/2-inch thick, minimum.

B. Plywood, painted black, 1/2-inch thick, minimum.

PART 3 – EXECUTION

3.1 SAFETY

A. Protection: Protect people, adjoining building surfaces, collections and landscape elements, et al from injury resulting from window restoration work. Use drop cloths, protective floor pads, or other coverings as necessary to protect interior finishes, floor and collections and exterior landscape material from dust and debris, etc.

1. Erect temporary protection over pedestrian walkways and at those points of entry and exit that must remain operational during restoration.

3.2 INSPECTION AND DOCUMENTATION

A. General: Document all elements of windows to be restored for work of this Section, all

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elements adjacent to elements that are to be removed, and all other window elements that will be in any way affected by work of this Section. Show overall window elements and details of all damage or deterioration that might be considered as resulting from work of this Section. Key all notes to photographs, clearly identifying portions of existing elements included in each photograph.

B. Images: Digital images with minimum resolution of 5”X7” @ 300 DPI, JPEG images on CDROM, portable USB drive or secure access cloud storage system (e.g., Dropbox, OneDrive, Google Drive, etc.).

3.3 PROTECTION

A. After removal of sash, protect window openings using plywood or polycarbonate.

1. Protection should guard against all water infiltration.
2. Protection should be installed so as to avoid any damage to adjacent trim elements.
3. Polycarbonate sheet(s) should be used to protect at least one window opening per room to allow for natural lighting during project.

B. Where polycarbonate is scheduled, polycarbonate should be set into wood frames and installed so as to mimic a double hung sash.

C. Where plywood is scheduled, plywood is to be painted black on exterior.

D. Protect removed and restored sash from damage or deterioration until time of reinstallation.

3.4 REMOVALS

A. General: Remove all window components that require removal for restoration or for proper installation.

1. To minimize breakage, paint lines at the edges of window stops and parting strips must be cut/scribed first with a sharp knife before moldings are removed.
2. All nails will be removed by pulling them through the back of the moldings only.
3. Hardware painted shut shall be removed by cutting the paint line with a sharp utility knife.
4. Identify and label each component that is to be removed and repaired for reinstallation with window opening designator (key to window schedule, as noted on

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project drawings) and location in jamb. Record numbers and locations of components.

5. Remove adjacent elements as required to modify or replace elements of window jambs, heads, and sills that must be altered to accommodate new window sash. Use all care necessary to prevent damage or deterioration of elements removed and elements remaining in place. Restore or replace all elements damaged during work of this Section to Contracting Officer's satisfaction at no additional cost.
6. Store removed elements in a secure location safe from theft, damage, and deterioration.
7. Protect window openings to prevent water entry, animal intrusion, or human intrusion.

B. Glass Removal: All glass will be removed to accommodate sash restoration.

1. Label each pane of glass with location and orientation within the sash so that the historic glass can be returned to its original location and orientation. Use painter's tape, grease pencil, or marker to label glass and consistently label on either interior or exterior to avoid confusion at reinstallation. All evidence of marking of the glass shall be cleaned prior to re-installation of sash.
2. For sashes that will be removed and restored in the workshop, remove all face glazing compound using steam system to soften glazing and facilitate glass removal.

C. Paint Removal: All paint will be removed from sash. Steam system should facilitate removal of most paint.

1. Refer to Section 090110 Paint Removal for additional details.
2. All paint removal shall be executed in compliance with all applicable federal, state, and local regulations.
3. Full paint stripping will be accomplished by use of an infrared heater or steam heating system. Infrared heat and steam will be used according to manufacturer's instructions and with care never to overheat wood.
4. Following paint removal, sash are to be air dried to a moisture content no greater than 11% prior to repainting efforts.

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D. Hardware Removal: All hardware will be removed as needed in order to restore sash and hardware.

1. Scribe paint around hardware so that removal of hardware does not splinter adjacent wood.
2. Remove paint from hardware so that any screws may be loosened.
3. Tag and retain all hardware and screws.
4. Allow Contracting Officer to review all hardware so that a determination may be made as to whether hardware will be reinstalled.

3.5 DUTCHMAN REPAIRS

A. General: Provide dutchman repairs where wood is structurally compromised. Wood repairs will not be made for aesthetic purposes. Dutchman repairs shall provide continuous smooth surfaces matching planes and profiles of wood members being repaired. dutchman shall match wood being repaired in species and cut. In wood for clear finish, grain pattern of dutchman shall match grain pattern of wood into which it is inserted.

B. Preparation: Neatly cut out existing opening as required to provide a prismatic void. Wherever possible create voids that will provide mechanical attachments such as in dovetails. The amount of wood removed should be minimized but the amount should include all damaged wood and extend just past damaged wood to prevent spread of any deterioration contained therein. Cut away area will provide ample glue surface.

C. Dutchman: Cut dutchman to exactly fit void, with exposed portion matching original profile of woodwork and just slightly proud of original surface. Orient grain of dutchman parallel to grain of element being patched. Where deterioration or loss at end of component requires dutchman repair, use a diagonal, half-lap scarf joint for end-to-end joint between dutchman and remaining portion of component.

D. Installation: Clean glue surfaces with acetone or denatured alcohol. Insert dutchman using specified adhesive and clamp in place until glue is set. Where clamping is not feasible, use small brads; remove brads and fill holes after adhesive has set.

E. Surfacing: Plane or scrape dutchman to provide smooth continuous surface coplanar with adjacent wood. Do not damage or alter profile or finish of adjacent wood.

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3.6 COMPONENT REPLACEMENT

A. General: Fabricate new components for any components which are deteriorated in entirety and cannot be repaired with dutchmen and epoxy.

B. In kind replacement: Except as specifically indicated otherwise, provide replacement elements of same species with configurations, profiles, dimensions and joinery exactly matching those of existing elements.

1. Profiles: Remove coatings from profiles of existing elements before recording profiles.

C. Machining and Surfacing: Machine and surface all new and replacement wood elements to provide smooth even surfaces without saw marks or plane marks. Wood with surface irregularities, including but not limited to scratches, saw marks, and plane knife marks, visible after finish has been applied will be rejected and shall be replaced with properly finished wood elements at no additional cost.

3.7 GLAZING

A. General: Re-glaze all window lites using approved pure linseed oil or soybean oil glazing putty. One glazing point per side shall be used to set glass in each opening.

B. Clean glass prior to glazing with non-ammoniated formula before reinstallation.

C. Broken panes will be replaced in kind, matching existing in overall visual clarity.

3.8 PAINTING

A. Refer to Section 099100 Exterior Painting for additional details.

B. General: Paint and finish new and restored elements of frames and trim to match original finishes and/or as specified by contract documents and paint specifications. Prime and paint sash in controlled environment according to manufacturer’s instructions.

C. Prepare substrates for repairs by hand sanding with 100 grit paper. The edges of the stiles (unpainted edges running along jambs) of double hung windows do not need to be sanded unless special conditions require it.

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D. After substrate is sanded, vacuum all surfaces and remove remaining dust with barely damp dust-free cloth. Allow surfaces to dry completely before priming.

E. Apply one coat of thinned linseed oil paint (30% linseed oil paint to 70% raw linseed oil) as an initial primer coat to all surfaces of the sash. Glazing rabbets shall be primed in this step.

F. Any sash surface without evidence of existing paint (prior to paint removal as part of this project) shall NOT be painted in this project.

G. Lightly sand surfaces after the primer has dried and clean of all dust.

H. Apply two topcoats of premium quality linseed oil paint to all surfaces. Color to match existing exactly unless otherwise specified. On all window sash, extend paint no more than 1/16” onto glass to seal glazing.

I. Immediately after installation touch-up any disturbed areas of paint.

J. Paint is NOT to be cleaned off glass with a razor as this will break the seal. Paint should be carefully applied to allow for the 1/16” lap onto glass.

K. The use of masking agents on the glass to protect from paint requires additional approvals.

3.9 RESTORATION OF EXISTING HARDWARE

A. General: Remove historic sash hardware from existing sash to be replaced. Store hardware in plastic bags or containers identified with sash number to ensure that each unit of hardware is reinstalled in its original location.

B. Strip paint coatings on existing hardware by chemical or steam methods.

C. After removal of paint and other coatings, thoroughly rinse in appropriate solvent and wipe dry with soft cloths.

D. Hardware is not to be polished to a brilliant sheen but left in a clean, yet naturally patinaed state.

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E. Replacement Parts: Provide replacement parts, including operating parts and fasteners, matching original parts in metal and alloy, configuration, size, and finish for all missing and damaged parts.

F. Lubricate operating parts.

G. Store units in protective packaging.

H. Provide all missing fasteners for hardware. Fasteners must match all visual aspects of existing fasteners.

3.10 WEATHERSTRIPPING

A. New Weatherstripping: Sash are to be weather stripped in the window jamb using spring bronze weather stripping.

1. Weather stripping is to be ¼” less than the width of the jamb.
2. Weather stripping is to be secured with coppered nails at intervals not exceeding 2”.
3. Weather stripping is to be installed to provide maximal sealing and not interfere with the sash operation.
4. Weather stripping shall be installed along the bottom edge of the lower sash.
5. No weather stripping shall be installed at the meeting rail.
6. No sash shall be irreversibly modified to support the installation of the weather stripping.

3.11 SASH INSTALLATION

A. General: Install new and restored sash as per contract. At completion of installation, windows shall be complete with all components and with unblemished paint and finish coats. All lower sash shall operate smoothly over entire height. Weather stripping shall provide weatherproof seal.

B. Sash Hardware: Install any hardware, including sash lifts and sash locks, on restored sash in the same locations as originally located. Adjust sash locks for smooth, easy operation and firm, secure locking.

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3.12 ADJUSTING

A. General: Adjust operating sash and hardware to provide a tight fit at contact points and to provide smooth operation and a weather tight closure. Lubricate hardware and moving parts.

3.13 CLEANING

A. Clean interior and exterior surfaces promptly after installation. Take care to avoid damage to historic and protective coatings and finishes.

B. Use only cleaners which do not contain ammonia, such as ClearVue Window Cleaner or an approved equivalent.

END OF SECTION

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SECTION 08 52 00 – WOOD WINDOWS

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 DESCRIPTION

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the work of new, replacement wood windows as shown on the Drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:

1. Providing new wood windows to match appearance of existing windows in configurations shown on the Drawings and with all accessories as specified and as necessary for complete, optimum installation and operation.
    a. Types of new wood windows include:
        1) Two over two windows.
        2) Two over two windows, modified to incorporate HVAC ventilation panels in locations shown on drawings
        3) Outswing casement windows with mulled separation.
2. Providing new trim molding for new wood windows.
3. Providing hardware and accessories as specified and as necessary for optimum operation.

B. Related Work Specified Elsewhere

1. Asbestos Remediation – Section 02 82 00
2. Brick Masonry Restoration – Section 04 01 20
3. Stone Restoration – Section 04 01 40
4. Cast Stone Restoration – Section 04 72 00
5. Exterior Joint Sealants – Section 07 92 00
6. Architectural Woodwork Restoration – Section 06 01 40
7. Wood Door Restoration – Section 08 01 14
8. Wood Window Restoration – Section 08 01 52
9. Paint Removal – Section 09 01 10
10. Exterior Painting – Section 09 91 00

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A. Window Manufacturer: Award wood windows to a millwork shop specializing in traditional architectural millwork and superior quality wood windows to match historic windows employing workers skilled in processes and operations indicated. Firm shall have a minimum of five years' experience manufacturing wood windows similar to those required for this Project, including windows glazed with insulating glass units with simulated divided lights.

1. Woodworkers: Windows and trim shall be fabricated by skilled cabinetmakers with a minimum of five years' experience in the construction of wood windows similar to the windows for this Project.

B. Window Installer: Wood windows shall be installed by an experienced installer regularly engaged in the installation of wood windows that can demonstrate to Government's satisfaction that, within previous five years, it has successfully completed at least three projects similar in scope and type to work required on this Project involving buildings designated as Landmarks by local governmental authorities, buildings listed in the National Register of Historic Places, or buildings listed in a State Register of Historic Places under the direction of preservation authorities.

1. Foreman: Wood window installation shall be directly supervised by a full-time foreman with experience equal to or greater than that required of Window Installer. Foreman shall be on site and/or in shop daily for duration of work of this Section. Same foreman shall remain on Project throughout work of this Section unless Government deems foreman's performance unacceptable.
2. Mechanics: Wood window installation shall be carried out by a steady crew of skilled finish carpenters who are thoroughly experienced with installation of wood windows similar to those to be provided as work of this Section and have a minimum of three years' experience with similar work on historic buildings. In acceptance or rejection of work of this Section, no allowance will be made for workers' inattention or lack of skill.

C. Laws, Codes, and Regulations: Work of this Section shall comply with applicable federal, state, and local laws, codes, and regulations.

D. Referenced Standards: Work of this Section shall comply with applicable requirements and recommendations of latest editions of the documents listed herein, except as modified by more stringent requirements of the Contract Documents and of applicable laws, codes, and regulations of authorities having jurisdiction. In each case in which there is a conflict between requirements of referenced standards; requirements of laws, codes, and regulations; and requirements of this Section, the most stringent or restrictive requirement shall govern.

1. Architectural Woodwork Institute (AWI), Architectural Woodwork Standards, latest edition. Comply with applicable requirements for "Premium Grade" materials and workmanship.
2. Window and Door Manufacturers Association (WDMA)

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a. I.S .2, Standard/Specification for Windows, Doors and Unit Skylights. Except to extent more stringent requirements are specified, comply with General Requirements of this standard.
b. I.S. 4, Water-Repellent Preservative Non-Pressure Treatment for Millwork.

E. Sources of Materials: Obtain each type of material required for wood windows from a single source to ensure a match in quality, performance, and appearance.

F. Knowledge of Site and Project Conditions: Before submitting bid, Bidders shall make themselves thoroughly familiar with the Drawings and Specifications, with the scope of this Project, and with conditions at the Project site relating to requirements of this Section and limitations under which the work will be performed and shall determine or verify dimensions and quantities. Submission of a bid shall be considered conclusive evidence that Contractor is thoroughly familiar with Project requirements and site conditions and limitations.

G. Certifications and Warranties: Certifications and warranties required under Article “Submittals,” below, shall be signed by an officer of the firm providing the certification who is authorized to sign such documents and shall be notarized.

1.3 SUBMITTALS

A. General: Submit the following in compliance with the requirements of the Contract Documents. Revise and resubmit each item as required to obtain Contracting Officer’s approval.

B. Qualification Data: Qualification data for firm and personnel specified in “Quality Assurance” Article that demonstrates that both firm and personnel have capabilities and experience complying with requirements specified. For firm and foreman, provide a list of at least three completed projects similar in size and scope to the work required on this Project. For each project list project name, address, architect, conservator, supervising preservation agency, scope of contractor’s work, and other relevant information. Submit this information with the bid.

C. Product Data: Manufacturer’s published technical data for each product to be used in work of this Section including material description, chemical composition (ingredients and proportions), physical properties, recommendations for application and use, test reports and certificates verifying that product complies with specified requirements.

D. Shop Drawings: Dimensioned, detailed scaled drawings for each type, configuration, and size of window. Submit newly prepared drawings showing site-verified conditions and materials. Photocopies of Contract Documents and/or electronic scans of Contract Documents will not be accepted for Shop Drawing submittals. Drawings shall include, but shall not be limited to:

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1. Window Unit Elevations and Sections: Each configuration, 1-1/2-inch equals 1 foot, minimum.
2. Installation Details: Each condition, including anchors and flashing, half-scale, minimum.
3. Member Profiles: Each member, full-size profile.
4. Joinery: Each condition, full-size.
5. Hardware: Each type in each type of installation, half-scale, minimum.
6. Weatherstripping: Each type in each type of installation, half-scale, minimum.
7. Glazing Details: Each condition in each type of glazing unit, full-size.
8. Accessories: Each type, full-size.

E. Samples: For each type of window specified.

1. Wood Member Profiles: Each profile, 12-inch-long sections.
2. Hardware: Each type, finished.
3. Weatherstripping: Each type, configuration, and dimension, 12-inch-long samples.
4. Small Scale Wood Window: Typical window samples.

F. Window Manufacturer's Certification: Signed and notarized certification by window manufacturer certifying the following:

1. Standards: Windows meet both requirements for "Premium Grade" work as specified in Architectural Woodwork Institute's Architectural Woodwork Standards and requirements of Window and Door Manufacturers Association, I.S .2, Standard/Specification for Windows, Doors and Unit Skylights.
2. Requirements of This Section: Windows meet requirements of this Section except those variations from specified requirements (if any) specifically approved in writing by Contracting Officer. Attach copies of Contracting Officer's approvals of variations (if any) to certification.

1.4 MOCK-UPS

A. General: Before beginning general wood window installation, prepare mock-ups to provide standards for wood window installation. Do not proceed with wood window installation until Contracting Officer has approved mock-ups.

1. Locate mock-ups as directed by Contracting Officer.
2. Notify Contracting Officer 5 business days prior to start of each mock-up.
3. Contracting Officer will monitor mock-ups. Mock-ups not performed in presence of Contracting Officer will be rejected.
4. Use crew that will execute the work and follow requirements of this Section.
5. Repeat mock-ups as necessary to obtain Contracting Officer's approval.
6. Protect approved mock-ups to ensure that they are without damage, deterioration, or alteration at time of Substantial Completion.

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7. Approved mock-ups in undamaged condition at time of Substantial Completion may be incorporated into the Work.
8. Approved mock-ups will represent minimum acceptable standards for wood window installation. Subsequent wood window installation work that does not meet standards of approved mock-ups will be rejected.

B. Prepare the Following Mock-ups

1. Installation of new replacement window: One window, including hardware, trim, weatherstripping, and sealant.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products to avoid damage and deterioration. Remove damaged materials, deteriorated materials, and products that have exceeded their expiration dates from site and replace with new products complying with requirements of this Section.

B. Deliver windows to Project site in manufacturer's original packaging and without damage or deterioration. Replace vent louvers with new windows complying with requirements of this Section.

1.6 PROJECT CONDITIONS

A. Safety: Take all necessary precautions to protect persons, whether engaged in work of this Section or not, from hazards associated with work of this Section.

B. Protection of Building: Protect building elements and finishes from damage and from deterioration resulting from work of this Section. Repair damage to materials and damage to finishes caused by or resulting from work of this Section using mechanics experienced in the respective type of work to Contracting Officer's satisfaction at no additional cost to Government.

1. Protection from Water and Other Precipitation: Protect building elements and finishes from exposure to weather during work of this Section. Take precautions necessary to ensure that window openings are watertight during the entire work of this Section. Openings shall be watertight at all times whether or not a window is being installed.
2. Protection from Unauthorized Entry: Secure openings against entry by insects, animals, and unauthorized persons.
3. Protection of Adjacent Elements: Protect adjacent elements and materials from damage and from deterioration during work of this Section.

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C. Contractor's Responsibility for Dimensions: Dimensions in Contract Documents, whether numerical, tabular, or graphic, are provided for bidding purposes and for Contractor's information and are not guaranteed. Contractor shall measure existing elements in field before preparing shop drawings, ordering materials, or starting fabrication and shall certify on shop drawings that dimensions have been field verified. Contractor is responsible for dimensions.

D. Coordination: Coordinate work of this Section with work of other sections as necessary to ensure optimum performance of the Work.

E. Preconstruction Meeting: Convene a preconstruction meeting to discuss wood window work and its effect on adjacent elements, materials, and finishes. Attendees shall include Government's Representatives, Architect, Construction Manager, firm that will perform wood window work, and other entities that might be affected by wood window work.

PART 2 – PRODUCTS

2.1 WOOD

A. General: Wood species shall be Sapele, Mahogany, Spanish cedar or Cypress, 100% heartwood, quartersawn and shall be of solid lumber stock (without finger joints or other joints in individual elements).

1. Quality: Wood shall be free from defects and imperfections that might impair its strength, durability, or appearance. Do not use materials that are defective, materials that do not comply with specifications for quality and grade, or materials that are otherwise not in proper condition.
2. Moisture Content: Wood shall be kiln-dried to a moisture content of 6 to 10 percent at time of fabrication and installation.

B. Wood for Wood Windows and Trim: Sapele, South American Mahogany (Swietenia macrophylla), Spanish cedar or Cypress.

C. Wood for Blocking, Spacers, and Nailers: "Standard" grade light-framing-size lumber of any species or board-size lumber as required. "No. 3 Common" or "Standard" grade boards per WWPA rules or "No. 2 Boards" per SPIB rules. Water-repellent preservative-treat wood after machining to comply with WDMA I.S. 4.

2.1 ADHESIVES AND FASTENERS

A. Adhesive: Epoxy resin glue designed for use with wood and slightly flexible when dry. Follow manufacturer's written instructions for use in low ambient temperatures.

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B. Fasteners: Comply with requirements of referenced standards for fabrication and with millwork shop's recommendations and standard industry practices for type and size of installation fasteners.

1. Fasteners for Fabrication: Type 302, 304, or 316 stainless steel and of size and configuration necessary for optimum performance.
2. Fasteners for Hardware and Accessory Installation: Matching metal of hardware unit and of size and configuration for optimum performance.

2.2 HARDWARE

A. General: Hardware as specified herein for each sash.

1. Finish: Provide hardware with finish, except as specifically noted otherwise.
2. Screws: Provide screws of appropriate size and configuration to provide sound, secure attachment. Screws shall be brass or silicone bronze with finish to match existing hardware finish.

2.3 WEATHERSTRIPPING

A. Manufacturers: Subject to compliance with requirements, provide products of one of the following or approved equal.

1. Compression Weatherstripping made from silicone and capable of compressing at least 50% and returning to original shape when uncompressed. Material shall not tear or deteriorate upon routine and regular use for a minimum period of five years.

B. Weatherstripping Installation:

1. Sash frame:

a. Silicone Tube: Continuous hollow silicone gasket with darted tongue of size recommended by manufacturer for conditions at each location in which it is to be installed.

2. Weatherstripping to be inserted into continuous kerf as detailed by manufacturer.

2.4 FABRICATION

A. General: Fabricate windows with sizes and profiles matching those as indicated on Drawings and approved shop drawings and sample submittals.

B. Extent of Each Window: Except as otherwise specifically indicated, each window unit includes sashes, stops, sill (including undersill or nosing), exterior casing and moldings (including brick molding and exterior sill), hardware, weatherstripping, and accessories. Sash to be installed in existing window frames.

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C. Weatherstripping: Provide weatherstripping at perimeter of each sash.

D. Sizes and Profiles: Fabricate window members with sizes and profiles matching those as indicated on Drawings and approved shop drawings and sample submittals.

E. Coordination: Coordinate dimensions with actual measurements of window openings and adjacent construction.

F. Corners: Cope all moldings.

G. Sash to include plough and bore for sash cord (reuse existing pulleys and sash weights).

H. Joinery: Stile and rail joints to be mortise and tenon with minimum tenon length of 1”. Tenons to be glued in mortises and reinforced with tapered hard wood pins in a draw bore configuration.

I. Insulated glass units to be secured in place using beveled wood glazing strips. Wood species to match that used in fabrication of sash.

J. Extent of Shop Fabrication: Complete fabrication, assembly, finishing, glazing, hardware application, weatherstripping installation, and other work before shipment to Project site, to maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

PART 3 – EXECUTION

3.1 INSPECTION

A. Inspect openings before beginning installation. Do not proceed with installation of window units until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with fabricator’s instructions and recommendations for installation of window units, trim, hardware, weatherstripping, and other window components.

B. Set units plumb, level, true to line, without warp or rack of frames or sash. Provide solid, sound support and anchor securely in place.

1. Provide nailers, spacers, and blocking as required for optimum installation.

C. Set sill members in a bed of compound or with joint fillers or gaskets as indicated, to provide

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weathertight construction.

3.3 ADJUSTING

A. Adjust operating sash and hardware to provide a tight fit at contact points and weatherstripping, and to provide smooth operation and a weathertight closure. Lubricate hardware and moving parts.

B. Install full length jack supports to secure upper sash in place.

3.4 CLEANING

A. Clean interior and exterior surfaces promptly after installation. Take care to avoid damage to protective coatings and finishes. Remove excess glazing and sealants, dirt, and other substances.

B. Clean glass promptly after installation. Wash and polish glass on both faces before Substantial Completion. Comply with manufacturer's recommendations for final cleaning and maintenance. Remove non-permanent labels from glass surfaces.

C. Remove and replace glass that is broken, chipped, cracked, abraded, or otherwise damaged or deteriorated during the construction period.

3.5 PAINTING AND FINISHING

A. General: Paint and finish new windows as specified by contract documents and paint specifications. Prime and paint sash in controlled environment according to manufacturer's instructions.

B. Apply one coat of thinned linseed oil paint (30% linseed oil paint to 70% raw linseed oil) as an initial primer coat to all surfaces of the sash.

C. Lightly sand surfaces after the primer has dried and clean of all dust.

D. Apply two topcoats of premium quality linseed oil paint to all surfaces. Color to match existing exactly unless otherwise specified.

E. Immediately after installation touch-up any disturbed areas of paint.

3.6 PROTECTION

A. Protect window units from damage and from deterioration until time of Substantial Completion.

END OF SECTION

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SECTION 09 01 10 – PAINT REMOVAL

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 DESCRIPTION

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the work of paint and coating removal as shown on the Drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:

1. Stripping paint from wood windows and doors, including frames, sash, and exterior trim components.
2. Stripping paint and coatings from hardware.

B. Intent: It is the specific intent of this Section to provide for removing paints and coatings from surfaces as specified to provide substrates free of paints, coatings, and finishes without damaging or deteriorating elements and materials from which coatings have been removed and without damaging or deteriorating adjacent elements, materials, and finishes and other elements, materials, and finishes that are not part of the work of this Section. All work required to accomplish this intent shall be included as work of this Section.

C. Related Work Specified Elsewhere

1. Asbestos Remediation – Section 02 82 00
2. Brick Masonry Restoration – Section 04 01 20
3. Stone Restoration – Section 04 01 40
4. Cast Stone Restoration – Section 04 72 00
5. Architectural Woodwork Restoration – Section 06 01 40
6. Exterior Joint Sealants – Section 07 92 00

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7. Wood Door Restoration – Section 08 01 14
8. Wood Window Restoration – Section 08 01 52
9. New Wood Windows – Section 08 52 00
10. Exterior Painting – Section 09 91 00

1.3 QUALITY ASSURANCE

A. Paint and Coating Removal Specialist: Award paint and coating removal work to firm regularly engaged in removing paints and coatings from historic building elements and materials similar to the paint and coating removal work required by this Section that can demonstrate to Government's satisfaction that, within previous five years, the firm has successfully performed and completed in a timely manner at least three projects similar in scope and type to work required on this Project involving buildings designated as Landmarks by local governmental authorities, buildings listed in the National Register of Historic Places, or buildings listed in a State Register of Historic Places under the direction of preservation authorities.

1. Foreman: Paint and coating removal work shall be directly supervised by a full-time foreman with experience equal to or greater than that required of Paint and Coating Removal Specialist. Same foreman shall remain on Project throughout work of this Section unless Government deems foreman's performance unacceptable.
2. Mechanics: Paint and coating removal work shall be carried out by a steady crew of skilled mechanics who are thoroughly experienced in the removal of paints and coatings from historic building elements and materials and who have a minimum of five years' experience with work on historic buildings similar to that required by this Section. In acceptance or rejection of work of this Section, no allowance will be made for workers' inattention or lack of skill.

B. Laws, Codes, and Regulations: Work of this Section shall comply with applicable federal, state, and local laws, codes, and regulations.

C. Access for Observation and Approvals: Provide Contracting Officer access on a continuing basis to locations on which mock-ups are being carried out, on which work is ongoing, and where work has been completed to allow for observation and approvals. Provide pipe scaffolding and manpower to move and reconfigure scaffolding and planking, personnel lift and manpower to operate lift, or other means of access complying with all laws and

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regulations regarding safety and acceptable to Contracting Officer. Provide manpower and equipment to facilitate observation and approvals.

1. Extent of Access: Provide Contracting Officer with hands-on access to each and every surface from which paints and coatings have been removed. No approval of paint and coating removal work will be given before Contracting Officer is provided hands-on access to all surfaces from which paints and coatings have been removed. Provide access for reinspection of areas where paint and coating removal work was not approved on first or subsequent inspections until Contracting Officer approves work.
2. Relocation of Means of Access: If Contractor moves scaffolding, lift, or other means of access before providing Contracting Officer with hands-on access to each and every surface from which paints and coatings have been removed and to each and every surface from which paints and coatings have been removed after previous paint and coating removal work was rejected, Contractor shall reinstall means of access to provide for close-up inspection by Contracting Officer at no additional cost to Government.

D. Knowledge of Site and Project Conditions: Before submitting bid, Bidders shall make themselves thoroughly familiar with the Drawings and Specifications, with the scope of this Project, and with conditions at the Project site relating to requirements of this Section and limitations under which the work will be performed and shall determine or verify dimensions and quantities. Submission of a bid shall be considered conclusive evidence that Contractor is thoroughly familiar with Project requirements and site conditions and limitations.

1.4 SUBMITTALS

A. General: Submit the following in compliance with the requirements of the Contract Documents. Revise and resubmit each item as required to obtain Contracting Officer's approval.

B. Qualification Data: Submit qualification data for firm and personnel specified in "Quality Assurance" Article that demonstrates that both firm and personnel have capabilities and experience complying with requirements specified. For firm and foreman, provide a list of at least three completed projects similar in size and scope to work required on this Project.

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For each project list project name, address, architect, conservator, supervising preservation agency, scope of contractor's work, and other relevant information. Submit this information with the bid.

C. Product Data: Manufacturer's published technical data for each product to be used in work of this Section including material description, chemical composition (ingredients and proportions), physical properties, recommendations for application and use, test reports and certificates verifying that product complies with specified requirements, and Safety Data Sheets (SDS). If materials other than those specified are submitted, submit Safety Data Sheets (SDS) for review of components only. Matters pertaining to safety of the materials themselves or their use will not be reviewed. Do not otherwise submit Safety Data Sheets (SDS).

D. Work Description: Prior to beginning paint removal work on site, submit detailed written description of proposed removal work for each type of coating on each type of substrate. Submit new written descriptive information. Photocopies of Contract Documents, excerpts from Contract Documents, and/or duplication of text in Contract Documents will not be accepted for Work Description. Do not begin work on site until work description has been approved in writing. Description for each material on each substrate shall include, but not be limited to:

1. General Process: Materials, methods, tools, and equipment for each condition of removal work.
2. Protection: Description, including drawings and diagrams, of proposed materials and methods of protection for preventing harm, damage, and deterioration caused by work of this Section to all persons (whether involved in the Work or not), building elements, materials, and finishes, surrounding landscape and site, and the environment (including air and water).
3. Alternate Coating Removal Methods and Materials (If Any): Contractor proposed alternate methods and materials (if any) to those specified for paint and coating removal work. Provide evidence of successful use on comparable projects and demonstrate effectiveness for use on this Project.

E. Waste Disposal Program: Proposed materials and methods for collection, treatment, and legal, offsite disposal of wastes resulting from work of this Section.

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1.5 TESTING

A. General: Before beginning general paint removal or preparing mock-ups, test paint removal methods on sample areas to determine most appropriate product and method for each coating and substrate. Testing will consist of graduated trials beginning with the least aggressive method and testing more aggressive methods once it is proven that gentler methods are not acceptable to the Contracting Officer. A successful test is one where all loose and flaking paint and coatings are removed without causing damage or deterioration of the substrate. Tightly adhered paint and coatings may remain if required to prevent damage to substrate. Do not proceed with paint removal mock-ups until Contracting Officer has approved results of testing.

1. Locate tests as directed by Contracting Officer.
2. Size of Test Panels

    a. Stripping Paints and Coatings from Wood Surfaces: 1 window opening

3. Notify Contracting Officer 48 hours prior to start of testing.
4. Contracting Officer will monitor testing. No testing done in Contracting Officer's absence will be accepted.
5. Use crew that will execute work and follow requirements of this Section.
6. Stop testing and remove product from surface immediately using appropriate solvent upon observing any adverse effect to substrate.

B. Test the following methods to remove paint and coatings from wood surfaces:

1. Hand Sanding and Hand Scraping Paint and Coating Removal Methods: Test hand sanding and hand scraping. Note: Sanding and scraping require active HEPA collection/filtration of all dust and scrapings associated with this process.
2. Steam Paint Removal Methods: Test steam paint removal methods.
3. Infrared Paint and Coatings Removal Methods: Test Infrared paint removal method.

1.6 MOCK-UPS

A. General: Following testing and before beginning general paint removal work, prepare mock-ups to provide standards for paint removal work. Do not proceed with removal work until Contracting Officer has approved mock-ups.

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1. Locate mock-ups as directed by Contracting Officer.
2. Notify Contracting Officer 48 hours prior to start of each mock-up.
3. Contracting Officer will monitor mock-ups. Mock-ups not performed in presence of Contracting Officer will be rejected.
4. Use crew that will execute the work and follow requirements of this Section.
5. Repeat mock-ups as necessary to obtain Contracting Officer's approval.
6. Protect approved mock-ups to ensure that they are without damage, deterioration, or alteration at time of Substantial Completion.
7. Approved mock-ups in undamaged condition at time of Substantial Completion may be incorporated into the Work.
8. Approved mock-ups will represent minimum standards for paint and coating removal work. Subsequent paint and coating removal work that does not meet standards of approved mock-ups will be rejected.

B. Prepare the Following Mock-Ups

1. Stripping Paint from Wood elements: One sash, one single leaf door, one window opening including brick mold and sill.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products and materials to prevent damage, deterioration, or degradation and intrusion of foreign material.

B. Discard and remove from site deteriorated materials, contaminated materials, and products that have exceeded their expiration dates. Replace with fresh materials.

1.8 PROJECT CONDITIONS

A. Safety: Protect all persons, whether or not they are involved with work of this Section, from harm caused by work of this Section.

1. Ensure adequate ventilation during work of this Section.
2. Ensure that workers are fully protected from contact with abrasives, chemicals, dust, coating residues, and other materials generated by work of this Section.

B. Protection of Building: Protect building elements and finishes from damage and from

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deterioration caused by work of this Section. Repair damage to materials and damage to finishes to Contracting Officer's satisfaction at no additional cost to Government.

1. Take precautions necessary to prevent fire and spread of fire.

    a. Do not use torches or heat guns to remove paint.
    b. Hand held infrared heat devices may be used following approval by Contracting Officer and demonstrated use following manufacturer's requirements.
    c. Place paint- or solvent-soaked rags, waste, overalls, and other material that might constitute a fire hazard in metal containers and remove from Project site daily.

C. Surfaces To Receive Work: The Drawings are two-dimensional representations of three-dimensional objects and do not show all surfaces of building components on which work is to be performed, including surfaces concealed from view behind objects shown; surfaces of projections, reveals, returns, and other elements perpendicular to or at an oblique angle to surfaces shown; concealed surfaces of profiled members and of ornament; and surfaces of profiled members and of ornament not drawn in detail. Perform work on surfaces of projections, reveals, returns, profiled members, and ornaments associated with surfaces indicated to receive work and on surfaces of building components concealed behind building components shown. It is the specific intent of the Contract Documents to include work on all surfaces within Project area, whether or not shown on the Drawings, except as specifically indicated otherwise

D. Coordination: Coordinate work of this Section with other work to ensure proper completion of the Work.

E. Preconstruction Meeting: Convene a preconstruction meeting to discuss paint and coating removal and its effect on adjacent elements, materials, and finishes. Attendees shall include Government's Representatives, Architect, Restoration Consultant, Construction Manager, firm(s) that will perform paint and coating removal, and other entities that might be affected by paint and coating removal work.

1.9 LEAD-CONTAINING PAINT (LCP)

A. General: Perform work that disturbs lead-containing paint (LCP), handle material that

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involves lead-containing paint, and transport and dispose of lead-containing paint and residue in compliance with applicable federal, state, and local laws and regulations for identification, removal, labeling, handling, containerization, transportation, and disposal of lead-containing material including, but not limited to, those referenced herein.

B. U.S. Department of Labor OSHA Regulations: Including but not limited to: Title 29, Code of Federal Regulations (CFR) Section 1926.62: “Lead Exposure in Construction” and Title 29, CFR Section 1910.1200: “Hazard Communication Standard.”

C. U.S. Environmental Protection Agency (USEPA) Regulations: Including but not limited to: Title 40 CFR Part 262: “Standards Applicable to Generators of Hazardous Waste” and Part 263: “Standards Applicable to Transporters of Hazardous Waste.”

D. U.S. Department of Transportation (USDOT) Regulations: Including but not limited to: 49 CFR Parts 172, 173, 174, 175, 177, 178, 179, and 180.

1.10 ENVIRONMENTAL REQUIREMENTS

A. Temperature Requirements: Use coating removers only when temperature of air, temperature of substrate, and temperature of remover comply with manufacturer’s recommendations.

PART 2 – PRODUCTS

2.1 ECO-FRIENDLY CHEMICAL PAINT REMOVERS

A. Solvent Paint Removers: Paint removers shall contain no methylene chloride, low VOC, be pH neutral, require no neutralization after use, applied in a gel form for use on horizontal and vertical surfaces.

B. General

1. Specified Strippers: Furnish applicable strippers for mock-ups and for general paint and coating removal work.
2. Strippers for Testing: Test strippers as specified herein. Furnish strippers selected during testing for mock-ups and for general paint and coating removal work.
3. Alternatives: Alternative strippers may be selected based on Project conditions.

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Furnish products selected for paint and coating removal at no additional cost to Government.

C. Strippers for Testing for Removing Paint and Other Coatings from Wood: Test each proposed paint stripping product on each type of coating to be removed. Perform additional tests using different dwell times and other variations as directed by Contracting Officer to determine most effective product and procedure for removing each type of paint and coating from each substrate.

2.2 INFRARED PAINT AND COATING REMOVAL SYSTEMS

A. General: Provide one or more infrared paint remover systems using equipment and procedures tested previously or as determined during testing as part of work of this Section.

B. Infrared Paint Removal System: Provide Speedheater System and paint scraping tools as supplied by Eco-Strip, 11160-C1 Southlakes Drive #263, Reston, VA 20191 (703-810-7297) or approved equal.

2.3 STEAM PAINT AND COATING REMOVAL SYSTEMS

A. General: Provide one or more steam paint remover systems using equipment and procedures tested previously or as determined during testing as part of work of this Section.

B. Steam Paint Removal System:

1. Surface applied: Provide hand held, low pressure steam generator.
2. Steam Cabinet: Insulated cabinet with inlet for steam. Steam supplied by steam generator.

2.4 MISCELLANEOUS TOOLS AND EQUIPMENT

A. Hand Tools with Vacuum Attachments for Removing Coatings from Wood on Site: Provide tools specifically made to contain and collect paint removal products that can attach to a vacuum with HEPA filters.

B. Brushes: Fiber-bristle brushes.

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C. Tools for Removing Paint and Chemical Strippers: Plastic scrapers and putty knives with rounded edges that will not scratch substrate.

D. Non-metallic Cleaning Pads

E. Sponges: Clean natural sponges in various sizes for rinsing.

F. Cloths: Clean, lint-free cotton rags and cheesecloth.

PART 3 – EXECUTION

3.1 PROTECTION

A. General: Install protection and waste collection systems as described in approved Work Description prior to start of work.

B. Protection from Hazardous Materials: Erect protection as necessary to protect workers, public, and environment from hazardous materials, including, but not limited to, lead-based paint, chemicals, abrasives, and dust.

C. Protection of Adjacent Materials: Erect protection to prevent materials not to be stripped from damage and from deterioration resulting from water, chemicals, abrasives, coating residues, and other work of paint and coating removal.

D. Waste Collection and Disposal: Provide containment system to collect and treat water, abrasives, coating residues, and other materials of this Section. Dispose of collected materials legally offsite.

3.2 TESTING AND MOCK-UPS

A. General: Perform testing and mock-ups as directed to determine materials and methods for removing paints and coatings from substrates for which specific products and procedures are not specified herein.

3.3 PAINT REMOVAL, GENERAL

A. General: Perform paint removal in a manner that results in removing paints to clean

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substrates and provides condition matching that of approved mock-ups using least aggressive method that removes paint from specified surfaces.

B. Manufacturer's Recommendations: Apply and remove stripping materials to comply with manufacturer's recommendations using procedures developed during testing and mock-ups.

C. Uniform Results: Perform stripping in a manner that achieves uniform results on all surfaces, including corners and moldings, without streaking or damage.

D. Methods of Paint and Coating Removal: Remove paint from the following elements using methods specified.

1. Wood: Method determined by testing to be the most gentle.

E. Cleaning and Neutralization: Clean residue from stripped surfaces at completion of stripping, leaving surface in optimum condition to accept specified finish.

3.4 HAND SCRAPING AND SANDING REMOVAL METHODS

A. General: Remove paint using hand scraping and sanding using the gentlest, most effective method for removing each type of coating system from each substrate as approved by Contracting Officer.

B. Hand Scraping: Use a variety of scrapers with shapes matching the profiles of the moldings. Perform hand scraping in the direction of the grain of the wood to prevent damage to the substrate. Scrapers should be held at low angles for optimal paint removal.

1. Active HEPA vacuum filtration required to immediately collect scrapings and dust.

C. Sanding: Sand gently to avoid removing substrate or reshaping substrate in any way.

1. Active HEPA vacuum filtration required to immediately collect dust.

3.5 INFRARED PAINT REMOVER REMOVAL METHODS

A. General: Remove paint using infrared paint removal system method established during testing to be the gentlest, most effective method for removing each type of coating system

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from each substrate as approved by Contracting Officer.

B. Paint Removal: Carefully heat surface of paint with infrared equipment for 10 to 20 seconds to soften paint, according to manufacturer's requirements. Scrape softened paint with a pull scraper or dull putty knife with rounded corners to remove the softened paint layers. It may be necessary to repeat the heating and scraping to remove the bulk of the paint.

C. Lightly sand surface after removing paint. Provide initial paint coating within the same day for onsite work.

3.6 STEAM PAINT REMOVAL METHODS

A. General: Remove paint using steam paint removal system method established during testing to be the gentlest, most effective method for removing each type of coating system from each substrate as approved by Contracting Officer.

1. Determine moisture content of wood before beginning steam operation.

B. Paint Removal: Carefully heat surface of paint with steam to soften paint. Steam may be applied directly from the generator or in a steam cabinet. Scrape softened paint with a dull putty knife with rounded corners to remove the softened paint layers. It may be necessary to repeat the heating and scraping to remove the bulk of the paint.

C. Allow the wood to dry to within 1 percent of the moisture content of the wood as tested before the steam treatment. Lightly sand surface after removing paint.

3.7 ECO-FRIENDLY CHEMICAL PAINT REMOVAL METHODS, GENERAL

A. Selection: Use paint stripper specified. Where paint strippers are to be chosen during testing, use stripper found during testing to be gentlest, most effective method for removing each type of coating system from each substrate as approved by Contracting Officer.

1. Test solvent based paint strippers for stripping paint from wood elements.

B. Procedure (Subject to modification during testing and mock-ups)

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1. Install protection.
2. Remove loose and peeling paint by hand using scrapers that will not mar substrate surface.
3. Apply eco-friendly chemical stripper. Allow to dwell for approved time, as determined by test panels and mock-ups.
4. Manually scrape off paint stripper and softened paint to greatest extent possible.
5. Repeat process as needed to completely remove paint and coatings and residue from paint and coatings.
6. Rinse surfaces using solvents recommended by manufacturer of paint stripper to remove paint and stripper residue.
7. Neutralize surfaces where alkaline strippers have been used.

    a. Rinse surfaces with water.
    b. Test for neutralization with pH paper. Acceptable pH range is 6.0 to 8.0.
    c. Repeat rinsing until proper pH range is obtained.

8. Conduct final wipe down to remove residue using solvents and clean cloths. Repeat until cloths come away clean.

3.8 ECO-FRIENDLY CHEMICALLY STRIPPING PAINT AND COATINGS FROM WOOD SURFACES

A. General: Remove paint and coatings from exterior wood surfaces and wood elements (e.g., windows and doors) as indicated on Drawings.

B. Stripper Application: Apply paint stripper selected during testing and confirmed during mock-ups for each surface to painted surfaces following manufacturer’s instructions.

C. Dwell Time: Allow stripper to remain on surface for time determined during testing. Do not allow stripper to dry on surface. Apply additional stripper to ensure that material remains moist.

D. Removal: Scrape stripper and coating from surface using plastic scrapers with rounded corners. Remove remaining coating using stiff, fiber bristle scrub brushes, sponges, and water.

E. Repeating Removal: Repeat removal process as required to remove paint to achieve

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surface matching approved mock-up to Contracting Officer's satisfaction.

3.9 CLEAN-UP AND PROTECTION

F. Clean-up: Properly contain run-off and debris from paint and coating removal. Remove rubbish, rags, and effluent from site at end of each workday, in appropriately marked containers. Dispose of material generated by work of this Section offsite in a legal manner.

G. Protection: Protect work of other trades against damage and deterioration by paint and coating removal work. Correct damage by cleaning, repairing, or replacing elements, materials, and finishes damaged or deteriorated by paint and coating removal work, as acceptable to Contracting Officer, at no additional cost to Government.

END OF SECTION

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SECTION 09 91 00 - EXTERIOR PAINTING

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 DESCRIPTION

A. Work included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Preparation (including removal of existing failed paint) of all surfaces scheduled or indicated to be painted to provide sound, even uniform substrates for application of coatings.
2. Painting of all surfaces indicated to be painted. Paint as used herein means all coating system materials, including primers, sealers, and other applied materials.

B. Extent of Painting Work: Preparing, priming, and painting the following:

1. 100% of all exterior woodwork as specified in drawings.

C. Related work specified elsewhere:

1. Asbestos Remediation – Section 02 82 00
2. Brick Masonry Restoration – Section 04 01 20
3. Stone Restoration – Section 04 01 40
4. Cast Stone Restoration – Section 04 72 00
5. Architectural Woodwork Restoration – Section 06 01 40
6. Exterior Joint Sealants – Section 07 92 00
7. Wood Door Restoration – Section 08 01 14
8. Wood Window Restoration – Section 08 01 52
9. New Wood Windows – Section 08 52 00

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10. Paint Removal – Section 09 01 10

1.3 QUALITY ASSURANCE

A. Painting Contractor: Contractor that performs painting work shall be regularly engaged in painting of historic buildings. Contractor shall demonstrate to Government's satisfaction that, within previous five (5) years, contractor has successfully performed and completed in a timely manner at least three (3) projects similar in scope and type to required work involving facilities designated as landmarks by local governmental authorities or buildings listed on the National Register or State Registers of Historic Places. Subcontracting of any work included in this Section, except for that accepted by Government in writing prior to award of Contract, is specifically prohibited.

1. Foreman: Work of painting shall be directly supervised by a full-time foreman with experience supervising painting work on historic buildings similar to that required by this Section and are familiar with design requirements. Foreman shall be on site daily for duration of work of this Section. Same foreman shall remain on job throughout work unless his performance is deemed unacceptable.
2. Mechanics: Painting shall be carried out by a steady crew of skilled mechanics who are thoroughly experienced with materials and methods specified, have a minimum of three (3) years experience with work on historic buildings similar to that required by this Section, and are familiar with design requirements. In acceptance or rejection of work of this Section, no allowance will be made for workers' incompetence or lack of skill.

B. Familiarity with Site Conditions: Bidders shall visit site prior to bid and carefully examine project scope and conditions that may affect proper execution of work of this Section. Contractor's submission of bid shall be acknowledgment that he is thoroughly familiar with project scope and site conditions.

C. Single-Source Responsibility: Provide all finish paint produced by same manufacturer and mixed to color match by same vendor.

D. Referenced Standards: Comply with applicable requirements and recommendations of the latest editions of the referenced standards listed herein, except as modified by more stringent requirements of the Contract Documents and of applicable laws, codes, and regulations. In each case in which there is a conflict between the requirements of referenced standards; requirements of laws, codes, and regulations; and requirements of this Section, the most stringent or restrictive requirement shall govern.

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1. U. S. Department of the Interior, United States Secretary of the Interior Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings.

1.4 SUBMITTALS

A. General: Submit the following in compliance with requirements of the Conditions of the Contract and Division 1 specification sections. Revise and resubmit each item as required to obtain Architect or Restoration Consultant's approval.

B. Qualification Data: Qualification data for firm and personnel specified in “Quality Assurance” Article that demonstrates that both firm and personnel have capabilities and experience complying with requirements specified. For firm and foreman, provide a list of at least three completed projects similar in size and scope to the work required on this Project. For each project list project name, address, architect, and scope of contractor’s work, and other relevant information. Submit this information with the bid.

C. Product Literature: Manufacturer’s published technical data for each product to be used in work of this Section including recommendations for application and use, test reports and certificates verifying that product complies with specified requirements, and Safety Data Sheets (SDS).

D. Work Description: Detailed description for surface preparation and painting of each substrate and condition. Submit new written descriptive information. Photocopies of Contract Documents, excerpts from Contract Documents, and/or duplication of text in Contract Documents will not be accepted for Work Description. Do not begin work on site until work description has been approved in writing. Description for each substrate to be painted or finished and for each condition shall include, but not be limited to:

E. Materials and Procedure: Materials, methods, tools, and equipment to be used.

F. Protection: Description, including drawings and diagrams, of proposed materials and methods of protection for preventing harm, damage, and deterioration caused by work of this Section to persons (whether involved in the Work or not), building elements, materials, and finishes, surrounding landscape and site, and the environment.

G. Alternate Methods and Materials: Proposed alternate methods and materials to those specified for painting and finishing work. Provide evidence of successful use on comparable projects and demonstrate that they will provide results equal to or superior to those of the products specified on this Project.

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H. Samples: Provide samples of each color and material to be applied, with sheen to simulate actual conditions, on representative samples of the actual substrate.

1. Resubmit until required sheen and color are achieved.
2. Provide a list of materials and applications for each coat of each sample. Label each sample as to location and application.

I. Prepare mock-ups as specified in Article “Mock-Ups” below.

1.5 MOCK-UPS

A. General: Before beginning general painting work, prepare mock-ups to provide standards for work of this Section. Do not proceed with painting work until Architect or Restoration Consultant has approved mock-ups.

1. Locate quality mock-ups in locations as directed by and accessible for review by Architect or Restoration Consultant.
2. Provide 48 hours notice to Architect or Restoration Consultant prior to start of each quality mock-up.
3. Architect or Restoration Consultant will monitor quality mock-ups.
4. Perform quality mock-ups using crew who will be executing the work and following requirements of this Section.
5. Repeat quality mock-ups as necessary to obtain Restoration Consultant's approval.
6. Protect approved quality mock-ups to ensure that they are without damage, deterioration, or alteration at time of Substantial Completion.
7. Approved quality mock-ups in undamaged condition at time of Substantial Completion may be incorporated into the Work.
8. Approved quality mock-ups will represent minimum acceptable standard for painting work for each surface and color. Subsequent work that does not meet standard of approved quality mock-ups will be rejected.

B. Provide the following quality mock-ups:

1. One window opening where all wood brick mold and sill have been restored and painted.
2. Mock-up to show approved color and sheen.

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1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver materials to site until they have been approved by Architect or Restoration Consultant.

B. Deliver and store materials in manufacturers' original sealed containers or packaging, clearly labeled with manufacturer's name, address and product identification, including grade, type, color, date of manufacturer, contents by volume for pigment and vehicle, thinning instructions, and application instructions. Immediately reseal containers after partial use.

C. Store all materials in spaces designated by Architect or Restoration Consultant. All such spaces shall comply with pertinent federal, state, and local laws, codes, and regulations and shall be locked and inaccessible to those not employed under this Section, except Government 's Representatives.

1. Maintain temperatures in storage spaces within range recommended by manufacturer of material being stored in each case but at a temperature of not less than 45° Fahrenheit.

D. Deliver, store, and handle all products and materials to prevent damage, deterioration, or degradation and intrusion of foreign material.

E. Discard and remove from site deteriorated or contaminated materials and products that have exceeded their expiration dates. Replace with fresh materials.

1.7 PROJECT CONDITIONS

A. Laws and Regulations: Perform all work of this Section in compliance with all applicable federal, state, and local laws and regulations.

B. Protection of Persons: Take all necessary measures to protect all persons, whether or not they are involved with work of this Section, from harm caused by work of this Section.

1. Ensure adequate ventilation at all times during work of this Section.

C. Protection of Building: Protect building elements and finishes from damage or deterioration caused by work of this Section using all means necessary. Repair any damage to materials or finishes to satisfaction of Architect or Restoration Consultant no additional cost to Government.

1. Take all necessary precautions to prevent fire and spread of fire.
2. Do not use torches or heat guns to remove paint. Refer to 090100 Paint Removal for additional requirements.

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3. Store oily rags in closed metal containers. Remove oily rags and waste daily.

D. Protection of Site and Surroundings: Protect adjacent buildings, site, landscape features, public rights of way, motor vehicles, and other surrounding elements from damage and deterioration resulting from work of this Section.

E. Material Safety: All chemical materials shall be safe in use and shall comply with all applicable federal, state, and local laws and regulations.

F. Coordination: Coordinate work of this Section with other work to ensure proper completion of all work.
1. Schedule painting so that uncured paint will not be harmed or marred by airborne dust or debris from other construction work.

G. Contract Drawings: Drawings are two-dimensional representations of three-dimensional objects and do not show all surfaces. Perform work on all surfaces of projections, reveals, ornament, and other elements associated with areas on which work is indicated.

H. Access for Inspection and Approvals: Provide Architect or Restoration Consultant access on a regular basis to all locations on which quality mock-ups are being carried out, on which work is ongoing, and where work has been completed to allow for inspections and approvals. Provide means of access and safety precautions required to facilitate inspections and approvals.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Follow specified requirements and manufacturer's recommendations concerning temperature requirements for products specified herein. In case of conflict, the more stringent requirements shall govern.

B. Apply water-based paints only when temperature of surfaces to be painted and surrounding air temperatures are between 50 deg F and 90 deg F.

C. Do not apply paint in snow, rain, fog, or mist; or when relative humidity exceeds 85 percent; or at temperatures less than 5 deg F above dew point; or to damp or wet surfaces.

1.9 LEAD-CONTAINING PAINT

A. General: Perform work that disturbs lead-containing paint (LCP), handle material that involves lead-containing paint, and transport and dispose of lead-containing paint and residue in

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compliance with applicable federal, state, and local laws and regulations for identification, removal, labeling, handling, containerization, transportation, and disposal of lead-containing material including, but not limited to, those referenced herein.

B. U.S. Department of Labor OSHA Regulations: Including but not limited to: Title 29, Code of Federal Regulations (CFR) Section 1926.62: “Lead Exposure in Construction” and Title 29, CFR Section 1910.1200: “Hazard Communication Standard.”

C. U.S. Environmental Protection Agency (USEPA) Regulations: Including but not limited to: Title 40 CFR Part 262: “Standards Applicable to Generators of Hazardous Waste” and Part 263: “Standards Applicable to Transporters of Hazardous Waste.”

D. U.S. Department of Transportation (USDOT) Regulations: Including but not limited to: 49 CFR Parts 172, 173, 174, 175, 177, 178, 179, and 180.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Grade and Quality: Materials shall conform to the requirements of this Section and shall be new, free from defects, and of recent manufacture.

1. Where products specified by name and number are not available, furnish products equal to original specifications, as approved by Architect or Restoration Consultant at no additional cost to the Government.

B. Ready-Mixed Products: Wherever a ready-mixed product is specified for use, containers shall bear labels giving exact formula of mixture. Formula shall be guaranteed by manufacturer.

C. Manufacturer's Instructions: Comply with material manufacturer’s instructions for use of products (including surface preparation, mixing, applying, drying, etc.). In case of conflict with requirements of this Section, the more stringent requirements shall govern.

D. ASTM Standards: All materials shall comply with relevant ASTM standards.

2.2 PAINT

A. Paint: Paint shall be a premium quality linseed oil based paint and match existing color exactly unless otherwise specified and shall comply with requirements of contract document. Provide the

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following or approved equal.

1. Ottosson Linseed Oil Paint, Earth+Flax, earthandflax.com
2. Brouns Linseed Oil Paint, Brouns & Co North America LLC, Distribution Center, 20 North Wentworth Ave, Londonderry, New Hampshire, 03053
3. Allback Linseed Oil Paint, Earth+Flax, earthandflax.com

2.3 PAINT MATERIALS, GENERAL

A. Material Compatibility: Provide primers, finish coat materials, and related materials that are compatible with one another and substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

B. Material Quality: Provide manufacturer's best-quality trade sale paint material of various coating types specified. Paint material containers not displaying manufacturer's product identification will not be acceptable.

C. Thinners: Use only thinners approved by paint manufacturer and use only within recommended limits and when approved in advance by Architect or Restoration Consultant.

D. Colors: Provide custom colors to match Architect or Restoration Consultant's samples. Colors will not be limited to the manufacturer’s standard colors.

E. Pigments: Pure non-fading and of applicable types to suit substrates and service indicated.

2.4 SCHEDULE OF PAINTS AND FINISHES

A. Paint System for Wood Surfaces: Provide the following paint system:

1. Primer to be one coat of thinned linseed oil paint - 30% linseed oil paint to 70% raw linseed oil per manufacturer’s requirements.
2. Finish paint to be two coats of premium quality linseed oil based paint as specified above.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Inspection: Inspect surfaces to be coated before beginning painting and finishing for compliance with paint application requirements. Correct defects in surfaces that might affect proper execution and durability of work of this Section.

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B. Unsatisfactory Surfaces: If surfaces are not thoroughly dry or if they cannot be put in proper condition to receive decorative finishes by customary, normal methods, including sanding or spackling, notify Architect or Restoration Consultant in writing. Do not begin to apply paint until unsatisfactory conditions have been corrected.

C. Responsibility for Accepted Surfaces: Starting of painting and finishing work under this Section will be construed as acceptance of surfaces as being satisfactory. Contractor shall correct defects to his work resulting from such accepted surfaces at his own expense.

3.2 PROTECTION

A. Protect existing materials, surfaces, and finishes against damage caused by painting and finishing work. Correct damage by cleaning, repairing or replacing, and repainting, as acceptable to Architect or Restoration Consultant.

3.3 REMOVING EXISTING FINISHES

A. Scrape and sand wood elements. Intent is to remove all failed paint, but not necessarily remove all paint to the substrate.

B. All sanding and mechanical scraping must be done in accordance with applicable regulations for lead paint.

C. Random orbital sanders are approved with grit no lower than 60. Power sanders are to be connected to HEPA vacuum systems to minimize airborne dust. Grinders are not approved.

D. All painted wood surfaces (trim, windows, doors, etc.) to be prepared for primer and finish topcoat by sanding to 100 grit.

E. On site paint removal to be performed in intervals that allow for removal, prep, and initial primer coat within a single workday.

3.4 MATERIALS PREPARATION

A. General

1. Manufacturer’s Directions: Carefully mix and prepare paint materials to comply with manufacturer’s directions and recommendations for optimum coating application.
2. Cleanliness: Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.

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3. Mixing: Stir material before application to produce a mixture of uniform density; stir as necessary to maintain well-mixed material during application. Do not stir surface film into product. Remove film and, if necessary to achieve material free of film, strain material before using.
4. Thinning: Use only thinners approved by the paint manufacturer and only within manufacturer's recommended limits and as approved by Architect or Restoration Consultant.

B. Tinting: Tint primer to nearly match color of finish coat but provide sufficient differences in shade of undercoats to clearly distinguish each separate coat.

3.5 PAINT APPLICATION

A. General: Paint shall be applied to comply with manufacturer's directions by skilled journeyman painters.

1. Properly Prepared Surfaces: Apply paint only to properly prepared surfaces. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film. Reprepare surfaces that have deteriorated following preparation and prior to paint application as necessary to provide optimum surface to receive paint.
2. Coating Compatibility: Provide finish coats that are compatible with primers and undercoats.
3. Number of Coats and Film Thickness: Provide number of coats and film thickness specified regardless of application method. Apply additional coats if undercoats, stains, or other conditions show through final coat of paint until paint film is of uniform finish, color, and appearance. Give special attention to ensure that all surfaces, including edges, corners, crevices, welds, and exposed fasteners, receive a dry film thickness equivalent to that of flat surfaces.
4. Back-Priming
    a. Exterior Wood Elements: Apply a coat of the same primer applied on visible surfaces to concealed surfaces of new and replacement exterior wood elements, including, but not limited to, back sides, edges, and ends, before installation.
5. Workmanship: Materials shall be evenly spread, smoothly flowed on, and free from holidays, runs, sags, and drips. Finish surfaces shall be uniform without unevenness and with a uniform, even surface of gloss level specified.
6. Curing: Allow sufficient time between successive coats to permit proper drying as recommended by manufacturer and as necessary to provide sound paint film. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and where application of another coat of paint does not cause undercoat to lift or lose adhesion.

B. Scheduling Painting

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1. First Coat: Apply first finish coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
2. Sufficient Time for Curing: Allow sufficient time between successive coats to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and where application of another coat of paint does not cause undercoat to lift or lose adhesion.

C. Application Procedures

1. Application Method: Apply coatings using method to replicate application of original coating and as recommended by coating manufacturer.
    a. Brush Application: Brush each coat onto surfaces using appropriate brush to form an even film with parallel brush strokes. Use brushes best suited for application of coatings on substrates indicated.

D. Minimum Coating Thickness: Apply materials no thinner than manufacturer's recommended spreading rate. Provide total dry film thickness of entire system as recommended by manufacturer.

E. Prime Coats: Before applying finish coats, apply a prime coat of thinned paint (30% linseed oil paint to 70% raw linseed oil), as recommended by manufacturer, to material that is required to be painted and that has not been prime-coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.

F. Pigmented (Opaque) Finishes: Completely cover to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, bubbles, or other surface imperfections will not be acceptable.

G. Completed Work: Match approved samples for color, texture, and coverage. Remove and repaint work not complying with specified requirement

3.6 CLEANING

A. Daily Cleanup: At end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from site.

B. Final Cleanup: After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping. Do not scratch or damage adjacent finished surfaces.

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C. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

END OF SECTION

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