PROJECT MANUAL

SIOUX FALLS COURTHOUSE IRA WINDOW REPLACEMENT

Prepared for:

U.S. General Services Administration,
Rocky Mountain Region 8

United States Courthouse

400 South Phillips Ave

Sioux Falls, South Dakota 57104-6851

Building Number: SD0021ZZ

ISSUANCE TITLE Bid Package 2 – Construction Set

Project No: 13560.000

Issue date: December 6, 2024

Prepared by:

SMITHGROUP

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SECTION 000102 – DIVISION 00 COORDINATION – BP2

PART 1 - GENERAL

1.1 DOCUMENTS

A. Reference the Solicitation Documents and Contract Documents for Bid Package 2 Water Intrusion Repairs and Alterations at the U.S. Courthouse, 400 S Phillips Avenue, Sioux Falls, SD 57104, as described in the specifications, drawings, and design documents for the subject project.

B. Solicitation Documents:
   1. Standard Form 1442 Solicitation, Offer, and Award (Construction, Alteration, or Repair)
   2. The Solicitation for BP2 Water Intrusion Repairs and Alterations
   3. The Agreement for BP2 Water Intrusion Repairs and Alterations

END OF SECTION

SECTION 000107 – SEALS PAGE

Architect SmithGroup, Inc. Detroit, MI	

END OF SECTION

SECTION 000115 – LIST OF DRAWING SHEETS

PART 1 - GENERAL

1.1 LIST OF DRAWINGS

A. Drawings: Drawings consist of the Contract Drawings and other drawings listed on the Table of Contents page of the separately bound drawing set titled **SIOX FALLS COURTHOUSE IRA WINDOW REPLACEMENT**, dated **December 6, 2024,** as modified by subsequent Addenda and Contract modifications.

B. List of Drawings: Drawings consist of the following Contract Drawings and other drawings of type indicated:

1. G0.0 PROJECT COVER SHEET
2. A0.2.1 ARCHITECTURAL ABBREVIATIONS AND SYMBOLS
3. A1.2.1 ARCHITECTURAL EXISTING SITE PLAN - OVERALL
4. AD4.2.1 DEMOLITION ELEVATIONS
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END OF SECTION

SECTION 011000 – SUMMARY

PART 1 - GENERAL

1.1 PROJECT INFORMATION

A. Project Name and Location: Sioux Falls Window Replacement 400 South Phillips Ave, Sioux Falls, SD

B. Project Summary Description: This is a window replacement project at the historic Federal Sioux Falls Courthouse in Sioux Falls, SD. The building is a stone clad (local quartzite), concrete and steel framed building. The original building was added onto twice and there have been a variety of remodeling projects over the life of the structure. Built between the 1910's and the early 1930's, the building's exterior wall features inner wythes of brick and clay tile lath behind the stone veneer and painted plaster or drywall interior finishes, featuring extensive historic wood trim.

The original wood windows were partially removed in the 1970's when a more modern aluminum and glass window system was installed. The current project is to replace these aluminum windows with aluminum and glass windows that address enhanced energy efficiency and physical security needs. The existing original wood window frame is suspected to exist in many if not most of the openings. It would have been a priority to preserve as much of this original historic fabric as possible during the 1970's window project. It continues to be important to preserve the existing historic material as much as possible. Note some removal of the existing frame will be required to achieve adequate anchorage of the windows to the exterior wall of the building. Protection of the existing interior finishes is of high priority and damage to these finishes during construction shall be restored to pre-construction condition.

Window replacement will have to occur, coordinating with a fully occupied and operational courthouse. Additionally, the interior finishes will need to be protected from construction activity and resultant damage repaired in kind. Mortar joints hidden by existing metal window trim and associated sealants are to be tuck pointed. Existing window treatments are to be removed, cleaned, and stored and reinstalled.

Contractor will document individual openings and make adjustments to trim dimensions as needed.

C. Architect: The term Architect refers to the project designer. The Architect's status relative to the construction will be stated in writing by the Contracting Officer prior to the pre-construction conference. The project was designed by: SmithGroup Inc. 500 Griswold Street, Suite 1700, Detroit, Michigan 48226.

D. Project Delivery Method: Design/Bid/Build.

E. Type of Contract: Project will be constructed under a single prime contract.

F. The Contracting Officer for the project is: John Kelley - john.kelley@gsa.gov - (720) 292-8507.

1.2 WORK SEQUENCE (Not Applicable)

1.3 WORK BY OTHER CONTRACTORS

A. The Contractor shall cooperate with other contractors performing related work, including providing labor, materials and other costs necessary to satisfactorily coordinate the Contract work with work performed under other contracts.

1.4 SCHEDULE OF GOVERNMENT-FURNISHED PROPERTY (Not Applicable)

1.5 MISCELLANEOUS PROVISIONS

A. Work in existing facilities shall correspond in all respects with the existing conditions to which it connects, or to similar existing conditions, in materials, workmanship and finish.

B. Alterations to Existing Conditions: Existing conditions shall be cut, drilled, removed, temporarily removed, or removed and replaced, as necessary for performance of Work under the Contract. Work out of alignment where exposed by removal of existing work shall be called to the attention of GSA. Necessary corrective work shall be as directed.
   1. Replacements of existing conditions that are removed shall match similar existing conditions.
   2. Unless otherwise indicated, existing structural members shall not be cut or altered without authorization by the Contracting Officer.
   3. Conditions remaining in place, which are damaged or defaced during the Work, shall be restored to the condition existing at time of award of Contract.
   4. Discolored or unfinished surfaces exposed by removal of existing conditions, that are indicated to be final exposed surfaces, shall be refinished or replaced as necessary to produce uniform and harmonious contiguous surfaces.

C. Existing structures not included in the work will remain in place.

D. Existing utility services with related meters and equipment will remain in place.

E. Removed items indicated to remain the property of the Government shall be stored on site, where directed by the Contracting Officer.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 011400 - WORK RESTRICTIONS

PART 1 - GENERAL

1.1 CONTRACTOR USE OF PREMISES

A. The Contractor will review and document the existing conditions surrounding the project premises. Provide documentation to the Government prior to the commencement of any construction activity.

B. During the construction period, the Contractor shall have limited use of the designated premises for construction operations, including limited use of the indicated work site, limited only by the Government's right to perform work or retain other contractors to perform work on portions of the project. Contractor to coordinate with building users for access.

C. The Contractor shall limit use of the premises to the work in areas indicated, and to allow for Government occupancy and public use.

1. Confine operations at the site to areas indicated. Do not disturb portions of the site beyond the areas in which Work is indicated.
2. Keep driveways and entrances always serving the premises clear and available to the Government, Government employees and to visitors. Do not use these areas for parking or storage of materials.
3. Schedule deliveries to minimize space and time requirements for storage of material and equipment on site.
4. Maintain existing building in a safe and weather-tight condition throughout the construction period. Repair damage caused by construction operations to the satisfaction of the government. Take precautions to protect the building, its occupants and the public during the construction period. A representative of the Contractor shall be available to arrive on site within one (1) hour of notice should an emergency occur.
5. Keep public areas, such as hallways, stairs, lobbies and toilet rooms, free from accumulation of waste material, rubbish, construction debris and construction materials.
6. Space on the premises will be made available for the Contractor's storage and related activities, provided that its use will not interfere with operations of the Government. Arrange and gain approval for use of this space through the Contracting Officer.
7. Use of the existing loading dock facilities will be shared with Government activities on a first-come-first-served, wait-your-turn basis. The loading dock is available for the delivery of materials, tools, and supplies with prior approval by the facility manager.
8. Existing materials and equipment that are removed as part of the construction operations, and that are not reused or designated to be salvaged as Government property, shall become the property of the Contractor and shall be removed from the site. Storage or sale of excess salvageable materials and equipment is not permitted on site.
9. Pollution producing equipment shall not be located near air intakes where airborne smoke or fumes could be drawn into the building. When not required for powering unloading operations, turn off engines when docked.
10. Smoking is not permitted in or around the building, see Facilities Management Regulation (FMR) Case 2008-102—3. Also see Code of Federal Regulations (CFR) 41 CFR Part 102-74.
11. No Contractor parking will be available on site during working hours for building occupants. The Contractor and Contractor's employees shall make their own arrangements for vehicle parking off site.
12. No apparatus with an open flame is allowed to be used within the facility without the prior receipt of a burn permit. Contact the Field Office to obtain burn permits. Burn permits are required for each separate occurrence.
13. Permits: Refer to FAR 52.236-7
14. The work shall be sequenced to minimize disruption to building occupants, visitors, and maintenance activities. To the greatest extent feasible, demolition work should not take place until supplies are on hand to perform new work.
15. Coordinate with the GSA Building Manager and the COR for site access.

16. Coordinate with the GSA Building Manager and the COR on correct response procedures for any building system alarms occurring during or resulting from the construction process.
17. All building systems outside the immediate construction area shall be kept fully operational during normal working hours.
18. Protect building site from flying debris.

1.2 GOVERNMENT OCCUPANCY

A. The Government will occupy the site and the existing building during the entire period of construction. Cooperate with the Government's representatives during construction operations to minimize conflicts, mitigate noise, and facilitate Government usage. Perform the Work in a manner that does not interfere with the Government's operations.

1.3 WORKING HOURS

A. Government Occupied Hours: Government personnel are scheduled to occupy the building during the following hours on weekdays, Monday through Friday, except for established Government Holidays, **7:30 AM** to **5:00 PM**.

B. Government Unoccupied Hours: Government personnel are not scheduled to occupy the building during times not indicated as Government Occupied Hours.

C. Contractor's General Working Hours: The Contractor working hours shall be generally established to occur during Government Occupied Hours.

D. Contractor's Required Working Hours: The following work shall be performed during Government Unoccupied Hours:
1. Any work that requires temporarily obstructing any building entrance shall be performed during unoccupied hours.
2. Work that disrupts US Courts shall be conducted during unoccupied hours; the US Courts schedule is published each Monday for that week.
3. Disruptive work includes, but is not limited to:
   a. Saw-cutting
   b. Heavy equipment operation

E. Coordinate with the property manager each Monday for the week's court schedule

F. Work accomplished during Government Unoccupied Hours shall be performed at no additional cost to the Government. Contractor shall submit a proposed schedule and gain the Contracting Officer's approval at least 48 hours before proceeding with any work during Government Unoccupied Hours.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Government is providing the references included in this sub-section for information purposes only and is not intended to provide a comprehensive, all-inclusive list of any and all potentially relevant portions of the Contract Documents. Drawings and general provisions of the Contract and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Sections:

1. Division012100 Section "Allowances" for products selected under an allowance.
2. Divisions02 through 49 Sections for specific requirements and limitations for substitutions.

1.3 DEFINITIONS

A. Substitutions: Proposed changes to the Contract Documents by the Contractor for products, materials, equipment, and methods of construction.

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms

2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner

1.4 SUBMITTALS for Cause or Convenience:

A. Substitution Requests: Per Submittal Procedures Section 013300 submit electronic copies through GSA of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Coordinate with GSA PMIS. Substitutions must be approved in writing by GSA
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
   a. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Government and separate contractors that will be necessary to accommodate proposed substitution.
   b. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable specification section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, energy and resource performance goals, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
   c. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
   d. Samples, where applicable or requested.

e. Certificates and qualification data, where applicable or requested.
f. List of similar installations for completed projects with project name, location and contact information of owner and architect/engineer of record.
g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
h. Research reports evidencing compliance with building code in effect for project, when applicable for the proposed substitution.
i. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery. Provide a schedule fragment with a time impact analysis to allow the Government to consider the proposed substitution.
j. Cost information, including a proposal of change, if any, in the Contract Sum.
k. Proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
l. The Contracting Officer may require the Contractor to provide a contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. The Contracting Officer or Contracting Officer’s Representative (CO) or (COR) Action: If necessary, the Contracting Officer or COR will request additional information or documentation for evaluation. The Contractor shall be entitled to receive notice of action on submittals within a reasonable time, given the volume or complexity of the submittals and the criticality of the affected activities to Substantial Completion as may be indicated in the Project Schedule. The Contractor shall not be entitled to receive notice of action on submittals containing variations from Contract requirements in less than twenty working days.

1.5 Failure by the government to respond does not constitute acceptance of the proposed substitution.

1.6 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage qualified testing agency to perform compatibility tests recommended by manufacturers.

1.7 PROCEDURES

A. Coordination: Modify or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately upon discovery of need for change, but not later than 14 days prior to time required for preparation and review of related submittals.

1. Conditions: The Contracting Officer (CO) will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, the Contracting Officer (CO) will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution is consistent with the Contract Documents and will produce indicated results.

b. Substitution request is fully documented and properly submitted.
c. If requested substitution involves schedule impact Contractor has identified time impact and a mitigation plan.
d. Requested substitution has received necessary approvals of authorities having jurisdiction.
e. Requested substitution is compatible with other portions of the Work.
f. Requested substitution has been coordinated with other portions of the Work.
g. Requested substitution provides specified warranty.
h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: The Contracting Officer (CO) will consider requests for substitution if received within 60 days after Notice of Award. Requests received after that time may be considered or rejected at discretion of the Contracting Officer (CO) or the Contracting Officer Representative (COR).

1. Conditions: The Contracting Officer will consider Contractor's request for substitution when the following conditions are satisfied

a. Requested substitution offers the Government a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional obligations the Government incurs.
b. Requested substitution does not require extensive revisions to the Contract Documents.
c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
d. Substitution request is fully documented and properly submitted.
If requested substitution involves schedule impact Contractor has identified time impact and a mitigation plan.
e. Requested substitution is compatible with other portions of the Work.
f. Requested substitution has been coordinated with other portions of the Work.
g. Requested substitution provides specified warranty.
h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 DEFINITIONS

A. Schedule of Values: A detailed written statement (masterformat/uniformat) furnished by the Contractor outlining the portions of the contract sum, which allocates values (price & percentage) for the various parts of the work and used as the basis for payment application and reviewing progress payments. The Agreement provides further details.

B. Request for Payment: A contractor's invoice and request for progress payment with substantiating information consistent with approved schedule of values.

1.3 SCHEDULE OF VALUES

1. Coordination: Submit completed Schedule of Values no later than 14 calendar days prior to scheduled date of initial Requests for Payment.
2. Schedules for Phased Work: Where the work is separated into phases, provide Schedules showing values correlated with each phase using the standard format referenced below.

A. Format and Content: Contractor shall be responsible to complete the GSA Schedule of Values Workbook and compile the values into GSA Project Management Information System (PMIS) System. Contractor will enter values into workbook prior to PMIS input and provide associated electronic baseline copy to contracting officer for record. Contractor will follow guidelines in the Schedule of Values workbook to support GSA PMIS upload.

1. Identification: Complete the following Project Identification fields in the Schedule of Values:

   a. Project Name
   b. Project Number
   c. Project Location, City, State
   d. Base Contract Number
   e. Task Order Number
   f. Modification Number
   g. GSA Project Manager
   h. Contractor's Name and contact information
   i. Date of submittal

2. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Requests for Payment and progress reports.
   a. Work activity – (by division or specific work activity)
   b. Dollar value of each specific work activity – both with an amount in dollars and whole cents, and as a percentage of the Contract Sum to nearest one-hundredth percent. Adjust the amounts to total to the Contract Sum and the percentages to total 100 percent.
   c. Each item in the schedule of values and Requests for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item. (i.e. no stand alone item for Overhead, and Profit)
   d. Modifications that affect value.
   e. Update affected work branches and subordinate line items and
   f. resubmit the schedule of values before the next Request for Payment when Modifications result in a change in the Contract Sum
   g. Line item for mobilization and de-mobilization
   h. Line item for close out (% to be negotiated with GSA COR)

3. Options: Provide a separate Schedule of Values for each exercised Option.

4. Each item in the Schedule of Values and Requests for Payment shall be complete. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at the government's option.

5. Revise and update workbook in GSA PMIS with all items affecting scope, schedule or cost and resubmit within 14 calendar days as coordinated with project manager or contracting officer. Contractor shall provide a final as-built schedule at project completion. Update affected work branches and subordinate line items and resubmit the schedule of values before the next Request for Payment when Modifications result in a change in the Contract Sum

1.4 REQUESTS FOR PAYMENT

B. Requirements for Requests for Payment are in Section III, Terms and Conditions of the Agreement.

C. Each Request for Payment following the initial Request for Payment shall be consistent with previous Requests.

1. Initial Request for Payment, Request for Payment at time of Substantial Completion, and final Request for Payment involve additional requirements.

D. Payment Request Times: Submit Request for Payment to GSA by the first of the month. The period covered by each Request for Payment is one month, ending on the last day of the month.

1. Submit one paper draft copy (aka pencil copy) of Request for Payment to the CO or enter in GSA PMIS along with construction progress report seven days prior to due date for review by GSA. Provide documentation evidencing the cost of work performed to be included in the Request for Payment. Resolve questions resulting from GSA review of draft Request for Payment and construction progress report prior to submitting Request for Payment.

E. Request Preparation: All payments must be executed by a person authorized to legally bind the Contractor.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Include amounts for work completed following effective date of previous Request for Payment, whether or not payment has been received. Include only amounts for work completed as of effective date of current Request for Payment.
3. Include amounts of Modifications issued before last day of construction period covered by Request.
4. Provide a completed IRA Project Submittal Form reflecting any necessary updates in accordance with the frequency as noted on the LEC, E&ST and HPGB instruction tabs on the IRA Project Submittal Form. These constitute the minimum required submittals. The Contracting Officer may determine a more frequent submission based on the nature of the project. See Specification, Division One, Submittal Procedures, 013300 and Payment Procedures, 012900.

F. Stored Materials: Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, and consent of surety to payment, for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation.
3. Provide summary documentation for stored materials indicating the following:

    a. Value of materials previously stored and remaining stored as of effective date of previous Request for Payment.
    b. Value of previously stored materials put in place after effective date of previous Request for Payment and on or before effective date of current Request for Payment.
    c. Value of materials stored since effective date of previous Request for Payment and remaining stored as of effective date of current Request for Payment.

G. Initial Request for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Request for Payment include the following:

1. List of subcontractors.
2. Schedule of values.
3. Contractor's construction schedule per Agreement (startup if not final).
4. Products list (preliminary if not final).

5. Sustainable design submittal for project materials cost data.
6. Sustainable design action plans.
7. Schedule of unit prices.
8. Submittal schedule (preliminary if not final).
9. List of Contractor's staff assignments.
10. List of Contractor's principal consultants.
11. Copies of building permits.
12. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
13. Initial progress report.
14. Report of preconstruction conference.

H. Request for Payment at Substantial Completion: After GSA issues the Notice of Substantial Completion, submit a Request for Payment less previous payments made for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This Request shall reflect Notices of Substantial Completion issued previously for GSA occupancy of designated portions of the Work.

I. Final Payment Request: The Agreement provides further details

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION

PART 1 GENERAL

1.1 SUMMARY

A. This section includes certain administrative provisions for managing and coordinating construction operations, including but not limited to the following:

1. General project coordination.
2. Coordination drawings.
3. Conservation.
4. Administrative and supervisory personnel.
5. Conferences and meetings.

1.2 GENERAL PROJECT COORDINATION

A. Coordination of Trades: Coordinate construction operations included in the various sections of the Specifications to provide an efficient and orderly installation of each part of the Work. Coordinate construction operations included under different sections of the Specifications that depend on each other for proper installation, connection or operation. Keep pipes, ducts, conduit, and the like as close as possible to ceiling slab, walls, and columns to take up a minimum amount of space. Locate pipes, ducts, and equipment so that they do not interfere with the intended use of eye bolts and other lifting devices. Assure all controls can be reached and operated.

1. Schedule construction operations in the sequence required to obtain the best results where the installation of one part of the Work depends on installation of other components before or after that part.
2. Coordinate installation of different components to provide maximum accessibility for required maintenance, service, testing and repair.
3. Minimize roof penetrations.

B. Notification: Prepare and distribute memoranda to each party involved, outlining special procedures required for coordination. Include notices, reports and meeting minutes as part of the memoranda.

C. Administrative Procedures: Coordinate scheduling and timing of administrative procedures with other construction activities to avoid conflicts and promote orderly progress of the Work. Administrative procedures include but are not limited to the following:

1. Preparation of schedules.
2. Installation and removal of temporary facilities.
3. Security packages and systems by others (i.e. U.S. Marshals Service (USMS), Federal Protective Service (FPS), tenants, etc.)
4. Audio Visual (AV) and technology requirements and packages for tenants and/or end users.
5. Telecommunication, data, internet and other tele-work systems for GSA, tenants and/or end users.
6. Delivery and processing of submittals.

7. Progress meetings.

8. Project closeout activities.

9. Startup and adjustment of systems.

D. Art Protection

1.3 COORDINATION DRAWINGS

A. Prepare coordination drawings and/or BIM model and data where coordination is needed for installation of products and materials fabricated by separate entities, and prepare coordination drawings where limited space availability necessitates maximum use of the space for efficient installation of different components.

1. Show the relationship of components from the separate shop drawings. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems

2. Indicate required installation sequences.

3. Indicate minimum access space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.

4. Show locations and sizes of all access doors on vertical and horizontal surfaces throughout the facility.

5. Provide vertical and horizontal dimensions necessary to locate each component and avoid conflicts within the space.

6. Comply with shop drawing requirements for sheet size and submittal methods specified in Section 01 33 00 Submittal Procedures.

B. Develop BIM elements delineating equipment and system installations in mechanical and electrical rooms and spaces where two or more entities will provide the work and separate shop drawings are insufficient to show coordination. Refer to GSA FY23 01 78 25 BUILDING INFORMATION MODELING with CDX and REGIONAL STANDARD.

C . Work installed prior to full coordination and resolution of detected clashes shall be at the Contractor's risk. Subsequent relocations required to avoid interferences shall be made without additional expense to the Government. In the event that interference develops, the Government will decide which work shall be relocated, regardless of which was installed first.

D . Coordinate BIM model with GSA FY23 01 36 00 COBIE (Construction Operations Building information exchange) requirements.

1 . Digital Data Software Program: Utilize the latest version of AutoDesk BIM software authorized by the GSA GEAR team and accepted by the CO.

2 . File Preparation Format: Same digital data software program, version, and operating system as the original Drawings.

3 . File Submittal Format: Same digital data software program, version, and operating system as the original Drawings and Portable Document Format (PDF).

a. Digital Data Software Program: Utilize the latest version of AutoDesk BIM software authorized by the GSA GEAR team and accepted by the CO.

b. File Preparation Format: Same digital data software program, version, and operating system as the original Drawings.

c. File Submittal Format: Same digital data software program, version, and operating

system as the original Drawings and Portable Document Format (PDF).

1.3 CONSERVATION

A. Coordinate conservation of energy, water and materials in the conduct of construction operations. Salvage materials and equipment involved in the performance of, but not incorporated into, the Work.

B. Comply with Green Purchasing Plan requirements.

1.4 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

A. The Contractor shall provide administrative and supervisory personnel for proper performance of the Work.

B. Safety and Health Officer: Provide a safety and health officer whose duties shall consist of developing and implementing safety and health programs specified in GSA FY23 01 59 50 SAFETY and HEALTH

C. Provide a waste management coordinator whose duties shall consist of developing and implementing a program for maximizing recycling of waste.

1.5 CONFERENCES AND MEETINGS

A. Schedule and conduct meetings and conferences at the project site, unless otherwise indicated. Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify the Contracting Officer and Construction Manager of scheduled meeting dates and times. The Contractor shall prepare the meeting agenda and distribute to all invited attendees at least 48 hours prior to the meeting. Record significant discussions and agreements achieved and submit draft minutes to the CM and GSA COR for review and approval within three business days after the meeting. Distribute the meeting minutes to the project team via PMIS.Preconstruction Conference: The government shall schedule a preconstruction conference before *issuance of the NTP or starting construction* at a time and place convenient to the Contractor. The preconstruction conference shall review responsibilities and personnel.

1. Attendees: Participants at the conference shall be familiar with the project, shall be authorized to conclude matters relating to the Work, and shall minimally include representatives of the following parties:

a. GSA representatives

b. A/E Design Team

c. Tenant occupants

d. CMa (Construction Manager as advisor)

e. CxP (Commissioning Provider)

f. Primary design consultants

g. Contractor

h. Primary subcontractors

i. Major suppliers

j. Other concerned parties

2. Agenda: Subjects for discussion shall include items of significance that could affect progress, including but not limited to the following:

    a. Project Communications (PMIS)

    b. Tentative construction schedule

    c. Critical work sequencing

    d. Designation of responsible personnel

    e. Procedures for processing field decisions and Change Orders

    f. Procedures for processing Applications for Payment

    g. Distribution of Contract Documents

    h. Submittal of Shop Drawings, Product Data, and Samples

    i. LEED requirements including CxP overview of systems to be commissioned

    j. Preparation of Record Documents

    k. Use of the premises

    l. Parking availability

    m. Office, work, and storage areas

    n. Equipment deliveries and priorities

    o. First aid and reporting injuries/incidents

    p. Project Safety and Health program

    q. Security

    r. Housekeeping and progress cleaning

    s. Working hours

    t. Energy and resource efficiency / sustainability

    u. Waste management

    v. Commissioning

B. Progress Meetings: The Government or designee shall conduct progress meetings at the Project Site at regular intervals. Dates of meetings shall be coordinated with preparation of the payment request.

1. Attendees: In addition to the Contractor's and Government's representatives, each subcontractor, supplier, or other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.

2. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the status of the Project.

    a. Contractor's Construction Schedule: Review progress since the last progress meeting. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind schedule. Determine

how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time. Provide 12 week schedule look ahead. *[Coordinate further with team and legal on GSA FY23 01 31 10 CRITICAL PATH METHOD CPM SCHEDULING for PROSPECTUS PRJECTS or GSA FY23 01 31 20 CRITICAL PATH METHOD CPM SCHEDULING for BELOW PROSPECTUS PROJECTS.*

b. Review the present and future needs of each entity present, including but not limited to the following:

1) Interface requirements

2) Time

3) Sequences of operations.

4) Status of submittals.

5) Deliveries.

6) Off-site fabrication.

7) Access.

8) Site utilization.

9) Temporary facilities and controls.

10) Hours of work.

11) Hazards and risks.

12) Housekeeping and progress cleaning.

13) Quality and work standards.

14) Change Orders.

15) Documentation of information for payment requests.

16) Updating Record Documents.

3. Schedule Updating: The Contractor shall revise the Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. The revised schedule shall be issued concurrently with the report of each meeting.

1.6 UTILITY SERVICE INTERRUPTIONS

A. Utility Service Interruption Plan: Within *21* calendar days from Notice to Proceed (NTP) Contractor shall submit a utility service interruption plan for the project. Plan shall include dates and times of each scheduled interruption, with estimated period of outage, list of existing equipment that will be affected by the interruption, proposed sequence of equipment shut-down and start-up, and responsible personnel.

1. Keep interruptions and periods of interruption to a minimum.

2. Schedule interruptions during times when the facility is unoccupied.

3. Plan must be approved in writing by the Building Manager and the GSA. If not approved, consult with

the Building Manager, and revise and resubmit the plan until approved.

B. Coordination of Interruptions: Sufficiently in advance of each scheduled utility interruption, the Contractor shall issue a notice to all affected parties, confirming each provision of the interruption, or canceling and rescheduling. Coordinate with the Building Manager and GSA's representative, and confirm that the responsible personnel are prepared to execute the shut-down and start-up of affected existing equipment, prior to each interruption.

1.7 SUBMITTALS

A. Subcontract List: Within *14* calendar days from Notice to Proceed (NTP) prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, and telephone number of entities performing subcontract or supplying products.

2. Number and title of related Specification Section(s) covered by subcontract.

3. Drawing number and detail references, as appropriate, covered by subcontract.

4. Coordination Drawings: Comply with the shop drawing requirements specified in Division 1 Section "Submittal Procedures".

B. Waste Management Plan: Within *21* calendar days after commencement of construction, submit the waste management plan, followed by monthly implementation reports.

C. Staff Names: Within *14* calendar days after commencement of construction, submit a list of principal staff assignments, including the superintendent and other primary personnel at the Project site. Identify individuals by name, duties and responsibilities, home address, and business and home telephone numbers.

1. Post copies of this list in GSA's Project Management System, in the project meeting room, temporary field office and at each temporary telephone location.

D. Utility Service Interruptions: No later than *30* calendar days prior to the first planned interruption, submit the utility service interruption plan, followed by confirmed scheduled shut-down notices at least 3 calendar days prior to each interruption.

PART 2 PRODUCTS (Not applicable)

PART 3 EXECUTION

3.1 GENERAL COORDINATION PROVISIONS

A. Inspection of Conditions: Prior to installations, require the installer of each major component to inspect both the substrate and conditions under which work is to be performed.

1. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

2. Coordinate temporary enclosures with required inspections and tests to minimize the necessity of uncovering completed construction for that purpose.

B. Construction in Progress: Keep construction in progress, and adjoining materials in place, clean during handling and installation. Apply protective coverings where required for protection from damage or deterioration.

C. Completed Construction: Clean completed construction, and provide maintenance, as frequently as necessary to prevent damage or soiling or other deterioration through the remainder of the construction period. Adjust and lubricate operable components as necessary to assure operability without damage.

END OF SECTION 01 31 00

SECTION 013110 - CRITICAL PATH METHOD (CPM) SCHEDULING for PROSPECTUS PROJECTS

PART 1 GENERAL

1.1 SUMMARY:

The Contractor shall use a CPM Project Schedule to plan, coordinate, and perform the Work. The Project Schedule shall be a rational, reasonable and realistic plan for completing the Work, and conform to requirements specified in this specification section and elsewhere in this Contract. The Project Schedule shall depict all activities necessary to complete the design and construction of the project, including, as applicable, all submittal and submittal review activities, all procurement activities, and all field activities, including mobilization, construction, start-up, testing, balancing, commissioning, and punch-list. Activities shall be sufficiently detailed and limited in duration to enable proper planning and coordination of the Work and allow effective evaluation of the reasonableness and realism of the Project Schedule, accurate monitoring of progress, and reliable analysis of schedule impacts.

1.2 SCHEDULER REQUIREMENTS / QUALIFICATIONS:

A. Within five (5) Working Days after the Contractor receives Notice to Proceed (NTP) from the Contracting Officer (CO), the Contractor shall provide written notice to the CO naming a scheduling representative in the Contractor's organization who shall be responsible for coordinating with the GSA during the preparation and maintenance of the Project Schedule. The Contractor's scheduling representative shall have authority to act on behalf of the Contractor in fulfilling the Project Schedule requirements of the Contract.

B. The Contractor's scheduler shall possess a minimum of 5 years experience] in CPM scheduling on projects of similar size, scope, and complexity of the one specified in the Contract Documents.

C. The Contractor's scheduler shall also have taken, and provide proof of, at least one CPM training class within the past 5 years. If the Contracting Officer rejects the proposed scheduling representative, the Contractor shall submit a different candidate, at no additional cost to the Government. The Contractor shall not change the scheduling representative without the prior written consent of the Contracting Officer.

D. The Contractor agrees that if the Contracting Officer provides written notice to the Contractor that the scheduling representative is not performing the duties to the satisfaction of the Government, the Contractor shall change such representative at no additional cost to the Government. Within ten Working Days of receipt such written notice, the Contractor shall propose a new scheduling representative for approval by the Contracting Officer. Until the Contracting Officer approves of any such replacement, the Government reserves the right to reject any Project Schedule.

1.3 DEFINITIONS:

A. Activity - An element of the Work or task performed during the course of the project. Each scheduled activity shall be a clearly defined, manageable and monitorable task depicting an estimated duration, an estimated cost, and estimated resources. Each activity shall be limited to one trade unless approved by the Contracting Officer.

B. Baseline Schedule - The original work plan approved by the Contracting Officer depicting the Contractor's plan to prosecute the work. The Baseline Schedule becomes the schedule upon which progress is monitored.

C. Constraint - A scheduling restriction imposed on an activity to affect the start date, finish date or Float.

D. Critical Path - The sequence of activities that represents the longest path through a project, which

determines the shortest possible duration.

E. Critical Path Method (CPM) - A scheduling technique using activities, durations, and interrelationships/dependencies (logic), such that all activities are interrelated with logic ties from the beginning of the project to the completion of the project. Estimates the minimum project duration and determines the amount of scheduling flexibility on the logical network paths within the schedule model.

F. Data Date - The date to which progress is updated. In most scheduling software, the data date represents the next day of work and all progress is updated through the day prior to the data date.

G. Float - The amount of time an activity can be delayed in a project network without causing delay to subsequent activities (Free Float) or the Substantial Completion date (Total Float).

H. Free Float - The amount of time that an activity can be delayed without delaying the early start date of successor activities.

I. Total Float - The amount of time an activity (or chain of activities) can be delayed without affecting the Substantial Completion date.

J. Float Suppression - The masking of available Float through the use of constraints, unreasonable logical relationships or unreasonable durations.

K. Fragnet - A subset group of interrelated activities representing only a portion of the CPM schedule.

L. Near Critical Path - One or more near-critical activities that are susceptible to the risk of becoming critical and/or causing critical path delays

M. Network Plan - The entire database of activities, logic, durations, and all items relating to any activity input into the scheduling software and is the complete representation of the Project Schedule prepared using the CPM and graphically shown in a time-scaled form. The network shows the sequence and interdependence of the activities, and planned and actual progress by activity, required for complete performance of the Work.

N. Preliminary Schedule - The first schedule submission provided by the Contractor that: (a) defines detailed planned procurement and construction operations for the first 120 calendar days after NTP; and (b) provides a higher level summary of planned operations beginning 120 days after NTP through completion of the project.

O. Project Schedule - Any schedule submitted by the Contractor to the Government, including but not limited to Preliminary Schedule, Baseline Schedule, and all subsequent Schedule Updates, Recovery Schedules, and As-Built Schedule.

P. Recovery Schedule - A schedule depicting the Contractor's plan for recovery of time lost on the project.

Q. Retained Logic - The remaining duration of a progressed activity is not scheduled until the logical relationships of all predecessors are satisfied. With Progress Override, network logic is ignored and the activity can progress without delay.

R. Schedule Update - A schedule in which the Contractor will reflect project progress on a monthly basis and update from the prior data date to the current data date.

S. Status - The progress of work which can be applied at any level of work breakdown structure. Information on the progress of work or an action.

T. Time Impact Analysis - A schedule delay analysis procedure to demonstrate a revision or proposed revision to the Substantial Completion date against the current approved Project Schedule.

U. Work(ing) Day - A Work(ing) Day is a calendar day scheduled for active prosecution of the work.

PART 2 SOFTWARE PRODUCT

2.1 The Project Schedule shall be produced using widely used, industry standard, commercially available computer software that is capable of generating and monitoring a CPM schedule. Examples of widely used commercially available software include but not limited to Microsoft Project® and Primavera P6.® The software must be capable of meeting all requirements of this specification such as float calculation, baselining and earned value calculation.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS:

A. The Project Schedule shall provide the proposed sequence to perform the work and dates contemplated for starting and completing all scheduled activities. The Project Schedule is to include all work as identified within the scope of this contract. The Project Schedule should be a forward planning tool as well as a project monitoring tool.

3.2 PAYMENT TO CONTRACTOR:

A. Basis of Payment to Contractor: Requests for payment shall be based upon the current approved Schedule Update. The Contractor's overall progress along with progress for discrete activities will be used to determine the amount to be approved for the monthly payment request.

B. Payment Rejection: The Contractor's failure to meet the requirements of this specification justifies the CO's (i) withholding approval of any Project Schedule and (ii) rejecting, in whole or in part, any payment request.

C. As-Built Schedule: Along with the final request for payment, the Contractor shall submit an As-Built Schedule documenting actual start and actual finish dates for all activities, and logic ties between all activities to show the actual sequence in which the work was performed.

3.3 PROJECT SCHEDULE DETAILED REQUIREMENTS:

A. Level of Detail: The Project Schedule shall satisfy the minimum level of detail described below.

B. Activity Duration: Activity durations shall be in units of whole Working Days and scope of work shall be limited to one trade each. Except for submittal and procurement activities, durations shall not exceed 1 month

C. Activity Cost Loading: With the exception of submittal activities, all activities shall be cost-loaded.

1. The assigned dollar value (cost-loading) shall cumulatively equal the total Contract price.

2. General condition costs shall be shown as an activity with the exception of mobilization, insurance, and bonds costs, which shall be reflected as separate cost-loaded activities.

3. Activity cost loading must be reasonable and avoid any front-end loading.

4. To the extent that the Contractor anticipates requesting payments for stored materials, delivery activities shall be cost-loaded to reflect the cost of materials (excluding labor for installation) and shown separately from the related fabrication activity.

D. Design and Permit Activities: Include design and permit activities with the necessary conferences, follow-up actions, and design review submission dates. The design schedule shall reflect the sequence of events involved in carrying out the design tasks (refer to the DB SOW template and the project's DELIVERABLES MATRIX) within the specified contract period. The schedule shall be provided at a detailed level of scheduling sufficient to identify all major design tasks, including those that control the flow of work. Include review and correction periods associated with each item.

E. Procurement Activities: Include activities associated with critical submittals and their approvals, procurement, fabrication and delivery of long lead materials, equipment, fabricated assemblies and

supplies. Long lead procurement activities are those with an anticipated procurement sequence of over 90 calendar days. Indicate intended submittal dates, and depict the review period as defined in this specification and elsewhere in the Contract Documents.

F. Construction Activities: The Project Schedule shall include all activities associated with construction including but not limited to permits, mobilizations, inspections, tenant move-in periods, close-out, start-up, testing and balancing, commissioning, and turnover.

G. Government Activities: Show government activities that could impact progress, including but not limited to: approvals, acceptances, design reviews, inspections, Government Furnished Equipment (GFE), move coordination, lease expirations and NTP for phasing requirements.

H. Activity Coding: All activities shall, at a minimum, be coded by Area, Responsibility (trade/ subcontractor), Construction Division, and Phase. Additional codes are allowed to identify sufficiently where work will occur. Codes shall be a maximum of six (6) characters and abbreviations shall be fully described in the Project Schedule. The code for Construction Division shall be two digits per CSI Masterformat level 1 and listed in the 'Division' column. Division codes must be assigned at the project level." The work related to each activity shall be limited to one work trade and one area. All activity descriptions shall be unique. Include an activity code field Schedule of Values (SOV) for the coding of each schedule activity; this is for the tabulation and summarization of contractor assigned cost-loaded work activities fused for Progress Payment Request reporting. The Contractor's self-performed work shall be clearly identifiable.

I. Resource Loading: Assign workers per day for all field construction or direct work activities. Workers per day is based on the average number of workers expected each day to perform a task for the duration of that activity.

J. Contract Milestones and Constraints: Include contractual milestone events as defined in the Contract Documents including, but not limited to, phased work, work restrictions/access/shift work, and work being performed by separate contractors.

1. The Contractor is prohibited from assigning milestones that are not consistent with key dates in the Contract Documents. No Float constraint techniques shall be used without specific written approval from the Contracting Officer.

2. The first activity in the project schedule must be a start milestone titled "NTP Issued," which must have a "Start On" constraint date equal to the NTP date.

3. The last activity in the schedule must be a finish milestone titled "End Project". Constrain the Project Schedule to the Contract Completion Date in such a way that if the schedule calculates an early finish, then the Float calculation for the "End Project" milestone reflects positive Float on the longest path. If the schedule calculates a late finish, then the Float calculation for the "End Project" milestone reflects negative Float on the longest path.

K. Calendars: Establish a schedule calendar as it relates to durations for activities. For example calendars should identify the proposed number of working days per week, holidays to be observed, planned number of shifts per day, weather affected activities such as roofing or landscaping that normally cannot occur in the winter/fall months. Incorporate seasonal weather conditions in the project's geographic area into the project planning and include an average number of days lost to weather per month using the NOAA historical data five (5) year averages.

L. Logic: The project schedule shall include interrelationships (logic) and sequencing for all activities.

1. Only two open ended activities are allowed; the first activity "NTP Issued" may have no predecessor logic, and the last activity "End Project" may have no successor logic. For each activity, at least one successor must be a finished relationship (finish to start or finish to finish).

M. Out-of-Sequence Progress: Out-of-sequence activities are those that have progressed before all preceding logic has been satisfied. Address out-of-sequence progress or logic changes in the

Schedule Update and in the periodic schedule update meetings.

N. Added and Deleted Activities: Do not delete activities from the Project Schedule or add new activities without approval from the CO. The Schedule Update shall identify all deleted or added activities.

O. Lags, Leads, and Relationships: The Contractor shall limit the use of Start to Start (SS) and Finish to Finish (FF) relationships to allow Project Schedule detail to be fully developed.

1. Lags must be reasonable, not used in place of realistic durations, and not be in place to artificially absorb Float or to replace proper schedule logic.

2. Leads (negative lags) and Start to Finish (SF) relationships are prohibited.

P. Retained Logic: Schedule calculations must retain the logic between predecessors and successors ("retained logic" mode) even when the successor activity(s) start(s) and the predecessor activity(s) has not finished (out-of-sequence progress). Software features that in effect sever the tie between predecessor and successor activities when the successor has started and the predecessor logic is not satisfied ("progress override") are prohibited.

Q. Percent Complete: Update the percent complete for each activity started, based on the assessment of work in place. Activities which are complete but for remaining minor punch list work and which do not restrain the initiation of successor activities may be declared 100 percent complete to allow for proper schedule management.

R. Remaining Duration: Update the remaining duration for each activity based on the number of estimated Working Days it will take to complete the activity. Remaining duration may not mathematically correlate with percentage found under the paragraph entitled Percent Complete.

S. Ownership of Float: Float available in the schedule may not be considered for the exclusive use of either the GSA or the Contractor.

T. Early Substantial Completion Schedule: The Contractor shall have the right to submit a schedule for approval showing Substantial Completion earlier than the substantial completion date set forth in this Contract. The Government may approve such a schedule if it:

1. Provides a realistic forecast for early completion

2. Otherwise satisfies all of the requirements set forth in the Contract Documents

3. And is at no additional cost to the Government.

4. In the event the Government opts to approve an early Substantial Completion schedule, the CO is entitled, but is not required, to issue a unilateral, no-cost modification to the Contract to adjust the contractual Substantial Completion date.

5. GSA is under no affirmative obligation or duty to aid, assist, or otherwise adjust its performance, including but not limited to accelerating work items, to ensure that the early Substantial Completion date (as adjusted) is met.

6. The Contractor's early Substantial Completion schedule shall include all indirect costs through the Contract Completion date.

7. If the Government approves the early Substantial Completion schedule and a unilateral modification is not issued, the time between the forecast early Substantial Completion date and the date required by this Contract for Substantial Completion will be considered Float (see Section 3.3.S).

3.4 PROJECT SCHEDULE SUBMISSIONS AND REVIEWS

A. GSA's comments, reviews, or acceptance of a Project Schedule do not relieve the Contractor of responsibility for the accuracy or feasibility of the Project Schedule, or for meeting any of the

completion dates set forth therein. In addition, any such comment, review, or acceptance does not create a warranty on the part of the Government, whether expressed or implied, or constitute a Government acknowledgement of or admission of the reasonableness of the activities, logic, durations, manpower, or cost-loading as set forth by the Contractor in the Project Schedule. The Contractor shall meet with GSA within *[_x or ten Working Days___]* after NTP to conduct a joint review of the Project Schedule requirements in this Section. A GSA schedule expert shall participate in the meeting to assist in answering questions on the schedule requirements. GSA PM will coordinate expert participation.

B. Preliminary Schedule Submission and Review:

1. Within thirty (30) Calendar Days after NTP, the Contractor shall submit a preliminary schedule in an electronic format together with a written narrative describing the major design and construction activities. The preliminary schedule may indicate construction activities that are beyond the first 120 days after NTP in summary form prior to completion of final design documents.

2. The Contractor shall meet with GSA to discuss the results of GSA's schedule review. In the event that GSA provides comments or otherwise rejects the Preliminary Schedule, the Contractor shall, within five (5) Working Days of receipt of the comments or rejection, revise the Preliminary Schedule and resubmit the Preliminary Schedule for review and acceptance. When additional resubmittals are required, the same five (5) day revision period shall apply.

B. Baseline Schedule Submission and Review:

1. Upon a time frame determined by the CO, the Contractor shall submit a fully detailed, cost loaded and, if required in this specification, resource loaded schedule as the proposed Baseline Schedule. The proposed Baseline Schedule shall have a data date no later than NTP.

2. The GSA will review the proposed Baseline Schedule and provide comments to the Contractor within 10 Working Days of receipt of submittal and, if needed, will arrange for a Baseline Schedule review meeting with the Contractor for discussion of the schedule. The Baseline Schedule, when accepted, shall become the basis for the next monthly Schedule Update submitted by the Contractor.

3. In the event that GSA provides comments or otherwise rejects the Baseline Schedule, the Contractor shall, within five (5) Working Days of receipt of the comments or rejection, revise the Baseline Schedule and resubmit the Baseline Schedule for review and acceptance. When additional resubmittals are required, the same five (5) day revision period shall apply.

4. Upon acceptance of the Baseline Schedule, the cost-loaded values shown in the Baseline Schedule and progress of activities will be used as a basis for assessing the timeliness of the Contractor's performance, and for determining progress payments. The computer generated cost report will be used by the GSA to verify the payment application submitted by the Contractor.

5. Until the CO accepts the Baseline Schedule, the Contracting Officer may withhold approval of any payments.

C. Schedule Update Submission and Review:

1. Unless a shorter period for updates is specified by the CO, the Contractor shall make at least two (2) separate Project Schedule submittals each month as described below.

a. Schedule Update that indicates only actual start dates, actual finish dates and duration percent complete since approval of the prior schedule. No new actual dates will be allowed prior to the data date of the current approved schedule ; and, if necessary,

b. Schedule Revision incorporating changes (i.e., logic, durations, addition/deletion of

activities, calendar, etc.) made to the schedule other than progress update information. The Schedule Update and Schedule Revisions shall be submitted together.

2. Unless a shorter period for updates is specified by the CO, the Contractor shall attend monthly schedule update meetings with GSA to review the Schedule Update, including any reports or submissions thereto. At a minimum, the Contractor's project manager, project superintendent, and the scheduling representative shall attend.

3.5 Unless a shorter period for updates is specified by the Contracting Officer, the Contractor shall provide monthly Schedule Updates at a date mutually agreed upon between the Contracting Officer and the Contractor until Contract Completion is achievedSUBMISSION REQUIREMENTS

The Baseline Schedule and every Schedule Update shall include:

A. Electronic Version of Project Schedule: The electronic version shall be uploaded into. One (1) electronic version in native format (that is, the format generated from scheduling software). The electronic version shall be in a compressed format.

B. Narrative Report: The Narrative Report shall communicate the thorough analysis of the schedule output and the plans to compensate for any problems, either current or potential, which are revealed through that analysis. The Narrative Report shall include the following:

1. Critical path in the previous schedule at the beginning of the period.

2. Progress achieved on the critical path.

3. Variance between the progress planned on the critical path and the actual progress achieved on the critical path.

4. Near critical paths in the previous schedule at the beginning of the period.

5. Progress achieved on each of the near critical paths.

6. Variance between the progress planned on the near critical paths and the actual progress achieved on each of them. Provide explanations for the variances.

7. General description of the work on the forecasted critical path for the remainder of the project.

8. Work on the critical path planned to be performed during the next reporting period.

9. Work on the near critical paths planned to be performed during the next reporting period.

10. Other Work (as requested by the CO or that the Contractor deems necessary for communication purposes) anticipated to be performed during the next reporting period.

11. Changes to the critical path since the prior month's approved schedule.

12. Problem areas

13. Current and anticipated delays including cause of delay, corrective actions taken, and impact of the delay on other activities, milestones, and completion dates

14. Pending items (change orders, requests for time-extensions, etc.), and status thereof.

15. Identification and explanation of items or information required from the GSA or third parties to avoid schedule impacts.

16. All schedule changes by activity ID and activity name including what was specifically changed and why the change was needed. Include at a minimum new and deleted activities,

logic changes, duration changes, calendar changes, lag changes, resource changes, and actual start and finish date changes.

17. Out-of-sequence work.

C. Schedule Reports

1. In addition to the electronic version and narrative report, the Contractor shall provide *3* hard copies of the reports listed below:

   a. Logic Report

   b. A list of detailed predecessor and successor activities for every activity in ascending order by activity number.

   c. Total Float Report

   d. A list of all incomplete activities sorted in ascending order of Total Float. List activities which have the same amount of Total Float in ascending order of Early Start Dates. Do not show completed activities on this report.

   e. Pay Application Report: The Contractor shall provide an itemized report of all cost loaded items from the Schedule Update. The Contractor shall prepare a detailed pay application report based on the prior month's progress payment request to include the prior month's percent complete, costs incurred during the period, costs incurred to date, and costs anticipated to completion. For each task, the costs shall be linked to and generated from the percent complete.

   f. Earned Value Report: To assist in evaluation of project performance, an earned value report shall include standard schedule categories, as well as categories such as cost performance index, schedule performance index, budget at completion, variance at completion, schedule percent complete, performance percent complete, earned value cost, planned value cost, actual cost, schedule variance, cost variance, estimate to complete and estimated completion cost.

   g. Schedule Calculation Summary Report: Shall include listings of constraints, open-ends, out-of-sequence work, and scheduling statistics. This report is computer-generated when the schedule is calculated.

D. Schedule Charts and Diagrams

1. Provide *3* sets of hard copy charts. The following lists typical charts that will be requested:

2. Gantt Chart

3. A graphical representation of incomplete schedule activities.

4. Network Diagram

5. Two (2) full color time-scaled network prints. Prints shall be *30x42* _____ standard size sheets. The following information shall be shown on the prints: Activity ID, Activity Description, Calendar ID, Original Duration, Remaining Duration, Percent Complete, Area Code, Responsibility Code, Early Start, Early Finish, Total Float, Budgeted Cost, and Budgeted Quantity. The prints shall include legends, dates and titles to sufficiently identify the Project Schedule.

6. Critical Path: Show all activities on the critical path.

7. Cost Loaded Chart: Cost loaded graphic chart (i.e., S-Curve and monthly histogram) generated from the data contained in the Project Schedule. The graphic shall show the actual and forecasted monthly cash flow in a histogram format, and the actual and forecasted cost

over the planned project execution period shown on a cumulative cost curve using actual dates, early dates, and late dates.

8. Manpower Chart The Contractor shall prepare and submit a manpower histogram depicting the monthly (or weekly if requested by the Contracting Officer) actual and forecasted manpower usage (in a histogram format) and the actual and forecasted cumulative manpower for the project execution period. The manpower-loading shall indicate the total number of workers, not total number of crews. The manpower charts shall be computer generated from data contained in the Project Schedule.

9. Schedule Software Settings: The Contractor shall provide (screenshots of) the schedule software settings used under each tab of User Preferences, Admin Preferences, and Schedule Options with the Baseline Schedule and each Schedule Update.

3.6 REQUESTS FOR TIME EXTENSIONS

At no additional cost to the Government, the Contractor shall provide a Time Impact Analysis (TIA) in accordance with this section to justify any request for a time extension to extend the Substantial Completion date. The Government will not consider any requests without a TIA.

A. Written Narrative: Provide a detailed, written narrative that clearly sets forth the cause(s) of the delay and conclusively establishes the Contractor's entitlement to an extension of time. The narrative shall at a minimum: (i) evaluate each impact chronologically; (ii) explain the reason for the schedule revision; (iii) set forth the number of days of delay to Substantial Completion and impact to Contractual Completion; (iv) discuss all impacted schedule activities; (v) assign responsibility for the delay (e.g., government, A/E, utility provider, etc.); (vi) discuss concurrent delay; (vii) describe the change in the affected activities' Total Float value.

B. Fragmentary Network (Fragnet): The TIA shall include the Contractor's proposed schedule revisions illustrating the impact in fragnet form. The contractor shall provide the native file which identifies how the fragnet was incorporated into the schedule. Unless otherwise requested by the CO, the status analysis shall compare the progress of work in the most recently GSA approved project schedule update against the approved Baseline Schedule. Each fragnet shall be accompanied with a spreadsheet depicting the following:

1. Unique Fragnet Number

2. Date of the Fragnet

3. Schedule for the Fragnet to be inserted into

4. Data date of the schedule the fragnet is to be inserted into

5. Predecessor activity ID and activity name the fragnet is proposed to be linked to

6. Successor activity ID and activity name the fragnet is proposed to be linked to

7. Total Float for the path prior to insertion of the fragnet

8. Anticipated Total Float after the fragnet is inserted

9. Anticipated impact to the forecasted substantial completion date.2

C. Submission Timeframe: The Contractor shall not be entitled to an extension of time if the Contractor fails to submit a TIA to the CO within ten (10) Working Days from the time the Contractor knew or should have known of the circumstances, causes, events, or similar actions giving rise to the delay(s).

D. Time Extension: If the CO issues a contract modification extending the Substantial Completion date, the Contractor shall incorporate the extension into the Project Schedule with the next Schedule Update

3.7 FAILURE TO ACHIEVE PROGRESS:

If the Schedule Update shows negative Float due to Contractor performance, the Contractor shall take any and all steps necessary to improve its progress at no additional cost to the Government. The CO may require the Contractor to provide a Recovery Schedule along with a detailed, written plan.

A. Recovery Schedule: If a Recovery Schedule is requested, the Contractor's submission shall be consistent with the reporting requirements as set forth in Section 3.5 Submission Requirements.

3.8 TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER:

A. This provision specifies the procedure for the determination of time extensions for unusually severe weather in accordance with the Contract Clause entitled "Default: (Fixed Price Construction)". For the CO to award a time extension under this clause, the following conditions shall be satisfied:

1. The weather experienced at the project site during the contract period shall be found to be unusually severe, that is, more severe than the adverse weather anticipated for the project location during any given month.

2. The unusually severe weather shall cause a delay to the critical path for the project. The delay shall be beyond the control and without fault or negligence of the Contractor.

3. Records: Upon acknowledgement of the NTP and continuing throughout the contract, the Contractor will record on the daily Construction Quality Control (CQC) report, the occurrence of adverse weather and resultant impact to normally scheduled work. Actual adverse weather delay days shall prevent work on critical activities for 50 percent or more of the Contractor's scheduled workdays.

B. Impacted Days: The number of actual adverse weather days shall include days impacted by actual adverse weather (even if adverse weather occurred in previous month), be calculated chronologically from the first to the last day in each month and be recorded as full days. If the number of actual adverse weather delay days exceeds the number of days anticipated in the schedule of monthly anticipated adverse weather delays, above, the CO will convert any qualifying delays to calendar days, giving full consideration for equivalent fair-weather work days, and issue a modification in accordance with the Contract Clauses.

END OF SECTION 01 31 10

SECTION 013120 - CRITICAL PATH METHOD SCHEDULING

PART 1 - GENERAL

1.01 SUMMARY

A. Develop a detailed Network Plan using electronic scheduling software, demonstrating complete fulfillment of all Work shown in the contract documents. Regularly update the Network Plan in accordance with the requirements of this Section, and use it in planning, coordinating, and performing all the Work under this contract. Schedule activities shall accurately depict the entire scope of work to be performed to complete the project including, but not limited to, all activities of subcontractors, consultants, equipment vendors and suppliers, GSA, and others, as required.

C. The purpose of the Project Schedule shall be to:

1. Plan the project and communicate that plan.
2. Provide the status and forecast the timely completion of the work.
3. Record the actual start dates, actual finish dates and actual sequence of the work.
4. Ensure adequate planning, staffing, scheduling and reporting during execution of the Work by the Contractor.
5. Ensure coordination of the Work among all affected parties.
6. Assist the Contractor and GSA in the preparation and evaluation of the Contractor's monthly progress payments; and
7. Assist the Contractor and GSA in monitoring the progress of the work, and evaluating proposed changes to the Contract and/or requests for additional time to Project Completion.

1.02 RELATED SECTIONS

A. The Government is providing the references included in this sub-section for information purposes only and is not intended to provide a comprehensive, all-inclusive list of any and all potentially relevant portions of the Contract Documents. Drawings and provisions of the Contract including General and Supplementary Conditions apply to this Section as if repeated herein.

1.03 DEFINITIONS

A. Definitions applicable to this Section include the following:

1. Activity - An element of the Work or task performed during the course of the project. Each schedule activity shall be a clearly defined, manageable and monitorable task depicting an estimated duration and an estimated cost. Each activity shall be limited to one trade unless the GSA specifically approves otherwise on an exception basis.
2. Baseline Schedule - The original work plan approved by GSA as the Project Schedule depicting the contractor's plan to prosecute the work.
3. Constraint - A scheduling restriction imposed on the start, finish or float of an activity. No constraints will be allowed. Exception: for projects with limited or no storage areas requiring "just in time" deliveries, a zero free float may be acceptable.
4. Critical Path - The Project critical path is defined as the longest, continuous path of interrelated activities depicting project work from Notice To Proceed (NTP) to project completion. All reports and graphics indicating the Critical Path shall depict the longest path of interrelated activities. Unless otherwise approved by GSA, the Baseline Schedule Critical Path shall use all allotted Contract time. The contractor has the right to develop a schedule that forecasts an early finish. However, all time between the forecasted early finish of substantial completion and the contractual substantial completion date shall be shown as float and shall be available to the Project team.
5. Critical Path Method (CPM) - A scheduling technique using activities, durations, and interrelationships/dependencies (logic), such that all activities are interrelated with logic ties from the beginning of the project to the completion of the project. There shall be no open-ended relationships in the schedule. All activities shall have at least one successor with a finish relationship ("finish to start" or "finish to finish") except the last activity in the network.
6. Data Date - The date to which progress is updated. In most scheduling software, the data date represents the next day of work and all progress is updated through the day prior to the data date.
7. Float – is the difference between the forecasted early dates and the forecasted late dates; the amount of

time an activity can be delayed without delaying the Substantial Completion Date. Float is considered a project commodity jointly shared between GSA and the Contractor and shall be used in the best interest of completing the Project on time. The critical path is not dependent on float. Float is calculated after the critical (longest) path has been determined.

8. Project Schedule - The Project Schedule includes the Preliminary Schedule (submitted at bid or as determined by the CO), the approved Baseline Schedule (developed based on the Preliminary Schedule), and all subsequent Schedule Updates, Schedule Revisions, Recovery Schedules, and As-Built Schedule.
9. Recovery Schedule – A schedule depicting the Contractor's plan for recovery of time lost on the project.
10. Schedule Revision - A schedule in which the plan for the work is revised. A Schedule Revision is required when the current schedule no longer represents the actual or planned prosecution of the Work.
11. Schedule Update - A schedule in which only actual start dates, actual finish dates and duration percent complete is updated from the prior data date to the current data date. No revisions will be permitted in a Schedule Update (i.e. added activities, deleted activities, logical relationships, etc.).
12. Time Impact Analysis - A technique to demonstrate the effect of a schedule revision or proposed revision against the current approved Project Schedule.
13. Total Float - The amount of time an activity (or chain of activities) can be delayed without affecting the Project Substantial Completion Date.
14. Working Day - A Working Day is a calendar day scheduled for active prosecution of the work.

1.04 CRITICAL PATH METHOD SCHEDULE

A. Provide a detailed, time-scaled computer-generated Project Schedule with activities representing each portion of the Work for the entire Contract Performance Period. The Project Schedule shall use the Critical Path Method (CPM) for the planning, scheduling and reporting of the work to be performed under the contract.

B. No unspecified constraints, float suppression techniques, or use of activity durations, logic ties and/or sequences deemed unreasonable by GSA shall be used in the Project Schedule.

C. As defined by the Contract, the entire project performance period shall establish the Project Substantial Completion Date which shall be used in the planning and presentation of the Contractor’s Project Schedule. GSA reserves the right not to approve any schedule deemed to have an unrealistic forecasted Substantial Completion Date. Government approval of an early completion Project Schedule shall not modify the Contractual Substantial Completion Date or Project Completion Date. The time difference between the Contractor’s planned Substantial Completion Date and the Contract directed Substantial Completion Date shall be considered Project Float, jointly owned and for the mutual use of both the Contractor and GSA.

1.05 SUBMITTALS and MEETINGS

A. Project Schedule Requirements Meeting:

1. The Contractor shall meet with GSA after Notice to Proceed to conduct a joint review of the Project Schedule requirements in this Section.

B. Preliminary Schedule:

- Within 14 calendar days of Notice to Proceed, Contractor shall submit a Preliminary Schedule detailing the complete scope of work and proposed logical relationships. All owner furnished equipment and materials shall be identified with dates needed to be received by the contractor.

1. Within 7 calendar days of receipt by the GSA of the Preliminary Schedule, the Contractor and GSA shall meet to discuss the results of GSA's schedule review. To the extent that revisions are required, the Contractor shall resubmit the Preliminary Schedule to the GSA for approval within [seven (7) calendar] days of receipt of the GSA's comments.

a. Activities, durations shall not exceed one reporting period unless approved by the GSA. Durations for Government submittal reviews shall meet the requirements set forth in the Contract Documents. Activity durations shall not be overly short. One day durations shall not be assigned unless specifically requested by the contractor and specifically accepted by the GSA. Activity durations are

expected to be between one week and one month, however shorter or longer durations can be assigned as needed to properly plan and coordinate the work.

b. Contractual milestone events as defined in the Contract Documents including, but not limited to, phased work, work restrictions/access/shift work, and work being performed by separate contractors shall be included in the schedule. The substantial completion and project completion tasks shall be assigned to a seven (7) day work week calendar.

c. ALL activities shall at a minimum be coded by Area, Responsibility (trade/ subcontractor), and Phase. Additional codes are allowed to sufficiently identify where work will occur. Codes shall be a maximum of six (6) characters and abbreviations shall be fully described in the Project Schedule narrative. The Contractor's self-performed work shall be clearly identifiable.

a. Date. Such acceptance does not create a warranty, expressed or implied, or acknowledge or admit the reasonableness of the activities, logic, durations, manpower, cost or equipment loading of the Contractor's Project Schedule.

b. If the Contractor fails to timely submit the Baseline Schedule, the GSA may withhold approval of progress payments until the Contractor submits the required Project Schedule.

1. The Baseline Schedule submission shall be comprised of the following, unless otherwise requested by the GSA:

C. Schedule Updates

1. The Contractor shall submit a monthly Schedule Update that indicates the progress achieved since approval of the prior monthly Project Schedule update.

2. The Project Schedule shall be updated on a monthly basis throughout the entire Project performance period until Project completion is achieved.

3. The Contractor shall meet with GSA each month at a Schedule Update Meeting to review the Contractor's requested percent complete for actual progress achieved over the past period, including actual start dates, actual finish dates, and duration percent complete for activities that were started and/or completed during the reporting period.

1.06 RESPONSIBILITY FOR COMPLETION

A. If, in the opinion of the GSA, the Contractor falls behind the planned progress as noted by negative float shown on the current monthly Schedule Update, the Contractor shall take any and all steps necessary to improve its progress at no additional cost to the Government. This shall not be construed as prohibiting the Contractor from increasing the number of working hours, shifts per day, working days per week, or the amount of construction equipment, or any combination of the foregoing, to eliminate the delay in the scheduled progress.

B. Failure of the Contractor to comply with the requirements of the GSA under Paragraph 1.06.A shall be grounds for determination by the GSA that the Contractor is not prosecuting the work with such diligence as will ensure completion within the contract time. Upon such determination, the GSA may terminate the Contractor's right to proceed with the work, or any separable part thereof, in accordance with the applicable provisions of the contract.

1.07 PAYMENTS TO CONTRACTOR

A. The GSA shall review the Contractor's monthly request for payment upon receipt and shall process the request for payment based upon the current approved Schedule Update. The GSA will consider the Contractor's overall progress toward Project Completion along with the progress for discrete activities to determine the amount to be approved for the monthly payment request.

END OF SECTION

SECTION 013233 - PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for the following:
   1. Preconstruction photographs.

B. Related Requirements:
   1. Section 024119 "Selective Demolition" for photographic documentation before selective demolition operations commence.

1.3 INFORMATIONAL SUBMITTALS

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

B. Digital Photographs: Submit image files within three days of taking photographs.
   1. Submit photos thumb-drive. Include copy of key plan indicating each photograph's location and direction.
   2. Identification: Provide the following information with each image description in file metadata tag:
      a. Name of Project.
      b. Name and contact information for photographer.
      c. Name of Architect and Construction Manager.
      d. Name of Contractor.
      e. Date photograph was taken.
      f. Description of location, vantage point, and direction.
      g. Unique sequential identifier keyed to accompanying key plan.

1.4 QUALITY ASSURANCE

A. Photographer Qualifications: An individual who has been regularly engaged as a professional photographer of construction projects for not less than three years.

1.5 FORMATS AND MEDIA

A. Digital Photographs: Provide color images in JPG format, produced by a digital camera with minimum sensor size of 12 megapixels, and at an image resolution of not less than 3200 by 2400 pixels, and with vibration-reduction technology. Use flash in low light levels or backlit conditions.

B. Digital Images: Submit digital media as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
   1. Images are to clearly establish the existing pre-construction condition and will be used to resolve questions regarding damage during construction. If there is no image available to compare, it will be determined that the damage occured during construction.

C. Metadata: Record accurate date and time [and GPS location data]from camera.

D. File Names: Name media files with Project area and sequential numbering suffix.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes certain administrative and procedural requirements for shop drawings, coordination drawings, schedules, samples and certain other quality assurance submittals.

B. This section does not include requirements for the following submittals that are included in their specific sections:

1. Warranties specified in Division 1 Section "Product Requirements."
2. Closeout submittals specified in Division 1 Section "Closeout Procedures."

C. Shop drawings, coordination drawings and schedules are further categorized and defined as follows:

1. Shop drawings include drawings and schedules prepared for specific parts of the project, except for coordination drawings.
2. Coordination drawings are specified in Division 1 Section "Project Management and Coordination."
3. Product data includes manufacturer's standard catalogs, pamphlets and other printed materials that show and describe materials and items, and includes but is not limited to the following:

a. Product specifications.
b. Installation instructions.
c. Color charts.
d. Catalog cuts.
e. Rough-in diagrams and templates.
f. Wiring diagrams.
g. Performance curves.
h. Operational range diagrams.
i. Mill reports.

D. Samples of actual materials and items shall be provided at such scale to allow delivery for review, as well as for field samples or mock-ups of full-size physical examples erected on-site or elsewhere, to establish a true-scale standard by which the corresponding work will be judged or a standard for compliance testing.

E. Other quality assurance submittals include materials specifically prepared for the project, except drawings and schedules, and include but are not limited to the following:

1. Design data and calculations.
2. Certifications of compliance or conformance.
3. Manufacturer's instructions and field reports.

F. Approvals do not supersede requirements of the contract documents.

1.2 GENERAL SUBMITTAL REQUIREMENTS

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities and with the Submittal Schedule specified in Division 1 Section "Construction Progress Documentation". Unless otherwise specified, submittals shall be transmitted via GSA Project Management System as PDF electronic files to GSA according to the contractor’s approved construction schedule and submittal schedule. . Transmit each submittal sufficiently in advance of the scheduled performance of related construction activities to avoid delaying the Work, allowing for the review times specified for submittals.

1. Coordinate each submittal with other submittals and related activities that require sequential scheduling, to allow for testing, purchase, fabrication and product delivery in a timely manner.
2. Schedule transmittal of different categories of submittals for the same element of Work and for different elements of related parts of the Work at the same time. Notwithstanding the foregoing sentence, the Contractor shall provide a complete submittal package for each Division of the specification so as to enable the Government to review the related sections together. Coordinate submittals to enable approvals and acceptances so as not to inhibit orderly progress of the Work.
3. Post electronic submittals as PDF electronic files directly to the GSA Project Management Information System (PMIS) specifically established for the Project. GSA will return annotated file. Annotate and retain one copy of file as an electronic project record document file.
4. Allow sufficient time for submittal review, corrections following the initial review, and re-submittal review before activities scheduled after the submittal approval.
5. Failure on the part of the Contractor to indicate approval or acceptance on submittals prior to submission to Contracting Officer will result in their being returned to the Contractor without being acted upon.
6. Any resubmission required after Government review shall be made within 10 calendar days after return of the submittal, unless specifically authorized otherwise by GSA.
7. Submittals which are determined to be incomplete or otherwise substandard will be returned to the Contractor with no further review. Delays due to incomplete or rejected submittals will not be excused.
8. Construction will not be allowed to proceed if submittals are not received in a timely manner, and will not result in an extension to the Contractor's Construction Schedule.
9. Failure by the Contractor to provide the required submittals in a timely manner may result in withheld payments until submittals are up-to-date.
10. Maintain one complete set of submittals at project site.
11. Maintain an organized submittal register at project site. This will be an agenda item for progress meetings.
12. The contractor to schedule and allow a minimum of ten working days for the Architect/Engineer submittal review. The comment period initiates upon the receipt of the submittal by the office performing the primary review. The period commences upon issue of the submittal by the office performing the primary review. In the event the architect/engineer receives an extraordinary lengthy or complex submittal whose review may not be able to be accomplished within the stipulated submittal review period, architect/engineer to notify the Construction Manager Agency (CMa) in writing with a request for extended review period within 3 working days of receipt of the submittal. Such submittals may include structural steel, curtain wall, or complex systems requiring coordination with other systems.

B. Submittal Identification and Information: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble each submittal item into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each submittal item.
2. Name file with submittal number or other unique identifier, including revision identifier.

    a. File name shall use Contract number and Specification Section number followed by a decimal point and then a sequential number (e.g., LNHS-061000.01). Re-submittals shall include an alphabetic suffix after another decimal point (e.g., LNHS-061000.01.A).

3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by GSA.
4. Transmittal Form for Electronic Submittals:

    a. Project name.
    b. GSA project number.
    c. Date.
    d. Name and address of Architect.
    e. Name of Contractor.
    f. GSA contract number.
    g. Name of firm or entity that prepared submittal.
    h. Names of subcontractor, manufacturer, and supplier.
    i. Category and type of submittal.
    j. Submittal purpose and description.
    k. Specification Section number and title.

l. Specification paragraph number or drawing designation and generic name for each of multiple items.
m. Drawing number and detail references, as appropriate.
n. Location(s) where product is to be installed, as appropriate.
o. Related physical samples submitted directly.
p. Indication of full or partial submittal.
q. Transmittal number, numbered consecutively.
r. Submittal and transmittal distribution record.
s. Other necessary identification.

5. Include the following information as keywords in the electronic file metadata:

a. Project name.
b. GSA project number.
c. Contract number.
d. Number and title of appropriate Specification Section.
e. Specification paragraph number and generic name of each item.
f. Manufacturer name.
g. Product name and model number.

C. Low Embodied Carbon (LEC) Requirements: Provide updated data called for by IRA Project Submittal Form (Construction Team section). For each IRA Eligible Material furnished under the contract, report:
1. Environmental Product Declaration (EPD) compliant with the Compliance Documentation criteria listed for each IRA-Eligible Material in GSA's asphalt, concrete (and cement), glass and steel requirements.
2. EPD-reported GWP, in kilograms of carbon dioxide equivalent [$kgCO_2e$] per unit of material.
3. Product Category Rule (PCR) identified on the EPD.
4. IRA Limit Commitment specified in the Contract:
5. Total quantity being installed (e.g., from bill of materials)
a. For concrete, cement, steel, and glass: (i) the ENERGY STAR Energy Performance Score(s) for plants producing supply chain materials: cement, steel from integrated steel mills, or flat glass
b. The manufacturing plant name(s) and location(s);
c. the data period of the Energy Performance Score(s) at the time of purchase. Please see "How to Request an ENERGY STAR Energy Performance Score" for more information

1.3 SHOP DRAWINGS AND COORDINATION DRAWINGS

A. Submit originally prepared information, drawn accurately to scale. Do not reproduce Contract Documents or copy standard printed materials as the basis for Shop Drawings and Coordination Drawings.

B. Include at minimum the following information on Shop Drawings and Coordination Drawings:

1. Dimensions.
2. Identification of products and materials.
3. Compliance with specified standards.
4. Notation of coordination requirements.
5. Notation of dimensions established by field measurements.
6. Highlighted or encircled deviations from the Contract Documents.

C. Sheet size: Except for templates, patterns and similar full-size drawings, submit Shop Drawings and Coordination Drawings on sheets of at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 30 by 40 inches (750 by 1000 mm).

D. Submittals: Unless otherwise indicated, submit one electronic file (.pdf) of each drawing submittal through GSA PMIS. The file will be marked with action taken and returned.

E. Distribution: When submittal is approved or accepted, Contractor shall prepare final electronic files, for the following purposes.

1. One file shall be marked and retained as a "Record Document."

2. Unless otherwise requested, one file shall be provided to the Contracting Officer.
3. Additional prints shall be provided to the entities involved in the construction.
4. Prints will be included in the Operation and Maintenance manuals.

1.4 PRODUCT DATA

A. Collect Product Data into a single submittal for each system or element of construction. Mark each copy to show specific product choices and options applicable to the project. Product Data shall include the following information, where applicable:

1. Manufacturer's printed recommendations.
2. Compliance with recognized trade association standards.
3. Compliance with recognized testing standards.
4. Applicability of testing agency labels and seals.
5. Notation of dimensions verified for fit by field measurements.
6. Notation of coordination requirements.

B. Preliminary Submittal: Prior to submittal of complete Product Data, submit a preliminary single copy of that part of Product Data when selection of options is required, such as for color charts. Preliminary submittal will be returned, with selection noted, for the Contractor's use in subsequent submittals.

C. Submittals: Unless otherwise indicated, submit one electronic copy of each Product Data submittal. One original copy will be retained and a copy will be marked with action taken and returned to the contractor.

D. Distribution: When submittal is approved or accepted, Contractor shall distribute copies for the following purposes:

1. One copy shall be marked and retained as a "Record Document."
2. Additional copies shall be provided to the manufacturers, subcontractors, suppliers, installers, governing authorities and others as required for performance of the applicable construction activities.
3. Copies required for operation and maintenance manuals

1.5 SAMPLES

A. Submit full-size, fully fabricated samples, cured and finished in the manner specified. Samples shall be physically identical to the material or product proposed for use.

B. Mount, display, or package samples to facilitate review of kind, color, pattern, texture and other qualities indicated, as a final check of these characteristics with other elements and for comparison of these characteristics with those of the actual component delivered and installed.

C. Where variation in color, pattern, texture or other characteristic is inherent in the material or product, submit at least 3 multiple units that show approximate limits of the variations.

D. Refer to other specification sections for requirements for samples that illustrate workmanship, fabrication techniques, and details of assembly, connections, operations and similar construction characteristics.

E. Refer to other specification sections for samples to be returned to the Contractor for incorporation in the Work. Such samples must be in undamaged condition at time of use.

F. Preliminary Submittal: Where color, pattern, texture or similar characteristics are specified to be selected from a manufacturer's range of standard choices, submit a preliminary single set sample of available choices prior to submittal of the complete sample. Preliminary submittal will be returned, with selection noted, for the Contractor's use in subsequent submittals.

G. Submittals: Unless otherwise indicated and except for field samples or mock-ups of full-size physical examples erected on-site or elsewhere, submit not less than three (3) sets of each sample submittal. One copy will be

marked with action taken and returned. Comply with requirements in the individual specification section for field samples and mockups.

H. Distribution: Except for field samples or mockups, when submittal is approved, Contractor shall distribute approved copies for the following purposes:

1. One copy shall be marked and retained as a "Record Document" at the Project Site and shall be available for comparison throughout the course of construction activity.
2. Additional copies shall be provided to manufacturers, subcontractors, suppliers, installers, governing authorities and others as required for performance of the applicable construction activities.

I. Mock-Ups: Construct mock-ups as required by Drawings and/or Specifications.

1.6 OTHER QUALITY CONTROL SUBMITTALS

A. Submit other quality control submittals in compliance with requirements in the individual specification sections, including Division 1.

B. Certifications: Submit notarized certifications indicating compliance with specified requirements. Certifications shall be signed by an individual authorized to sign on behalf of the Contractor.

1.7 REVIEW ACTION ON SUBMITTALS

A. For electronic submittals,

1. Submit electronic submittals via GSA PMIS as PDF electronic files.

a. GSA will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.

B. Compliance with specified characteristics is the Contractor's responsibility and is not part of the Contracting Officer's review and indication of action taken.
The contract documents shall prevail in case of review action conflict.

C. Submittals without approval or acceptance shall not be used.

D. Action Stamp:
1. For paper or non-electronic submittal: Each submittal will be stamped with a uniform action stamp. The stamp shall be marked to indicate one of the following actions taken:

For electronic submittal: Provide a digital signature with digital certificate on electronically submitted certificates and certifications where indicated. For notarized signature if required, provide paper copies for signature.

a. Final Unrestricted Release: Where marked "Approved" or "Accepted", the work covered by the submittal may proceed, provided it complies with the requirements of the Contract Documents.
b. Final But Restricted Release: Where marked "Approved " or "Accepted" "As Noted", the work covered by the submittal may proceed, provided it complies with the notations or corrections on the submittal and with the requirements of the Contract Documents.
c. Return for Re-submittal: Where marked "Not Approved" or "Not Accepted", Revise and Resubmit", do not proceed with the work covered by the submittal, including purchasing, fabrication, delivery or any other activity. Revise or prepare a new submittal according to the notations on the submittal or on the return transmittal. Resubmit without delay, repeating as necessary to obtain a final release action mark.
d. No Action: Where a submittal is for the record or for information or for another purpose not requiring review action, the submittal may not be returned or may be returned and marked "Action Not Required."

E. 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 published data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information as applicable:

    a. Manufacturer's catalog cuts.
    b. Manufacturer's product specifications.
    c. Standard color charts.
    d. Statement of compliance with specified referenced standards.
    e. Testing by recognized testing agency.
    f. Application of testing agency labels and seals.
    g. Notation of coordination requirements.
    h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:

    a. Wiring diagrams showing factory-installed wiring.
    b. Printed performance curves.
    c. Operational range diagrams.
    d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before or concurrent with Samples.
6. Submit Product Data in the following format:

    a. PDF electronic file.

1.8 SUBSTITUTION REQUEST PROCEDURES

A. Substitution Requests: See section 012500 Substitution Procedures

PART 2 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 014000 - QUALITY ASSURANCE & CONTROL REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

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

1. See section 014050 SYSTEM QUALITY CONTROL for additional requirements.

2. See section 014100 STRUCTURAL TESTING LABORATORY SERVICES for additional Structural requirements

3. See section 017310 CUTTING & PATCHING for repair of work in place.

B. Quality Assurance & Control: The Contractor is solely responsible for developing, implementing, and providing for all quality control and related processes in the Contractor's Quality Control Plan to ensure that all parts of the project meet or exceed all of the requirements as set forth in the Contract Documents.

1. The testing and inspections indicated in the Specifications (Testing) is a spot checking program identified by the A/E per the design or building code requirements, performed by an Independent Testing Agency (Agency), and is not intended as a portion of the Contractor's Quality Control Plan.

2. The presence of the GSA and/or representative shall in no way relieve the Contractor of his obligation to perform the work in accordance with the Contract Documents.

3. The Testing indicated in the Specifications cannot be used to refute conditions of suspected poor quality observed in the field.

4. In order to provide for a measure of the Contractor's quality control, the Government, either with its own employees or contractors, may *continuously* monitor the Contractor's quality control and related processes. This monitoring is not a part of the Contractor's Quality Control Plan.

5. To the extent that the Contractor fails or otherwise refuses or neglects to develop, implement, or provide for all quality control and related processes, GSA may, in addition to any other available remedies under the Contract, elect to perform quality assurance beyond that indicated in the Specifications and charge the Contractor for any and all costs related thereto.

C. Quality assurance and quality control include tests, inspections and related actions, including reports, performed by the Contractor, manufacturers, independent agencies or governing authorities.

1. These testing and inspection services are required for products, customized fabrication and installation procedures as well as for items to be professionally designed by the Contractor (delegated design).

2. Product testing shall be done by a Nationally Recognized Testing Laboratory (NRTL) and National Voluntary Laboratory Accreditation Program (NVLAP), or other GSA approved testing facility.

D. The independent quality assurance testing and inspection (Testing) requirements for individual construction materials and activities are included in the Specification sections that specify those construction materials and activities.

E. Mock-ups: Full-size physical assemblies that are constructed on-site unless otherwise directed by GSA.

Mock-ups are constructed to verify selections made under Sample submittals; to demonstrate visual effects as well as qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mock-ups may be done on the interior or exterior. Mock-ups are not Samples. Approved mock-ups establish the standard by which the Work will be judged.

F. Definitions

1. Source Quality Control Testing is done at the product source.

2. Field Quality Control Testing is done on site.

1.2 TESTING AND INSPECTION REPORTS

A. The Contractor's testing agencies and the Agency, where they perform the services, shall submit a certified written report in PMIS of each test, inspection or other quality control service using the workflow process of the PMIS. Maintain a log both of accepted and rejected reports including corrective actions taken and date of retesting and compliance.

1. Paper Copies: In addition to uploading report copies to PMIS the "Agency" shall also send certified copies of test and inspection reports as specified to the following parties:

a. 2 copies to the Government.

b. 2 copies to the [CMA or Contractor]

c. 2 copies to the A/E

2. Testing and inspection reports shall include but not be limited to the following:

a. Date of issue.

b. Project title and number.

c. Name, address, and telephone number of testing agency.

d. Dates and locations of samples and tests or inspections.

e. Names of individuals making the test or inspection.

f. Designation of the work and test method.

g. Identifications of product and specification section.

h. Complete test or inspection data.

i. Test results and an interpretation of test results.

j. Ambient conditions at the time of sample taking and testing.

k. Certify whether tested or inspected Work complies with Contract Document requirements.

l. Name and signature of laboratory inspector.

m. Recommendations on retesting.

3. All quality operations shall within 24 hours notify, by personal contact and written notice, GSA's representative and the Contractor of irregularities or deficiencies observed in the Work

during performance of their services.

4. All quality operations shall maintain a log of all their tests and inspections and a separate log of those that do not conform to the requirements of the Contract Documents. Both logs shall be published and reviewed weekly with the Contractor and the Government and/or at the weekly meeting.

1.3 RESPONSIBILITIES

A. Contractor Responsibilities: Unless specifically indicated otherwise, the Contractor shall provide the quality control services including those required by local jurisdictions.

1. Obtain copies of applicable codes, standards, procedures, regulations, etc. relative to materials, procedures, testing and inspection on the Project and make those available at the Project site for reference.

B. Contractor shall submit each testing agency's firm name, and credentials to perform the specified services, to the Government for GSA's approval at least 15 calendar days before scheduled inspections or tests.

C. Retesting: The Contractor is responsible for retesting, including repeated inspections and other services, where results of the initial quality control services indicate noncompliance. The Contractor shall be responsible for the Agency or an equally qualified agency for these services. If the Agency does not provide the retesting or inspection, the Contractor shall be responsible for having the Agency observe the testing and inspection work.

1. Tests for Suspected Deficient Work: If in the opinion of the Government, any of the work of the Contractor that does not appear to conform to requirements, the Contractor shall make the tests that the Government deems advisable to determine its conformance to the Contract Documents.

2. The government shall pay the costs if the tests prove the **suspected work** to be satisfactory.

D. Associated Services: The Contractor shall cooperate with others, including the Agency, performing tests, inspections and other quality services, and shall provide reasonable auxiliary services as requested. Contractor shall notify the testing and inspection entities sufficiently in advance of operations to permit their timely assignment of personnel. Auxiliary services include but are not limited to the following:

1. Provide access to the work and all documents (Contract documents, shop drawings, product data, Contractor and Sub-Contractor testing and inspections, etc.).

2. Furnish incidental labor and facilities necessary to facilitate inspections and tests.

3. Provide adequate quantities of representative samples of materials that require testing or assist the agency in taking samples.

4. Provide facilities for storage and curing of test samples and equipment.

5. Deliver samples to testing laboratories.

6. Provide security and protection of samples and test equipment at the Project site.

E. Duties of the Independent Testing Agency (Agency): The Agency engaged to perform tests, inspections and other quality services shall cooperate with GSA's representative and the Contractor in performance of the Agency's duties.

1. The Agency shall provide qualified personnel to perform required inspections and tests.

2. The Agency shall provide certifications and a list of personnel assigned to each portion of the work.

3. The Agency is not authorized to release, revoke, alter or enlarge requirements of the Contract Documents or approve or accept any portion of the Work.

4. The agency shall not perform any duties of the Contractor.

5. The Testing Agency's proposal shall contain the outlined Testing based on a unit price basis for tests and inspections and on an hourly basis for personnel.

6. The Agency shall certify the test results and observations.

7. The Agency shall interpret whether or not their results and observations meet specified Project requirements.

8. The Agency shall submit reports per Section: Testing and Inspection Reports, above.

9. The Agency shall maintain logs per Section: Testing and Inspection Reports, above.

10. The Agency shall review the applicable certificates of the Contractor's personnel to verify the validity and current status of the certificate.

11. For construction personnel without necessary certificates, the Agency shall oversee the certification process of construction personnel to ensure their qualifications to perform the specified duties. The Contractor shall be responsible to the Agency for these services.

12. The Agency shall obtain and review the project plans and specifications with the Government as soon as possible prior to the start of construction.

13. The Agency shall attend pre construction conferences to coordinate materials inspection and testing requirements with the planned construction schedule. The Agency shall participate in such conferences where the Testing is indicated throughout the course of the project.

F. Independent Testing Agency Payment: The Contractor shall obtain and include the Agency's cost in the Contract Sum.

1. The Contractor shall submit payments for the Agency, track the Agency's budget and keep GSA informed on projected Agency costs and remaining budget.

2. Only GSA can modify the Agency's scope.

G. Coordination: The Contractor shall coordinate the sequence of activities to accommodate required services with a minimum of delay.

1. Activities shall be coordinated to avoid the necessity of removing and replacing construction to accommodate inspections and tests.

2. The Contractor shall be responsible for scheduling times for inspections, tests, taking samples and similar activities.

1.4 QUALIFICATIONS OF THE INDEPENDENT TESTING AGENCY (AGENCY) AND CONTRACTOR TESTING AGENCIES

A. A qualified independent testing agency shall be an accredited entity engaged to perform tests and inspections, both at the Project site or elsewhere and to report on and to interpret results of those tests or inspections. Testing agencies shall be acceptable to GSA and the Agency shall be authorized by authorities having jurisdiction to operate in the jurisdiction where the project is located.

B. Unless other accreditation is specifically specified in the applicable individual section, each testing agency

shall be prequalified as complying with the American Council of Independent Laboratories "Recommended Requirements for Independent Laboratory Qualifications", or shall be recognized by the Occupational Safety and Health Administration (OSHA) in accordance with 29 CFR Part 1910.7 to test and approve equipment or materials for their safe intended use. Each testing agency shall specialize in the types of tests and inspections to be performed.

C. Testing agencies shall be authorized by authorities having jurisdiction to operate in the jurisdiction where the project is located. Testing agency qualifications: NRTL (Nationally Recognized Testing Laboratory) per 29 CFR 1910.7, and NVLAP (National Voluntary Laboratory Accreditation Program) per NIST., and documented per ASTM 329 and is acceptable to GSA.

1.5 CONTRACTOR QUALITY CONTROL PLAN

A. Contractor's Quality-Control Plan: Submit within 5 days from NTP for quality-control activities and responsibilities. Submit in electronic format and upload to PMIS. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-control responsibilities. Coordinate with the construction schedule. The procedures, controls, inspections, and tests shall be indicated by specification section and shall include the specific actions that the Contractor's QC team will take to verify compliance of the work with the specifications and drawings.

B. Quality-Control Personnel Qualifications: Engage qualified full-time personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those indicated in the Specifications.

1. Provide a project quality-control manager, who may also serve as Project Superintendent.

2. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of the submittal process. Indicate qualifications of personnel responsible for submittal review.

3. Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship. Indicate types of corrective actions to be required to bring work into compliance with standards established by the Contract requirements and approved mock-ups.

C. Provide reports per Section 1.2 Testing and Inspection Reports, above.

D. Other Reports

1. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:

a. Name, address, and telephone number of the technical representative making the report.

b. Statement on condition of substrates and their acceptability for installation of product.

c. Statement that products at Project site comply with requirements.

d. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.

e. Results of operational and other tests and a statement of whether observed performance complies with requirements.

f. Statement if conditions, products, and installation will affect warranty.

g. Other required items indicated in individual Specification Sections.

2. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:

   a. Name, address, and telephone number of factory-authorized service representative making report.

   b. Statement that equipment complies with requirements.

   c. Results of operational and other tests and a statement of whether observed performance complies with requirements.

   d. Statement if conditions, products, and installation will affect warranty.

   e. Other required items indicated in individual Specification Sections.

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

PART 2 PRODUCTS (Not applicable)

PART 3 EXECUTION

3.1 REPAIR AND PROTECTION

A. Upon completion of testing, inspection, sample taking and other quality control services, repair damaged construction and restore substrates and finishes to like new conditions. Comply with the requirements of the Contract Document, including Division 1 Section "Cutting and Patching."

B. Protect construction exposed by or for quality control service activities, and protect repaired construction. Cleaning, repair and protection of testing areas is the Contractor's responsibility, regardless of the assignment of responsibility for testing, inspection or other quality control or assurance services.

END OF SECTION 01 40 00

SECTION 014025 – QUALITY CONTROL TESTING FOR AIR BARRIER SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

A. This section includes administrative and procedural requirements for accomplishing an airtight building enclosure that controls infiltration and exfiltration of air.

1. The airtight components of the building enclosure and the joints, junctures and transitions between materials, products, and assemblies forming the air-tightness of the building enclosure above and below grade are called “the air barrier system”. Services include coordination between the trades, the proper scheduling and sequencing of the work, preconstruction meetings, inspections, tests, and related actions, including reports performed by Contractor, by independent agencies, and by governing authorities.

2. The Contractor shall ensure that the building enclosure is constructed with a continuous air barrier system to control air leakage into, or out of, conditioned space. The air barrier system shall have the following characteristics:

a. be continuous, with all joints sealed.

b. be structurally supported to withstand expected peak positive and negative air pressures acting on it.

c. have airtight, sufficiently flexible and strong connections between the air barrier system in each assembly and penetrations, joints, and transitions, including but not limited to :

1) Foundations to walls.

2) Walls to windows and doors.

3) Different wall systems.

4) Walls to roofs, especially at parapets.

5) Walls to floors over unconditioned and polluted spaces.

6) Construction, control and expansion joints.

7) Building assemblies to utility, pipe, airtight damper, and duct penetrations.

B. An independent Testing Agency will verify whether the Contractor met the requirements of this section. The service provided by the Testing Agency shall not relieve Contractor of the Contractor’s responsibility for complying with the Contract Documents.

C. Requirements of this section relate to the coordination between subcontractors required to provide an airtight building enclosure, customized fabrication and installation procedures, not to the production of prefabricated assemblies or components. The Contractor shall ensure that each subcontractor is adequately and satisfactorily

performing quality control and the testing and procedures required by each section including:

1. Continuity of the air barrier materials, products, and interface of all parts to provide enclosure assemblies.

2. Continuity of all the enclosure assemblies with joints and transition materials to provide a whole building air barrier system.

3. Specific quality-control requirements for individual construction activities are specified in the sections of the specifications. Requirements in those sections may also cover production of standard products.

4. The Contractor's responsibility to provide an airtight building enclosure is not limited by quality-control services provided or required by the Government, its Architect or Engineer or authorities having jurisdiction and is further not limited by provisions of this section or other building envelope details in the contract drawings and other technical specifications herein.

1.2 RELATED SECTIONS

The Government is providing the references included in this sub-section for information purposes only and is not intended to provide a comprehensive, all-inclusive list of any and all potentially relevant portions of the Contract Documents.

A. Division 1 Section Quality Control

B. Division 1 Section Schedule

C. Division 1 Section Meetings

D. Division 3 Section Concrete

E. Division 3 Section Precast Concrete

F. Division 5 Section Light Gauge Metal Framing

G. Division 6 Section Wood Sheathing

H. Division 7 Section Roofing

I. Division 7 Section Air Barrier

J. Division 7 Section Sealants

K. Division 8 Section Windows

L. Division 8 Section Exterior Doors

M. Division 8 Section Curtain Walls

N. Division 8 Section Revolving Doors

O. Division 8 Section Skylights

P. Division 8 Section Storefronts and Entrances.

Q. Division 8 Section Loading Dock Roll-up Doors

1.3 RESPONSIBILITIES

A. Contractor Responsibilities: Unless otherwise indicated as the responsibility of another identified entity, Contractor shall provide coordination of the trades, and the sequence of construction to ensure continuity of the air barrier system joints, junctures and transitions between materials and assemblies of materials and products, from substructure to walls to roof. The Contractor shall provide quality control procedures, testing and verification as specified herein.

1. Organize pre construction meetings between the trades involved in the whole building's air barrier system to discuss where each trade begins and ends and the responsibility and sequence of installation of all the air-tight joints, junctures, and transitions between materials, products and assemblies of products specified in the different sections, to be installed by the different trades.

2. Build a mock-up before proceeding with the work, satisfactory to the Government and its Architect, of each air-tight joint type, juncture, penetration and transition between products, materials and assemblies.

3. Facilitate inspections, tests, and other quality-control services specified elsewhere in the Contract Documents and required by authorities having jurisdiction and the Government.

4. Install, as specified by the Testing Agency, indoor-to-outdoor pressure taps at various locations across the air barrier and tight-sealing dampers on all ducts carrying air across the air barrier. Unless otherwise specified, the Testing Agency will be provided by the Government.

B. Associated Services: The Contractor shall cooperate with the Testing Agency in the Testing Agency's performance of inspections, tests, and similar services, and provide reasonable auxiliary services. The Contractor shall notify the Testing Agency sufficiently in advance of operations to permit assignment of testing personnel. Auxiliary services to be provided by the Contractor required include, but are not limited to:

1. Providing access to the Work, including scaffolding or swing staging systems.

2. Furnishing incidental labor and facilities necessary to facilitate inspections and tests.

3. Taking adequate quantities of representative samples of materials that require testing or assist the agency in taking samples.

4. Delivering samples to testing laboratories as selected by Testing Agency.

5. Providing security and protection of samples and test equipment at the Project Site.

C. Coordination: The Contractor shall coordinate the sequence of activities to accommodate required services with a minimum of delay. Coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.

1. The Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities.

1.4 PERFORMANCE REQUIREMENTS

A. Compliance Alternatives:

a. Materials used for the air barrier system in the opaque enclosure shall have an air permeance not to exceed 0.004 cfm/ft^2 under a pressure differential of 0.3 in. water gauge (1.57psf) (0.02 L/s*m^2 @ 75 Pa) when tested in accordance with ASTM E 2178.

b. Assemblies of materials and components in opaque assemblies shall have an air permeance not to exceed 0.04 cfm/ft^2 under a pressure differential of 0.3 in. water gauge (1.57psf) (0.2 L/s*m^2 @ 75 Pa) when tested in accordance with ASTM E 2357 or E283.

c. The air leakage rate of the entire building shall not exceed 0.4 cfm/ft^2 under a pressure differential of 0.3 in. water gauge (1.57psf) (2.0 L/s*m^2 @ 75 Pa) when tested according to ASTM E 779 or E1827 or CGSB 149.15.

1.5 SUBMITTALS

A. The Testing Agency shall submit a certified written report, in duplicate, of each inspection, test, or similar service to the Government using the GSA's Project Management System. Provide courtesy copies to the Government's Architect.

1. Submit additional copies of each written report directly to the governing authority, when the authority so directs.

2. Report Data: Written reports of each inspection, test, or similar service include, but are not limited to, the following:

a. Date of issue.

b. Project title, location, and number.

c. Name, address, and telephone number of testing agency.

d. Dates and locations of samples and tests or inspections.

e. Names of individuals making the inspection or test.

f. Designation of the Work and test method.

g. Identification of product and Specification Section.

h. Complete inspection or test data.

i. Test results and an interpretation of test results.

j. Ambient conditions at the time of sample taking and testing.

k. Comments or professional opinion on whether inspected or tested Work complies with Contract Document requirements.

l. Name and signature of laboratory inspector.

m. Recommendations on retesting.

1.6 QUALITY CONTROL & ASSURANCE

A. Qualifications for Air Barrier Testing Agencies: Engage air barrier inspection and testing service agencies, including independent testing laboratories, that are prequalified and that specialize in the types of air barrier system inspections and tests to be performed.

PART 2 PRODUCTS

PART 3 EXECUTION

3.1 REPAIR AND PROTECTION

A. Upon completion of inspection, testing, sample taking and similar services, the Contractor shall repair any damaged construction and restore substrates and finishes. Comply with Contract Document requirements for Division 1 Section "Cutting and Patching."

B. The Contractor shall protect construction exposed by or for quality-control service activities, and protect repaired construction.

C. Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

3.2 TESTING AND INSPECTION

A. The Testing Agency will observe and inspect installation of the air barrier system.

B. Pursuant to the terms and conditions of the contract between the Government and the Testing Agency, the Testing Agency may provide some or all the following listed services. To the extent permitted by applicable law, the Government will provide a copy of the contract with the Testing Agency to the Contractor upon request.

1. Testing and Inspection:

a. Provide daily reports of observations to the Government using the Government's GSA's Project Management System.

b. Conduct a qualitative evaluation of the continuity of the air barrier system throughout the building enclosure with an emphasis on determining the existence or presence of any gaps or holes.

c. Conduct a qualitative evaluation of the continuity of the structural support of the air barrier system to withstand design air pressures.

d. Inspect masonry and concrete surfaces to confirm they are smooth, clean and free of cavities, protrusions and mortar droppings.

e. Report on site conditions regarding appropriate temperature and dryness of substrates for the application of air barrier materials and sealants.

f. Compare length of exposure time of materials to ultra-violet deterioration to manufacturers' requirements.

g. Observe if surfaces are properly primed.

h. Observe if laps in material are more than or equal to the minimum required by manufacturer, shingled in the correct direction (or mastic applied on exposed edges), and installed with no fish-mouths.

i. Observe that approved mastic or sealant is applied on cut edges.

j. Observe that roller has been used to enhance adhesion as needed.

k. Measure application thickness of liquid-applied materials to manufacturer's specifications for the specific substrate and/or confirm the materials used are the same as called for in the specifications

l. Indicate if materials used are compatible with others they are in contact with.

m. Report that transitions at changes in direction, and structural support at gaps are provided.

n. Report that connections between assemblies (membrane and sealants) for cleaning, preparation and priming of surfaces, structural support, integrity and continuity of seal.

o. Confirm that all visible penetrations are sealed.

2. The Testing Agency shall perform all of the following quantitative tests:

a. Test the completed building and demonstrate that the air leakage rate of the building enclosure does not exceed 0.4 cfm/ft2 (2.0 L/s/m2) at a pressure differential of 0.3" w.g.(75 Pa). The test method used should be developed for each specific project by the Testing Agency, and approved by the Government (or representative). Existing methods such as ASTM E779, Determining Air-tightness of Buildings Air Leakage Rate by Single Zone Air Pressurization ASTM E-1827 Standard Test Methods for Determining Air-tightness of Buildings Using an Orifice Blower Door or CGSB 149.15 Determination of the Overall Envelope Air-tightness of Buildings by the Fan Pressurization Method Using the Building's Air Handling Systems modified as necessary shall be used.

1) Note: Tests can be conducted using either pressurization or depressurization: conducting both provides diagnostic information. The building shall not be tested until the Testing Agency verifies that the Contractor has installed the continuous air barrier system per the design in accordance with installation instructions.

b. The Government and its Architect shall be notified at least three working days prior to the air tightness tests to provide the Government and its Architect the opportunity to witness the tests.

c. Prepare and deliver a written report that includes information about all of the test equipment, its capacity and accuracy, the procedure, the weather conditions, the test personnel, any observers, and the results. Divide the volume of air leakage in cfm @ 0.3" w.g. (L/s @ 75 Pa) by the area of the air barrier system including roof or ceiling, walls and floor to produce the air leakage rate in cfm/ft2 @ 0.3" w.g. (L/s.m2 @ 75 Pa) of enclosure area. Identify the height of the building, the number of stories, the roof area, and the below-grade area. Provide the Government with the test report.

d. The Testing Agency shall inform the Government in writing if the air leakage exceeds the target values and provide a detailed description of corrective work that needs to be performed by the Contractor to achieve the whole building air leakage rate specified in (a) above. The air leakage pathways can be determined as per ASTM E1186-03 Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems or similar. Perform Infrared thermography for diagnostics check. Use infrared cameras with a resolution of 0.1deg C or better. Perform testing on the building enclosure in accordance with ISO 6781:1983 and ASTM C1060-90(1997). If a retest is required, the

Testing Agency's report shall include a brief description of the remedial work undertaken since the last test. The Contractor shall pay for the costs of any re-testing and reporting required as the result of the building failing to meet the air tightness requirements.

3. For all qualitative testing, the Testing Agency shall following the standards listed below:

   a. Material air permeance, ASTM E 2178.

   b. ASTM E 283, Determining rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors under Specified Pressure Differences Across the Specimen.

   c. Assemblies, ASTM E 2357, test pressure and allowable air leakage rate to be determined by AE for design conditions and location of project.

   d. CAN/CGSB Standard 149.10, Determination of the Air-tightness of Building Envelopes by the Fan Depressurization Method.

   e. CAN/CGSB 1996 Standard 149.15 Determination of the Overall Envelope Air-tightness of Office Buildings by the Fan Depressurization Method Using the Building's Air Handling System.

   f. Whole building, floors, or suites Air-tightness, ASTM E779, Determining Air-tightness of Buildings Air Leakage Rate by Single Zone Air Pressurization.

   g. E-1827 Standard Test Method for Determining Air-tightness of Buildings Using an Orifice Blower Door

   h. Windows and connections to adjacent opaque assemblies, ASTM E783

   i. Tracer gas testing, ASTM E741

   j. Pressure test, ASTM E330

   k. Bond to substrate, ASTM D4541

   l. ASTM E 1186 "Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Retarder Systems."

      1) Infrared scanning with pressurization/depressurization.

      2) Smoke pencil with pressurization/depressurization.

      3) Pressurization/depressurization with use of anemometer

      4) Generated sound with sound detection

      5) Tracer gas measurement of decay rate

      6) Chamber pressurization/depressurization in conjunction with smoke tracers

      7) Chamber depressurization using detection liquids

END OF SECTION 01 40 25

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS GENERAL

1.1 SUMMARY

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

1. Temporary utilities include but are not limited to the following:
   a. Temporary sanitary facilities, including drinking water.

2. Support facilities include but are not limited to the following:

   a. Field offices, storage sheds.
   b. Project identification and other temporary signs.
   c. Waste disposal services.
   d. Other construction aids and miscellaneous services and facilities.

3. Protection includes but is not limited to the following:

   a. Temporary fire protection.
   b. Barricades, warning signs, and lights.
   c. Enclosure fence.
   d. Environmental protection.
   e. Enclosure partitions.

B. Provide temporary facilities and controls required for construction activities except, for facilities and controls indicated as existing or provided by the Government or others.

1.2 UTILITY USE CHARGES

A. Unless otherwise specified, Contractor shall pay utility service use charges for temporary utilities used by all entities engaged in construction activities at the Project site. Costs for these services are included in the Contract price.

B. Water Service: The Contractor may use water from the Government's existing water system, without metering and without payment of use charges.

C. Sewer Service: Contractor may use the Government's existing sewer system, without payment of use charges.

D. Electric Power Service: Contractor may use electric power from the Government's existing electric power system, without metering and without payment of use charges.

1.3 SUBMITTALS

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

B. Reports: Submit reports of tests, inspections, meter readings and similar procedures for temporary utilities.

C. Implementation and Termination Schedule: Within 15 calendar days after the date established for the submittal of the Contractor's Construction Schedule, submit a schedule indicating implementation and termination of each temporary utility.

D. Weather Protection:

1. Provide protection for work areas affected by moisture and thermal change. Including building floor areas, masonry scaffolds and fabrication areas. Covering, enclose and heat to maintain a relatively dry work area with a minimum temperature of 40°F at the working surface. Weather protection is not required for excavation, pile driving, steel erection, and similar operations normally completed in the open.
2. Historic wood window frame materials are to be protected.
3. Provide protection for interior finishes impacted by the Work.
4. Submit weather protection plan to GSA for approval. Future changes must be approved by GSA.

1.4 QUALITY ASSURANCE

A. Standards and Regulations: In temporary facilities, comply with industry standards, applicable laws, and regulations of authorities having jurisdiction, including but not limited to the following:

1. Building code requirements.
2. Health and Safety regulations.
3. Utility company regulations.
4. Police, fire department, local fire marshal and rescue squad rules.
5. Environmental protection regulations.
6. For temporary egress, ABAAS regulations.
7. NFPA 241 "Standards for Safeguarding Construction, Alterations and Demolition Operations".
8. ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition".
9. NECA Electrical Design Library "Temporary Electrical Facilities", NFPA 70, and NEMA, NECA and UL standards and regulations for temporary electric service.

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

1.5 PROJECT CONDITIONS

A. Install, operate, maintain and protect temporary facilities and controls.

1. Keep temporary facilities clean and neat in appearance.
2. Operate temporary facilities in a safe and efficient manner.
3. Relocate temporary facilities if needed as Work progresses.
4. Do not overload temporary services and facilities or permit them to interfere with progress.
5. Provide fire prevention.
6. Do not allow hazardous, dangerous or unsanitary conditions, or public nuisances to be on-site.

B. At the earliest feasible time, remove temporary facilities when no longer needed.

C. Existing Equipment and Items: Cover or otherwise protect and provide security for existing equipment and other items that are to remain in place, to prevent soiling, damage and loss, the cost of which is the responsibility of the Contractor.

1. Temporarily move equipment and other items that interfere with the performance of required work.
2. Store equipment and other items that have been temporarily removed. Upon reinstallation, clean and, if damaged, repair or replace equipment and items to match their condition prior to removal.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Provide undamaged materials in serviceable conditions and suitable for use intended.

B. Tarpaulins: Waterproof, fire-resistant UL labeled with flame spread rating of 15 or less. For temporary enclosures, provide translucent, nylon-reinforced, laminated polyethylene fire-retardant tarpaulins.

C. Wood: Lumber complying with DOC PS 20 and applicable grading rules of an inspection agency certified by ALSC's Board of Review for specific use. Provide preservative treated lumber where partially or fully in contact with the earth, concrete or masonry. Provide fire retardant treated lumber for temporary purposes where fire rated products are normally required.

D. Sign, Directory and Other Graphic Panel Materials: Unless otherwise indicated, products shall be as follows:

1. Panels: Exterior type Grade B-B high density concrete-form-overlay plywood.
2. Paint: Exterior primer and exterior grade alkyd gloss enamel top coat.
3. (Other)

E. Safety Barrier and Covered Walkway Materials: Unless otherwise indicated, products shall be as follows.

1. Panels: Minimum 5/8 inch (16 mm) thick exterior plywood.
2. Paint: Exterior primer and exterior grade acrylic-latex emulsion top coat.
3. (Other)

F. Wood Fencing and Vision Panel Materials: Unless otherwise indicated, products shall comply as follows:

1. Panels: Minimum 3/8 inch (9.5 mm) thick exterior plywood.
2. Paint: Exterior primer and exterior grade acrylic-latex emulsion top coat.

G. Open-Mesh Fencing: Minimum 0.12 inch (3 mm) thick galvanized 2 inch (50 mm) chain link fabric fencing with galvanized steel pipe posts, 1-1/2 inches (38 mm) inside diameter for line posts and 2-1/2 inches (64 mm) inside diameter for corner posts.

1. Fence height: 6 feet (2 m).
2. Top Protection: Galvanized barbed-wire top strand.

H. Dust control:
1. Dust Control Adhesive-Surface Walk-off Mats: Provide mats minimum (36 by 60 inches).
2. Polyethylene Sheet: Reinforced, fire-resistive sheet, (10 mils) minimum thickness, with flame-spread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test 2.

I. Job-Built Temporary Office, Shop and Shed Materials: Unless otherwise indicated, products shall be as follows:

1. Framing, Sheathing and Siding: UL labeled fire-treated lumber and plywood.
2. Roofing: UL Class A standard weight asphalt shingles, or UL Class C mineral surfaced roll roofing.
3. Exterior Paint: Exterior primer and exterior grade acrylic-latex emulsion top coat.
4. Interior Wall Panels for Offices: Minimum half inch (12.7 mm) thick by 48 inches (1219 mm) wide by maximum available lengths, regular type gypsum board with tapered edges, complying with ASTM C 36.
5. Interior Paint for Offices: 2 coats interior latex-flat wall paint.

2.2 EQUIPMENT

A. Provide equipment in serviceable condition and suitable for use intended.
1. Water Hoses: 3/4" (19 mm) heavy duty abrasive-resistant flexible rubber hoses, 100 feet (30 m) long with pressure rating greater than the maximum pressure of the water distribution system. Provide adjustable shutoff nozzles at hose discharge
2. Electric Outlets: NEMA-polarized outlets to prevent insertion of 110 to 120 Volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground fault circuit interrupters, reset button and pilot light for connection of power tools and equipment.
3. Electric Power Cords: Grounded extension cords.

a. Provide hard-service cords where exposed to abrasion or traffic.
b. Provide waterproof connectors to connect separate lengths of electric cords where single lengths will not reach areas of construction activity.
a. Do not exceed safe length-voltage ratio.

1. Lamps and Light Fixtures: General service lamps of wattage required for adequate illumination.
   a. Provide guard cages or tempered glass enclosures where exposed to breakage.
   b. Provide exterior fixtures when exposed to moisture.
2. Heating Units: Temporary heating units that have been tested and labeled by UL, FM or another recognized trade association related to the type of fuel consumed.

B. Temporary Offices: Prefabricated or mobile units or similar job-built enclosures, inclusive of but not limited to lockable entrances, operable windows, serviceable finishes, heating and air conditioning, electric power and lighting, and foundations adequate for the loads.
1. Fire Extinguishers: Hand-carried portable UL-rated fire extinguishers.
   a. Class A extinguishers for temporary offices and similar spaces.
   b. Class ABC dry chemical extinguishers or a combination of extinguishers of NFPA recommended classes for exposures in other locations.
   c. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent and size required by location and class of fire exposure.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Use qualified personnel for installation of temporary facilities.

B. Locate facilities where they will serve the project with minimum interference to performance of construction activities. Maintain, relocate and modify facilities as required for the duration of the performance of the Work.

3.2 TEMPORARY UTILITIES

A. Engage the appropriate local utility companies to install temporary services or connect to existing services. At Substantial Completion, restore these facilities to condition existing before initial use.
1. Electric Power Service: Provide weatherproof grounded electric power service and distribution system of sufficient size, capacity and power characteristics for construction needs. Include meters, transformers, overload-protected disconnects, automatic ground-fault interrupters and main distribution switch gear.
2. Lighting: Install and operate temporary lighting that will fulfill security and protection requirements without operating the entire system. Provide lighting that provides adequate illumination for construction operations and traffic conditions.
   a. Provide lighting for the Project identification signs.
   b. Install and operate temporary lighting that fulfills security and protection requirements of GSA without operating entire system.
3. Sanitary Facilities:
   a. Toilets: Portable toilet will be permitted and must be cleaned as required or when directed.

B. Storm Water Controls: Provide earthen embankments and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding by runoff of storm water from heavy rains.

3.3 TEMPORARY SUPPORT FACILITIES

A. Locate field offices on the street or surface lot east of the site, or as directed. Located sanitary facilities, temporary construction and support facilities within the fenced in area north of the building

B. Provide incombustible construction per ASTM E 136 for offices, shops and sheds located within the construction area or within 9 m (30') of building lines. Comply with NFPA 241.

C. Offices: Provide insulated, weather-tight temporary offices of sufficient size to accommodate office personnel at the Project site. Include space for meetings. Maintain offices clean and orderly. Furnish and equip offices for use.

D. Dewatering Facilities and Drains: Comply with dewatering requirements of applicable sections for temporary drainage and dewatering facilities and operations not directly associated with construction activities. Where feasible, use same facilities provided for the construction activities. Maintain site, excavation and construction free of standing water.

E. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress or completed, from exposure, inclement weather, other construction operations and similar conditions.

1. Where heat is needed, provide temporary enclosures where there is no other provision for containment of heat. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions or unacceptable effects to the materials.
2. Install tarpaulins securely with incombustible framing. Close openings of 25 sq. ft. (2.3 sq. m.) or less with plywood or similar materials.
3. Close openings through floor or roof decks and other horizontal surfaces with load-bearing wood-framed construction.
4. Where enclosure exceeds 100 sq. ft. (9.2 sq. m) in plan area, use UL labeled fire-retardant-treated wood and plywood for framing and sheathing.

F. Temporary Signs: Provide project identification and other signs of sizes, layout, content, graphics and colors appropriate for the job site. Locate signs where best to inform public and instruct persons seeking entrance to the project. Support signs on posts or framing of steel or wood-treated against rot.

1. Other Temporary Signs: Prepare signs to provide directional information to construction personnel and visitors.
2. Install exterior yard and sign lights so signs are visible at all times when work is being performed.
3. Do not permit installation of unauthorized signs.
4. Anchor all temporary signage.

G. Collection and Disposal of Waste/Salvaged Material: Collect waste from construction areas and elsewhere daily. Collect salvaged/recycled material from construction areas and elsewhere as necessary. Enforce requirements strictly and dispose of material lawfully.

1. Comply with NFPA 241 for removal of combustible waste material and debris.
2. Do not hold waste materials more than 7 days during periods when the ambient temperature remains continuously less than 80°F (27°C), or more than 3 days when the temperature exceeds or is expected to rise above 80° (27°C).
3. Handle and properly containerize hazardous, dangerous or unsanitary waste materials separately from other waste.
4. Comply with Construction Waste Management and Disposal requirements in Section 017419.

3.4 TEMPORARY PROTECTION FACILITIES

A. Access to building: Entrances and the loading dock will remain open during the work.

1. Provide overhead protection at entrances when work is being conducted above or adjacent. .

B. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, as indicated in accordance with authorities having jurisdiction.

1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant- protection zones.
2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established in the judgment of GSA.
3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from the project site during the course of the project.
4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

C. Tree and Plant Protection: Install temporary fencing located as indicated on the drawings to protect vegetation from damage due to construction operations. See specification 015639 for complete specifications on Tree and Plant protection.

D. Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erecting structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and the public of the hazard involved. Where appropriate and needed, provide lighting, including flashing red or amber lights.

E. Enclosure Fence: When excavation begins, install an enclosure fence with lockable entrance gates. Install in a manner that will prevent people and animals from easily entering the site. Maintain security with temporary key control system and distribution records and comply with Division 8 keying requirements in Door Hardware.

1. Locate where indicated or, if not indicated, enclose the entire site or the portion determined sufficient to accommodate construction operations.
2. Provide open-mesh chain link fencing with posts set in a compacted mixture of gravel and earth.
3. Provide 8 feet (2.5 m) high plywood fence framed with four nominal 2-by-4-inch (50-by-100-mm) wood rails, and preservative-treated wood posts spaced not more than 8 feet (2.5 m) apart.
4. Provide either open-mesh chain link fencing with posts set in a compacted mixture of gravel and earth or provide 8 feet (2.5 m) high plywood fence framed with four nominal 2-by-4 inch (50-by-100 mm) wood rails and preservative-treated wood posts spaced not more than 8 feet (2.5 m) apart.

3.5 MOISTURE CONTROL (non applicable)

3.6 OPERATION, TERMINATION, AND REMOVAL (non applicable)

END OF SECTION

SECTION 015930 - SECURITY REGULATIONS

PART 1 GENERAL

1.1 Refer to the Construction Contract Agreement Section III, Terms and Conditions, for HSPD-12 suitability investigation requirements for Contract employees requiring access to the facility. Also see http://www.GSA.gov/HSPD12 for more security suitability requirements.

1.2 GENERAL SECURITY REQUIREMENTS

A. Contractors and their staff will be required to comply with security regulations imposed by the occupying agency including any necessary clearances required for access to classified areas. Access to the project site will be limited to specific times established by the Government.

B. After award of the Contract, all Contractor employees requiring access to classified areas shall be required to furnish information for security clearances and shall comply with security regulations as imposed by the occupying agency and defined in this section.

C. Notification: For all contracting staff that has been successfully cleared, notify the Contracting Officer, or his designated representative, not less than 48 hours prior to performing work in a classified security area. Include the following:

1. Companies: Name of each company performing the work.

2. Employee names.

3. Time: The exact time, date, and hours of work.

4. Areas: Specific areas of the building in which work is to be performed.

1.3 GENERAL SECURITY REGULATIONS

A. Agency Security Regulations: All persons employed within the boundaries of the restricted-access areas therein, and all persons permitted to enter such property and areas shall comply with the security regulations that have been established for this Contract.

1. The Contractor agrees on behalf of themselves and all subcontractors that the following security regulations will be observed by Contractor and subcontractor personnel on the property. The Contractor shall make it a specific provision of his subcontracts that these regulations be accepted.

2. At the commencement of the work under this Contract, the following security facilities and procedures will apply for classified areas within the facility:

a. The Contractor shall provide information about all Contractor and subcontractor personnel and others who require continuing access to the site, before access is required and when access ceases.

b. Within 30 calendar days after the award of the Contract, the Contractor shall submit a list on the Contractor's letterhead stationary of all employees, subcontractors and their employees, and others who will perform work or otherwise require access to the classified area. Personnel shall be listed in alphabetical order by company.

c. The Contractor shall notify the Government in writing when personnel are no longer employed by the Contractor or a subcontractor that have been cleared.

d. In order to permit the Government to supply credentials, they shall follow the procedures for obtaining an HSPD-12 credential as outlined in the Construction Contract Agreement section of the solicitation.

e. The credential furnished by the Government to each Contractor employee or other person granted access to the classified area will serve to authorize the wearer to enter and leave the classified area. The credential must be worn so as to be clearly visible at all times when on the work site. The credential will be retained by the individual as long as they require continued admittance to the classified area. The Contractor will arrange for the credentials immediate return to the Government when such need ceases. Temporary or visitor badges along with escorts will be provided for persons who are identified as having an infrequent or temporary legitimate business need for access to the classified area.

3. At the commencement of the work under this contract, the following security procedures shall apply to the Contractor and all subcontractors.

a. Comply with the security regulations of the building.

b. Cameras are not permitted without written permission from the Occupant Agency and the Contracting Officer or his designated representative. If approved, permission will be granted in writing and will provide additional guidelines.

c. Personnel may be subject to inspection of their personal effects when entering and leaving the facility. In addition, unscheduled inspections of personnel may be made while on site.

d. If any work scheduled within the classified area is canceled, notify the Contracting Officer or his designated representative.

4. The Occupant Agency reserves the right to close down the job site and order Contractor personnel off the premises in the event of a national emergency or a shut-down, for as long as security problems persist. The Contractor may only return to the site with verbal approval from the Occupant Agency and the Contracting Officer or his authorized representative.

5. The Government reserves the right to exclude or remove from the site or building any employee of the Contractor or a subcontractor whom the Government deems incompetent, careless, insubordinate or otherwise objectionable, or whose continued employment on the work is deemed by the Government to be contrary to the public interests. The Government further reserves the right to complete processing of the security documentation for personnel assigned to work within classified areas prior to access to such areas by the personnel.

6. For overtime work within the classified area, the Contractor shall give the Contracting Officer or his designated representative at least 5 calendar days notice. This notice is required so that security escorts may be provided and is separate and distinct from any notices required for utility shutdown or other outages. Also, the Contractor shall notify the Government if personnel will not report to the job site on a particular day so that the security escort can be released for other duties.

7. A detailed weekly schedule shall be submitted once a week by the close of business on the last day of the previous week's work for work planned within classified areas.. The schedule shall include the following:

a. Specific location of work for each trade.

b. Description of work for each trade.

c. Number of persons who will be on site for each location and trade.

d. Specific impacts required, such as equipment or utility shutdowns.

e. Hours of operation.

PART 2 PRODUCTS (Not used)

PART 3 EXECUTION (Not used)

END OF SECTION 01 59 30

SECTION 015950 - SAFETY AND HEALTH

PART 1 GENERAL

1.1 SUMMARY

A. This project includes or may be expected to include the following tasks that involve unique safety and health risks.

1. Asbestos abatement or working around asbestos
2. Lead abatement or working around surface coatings or dust that contain lead
3. PCB abatement
4. Work generating silica dust (e.g. concrete drilling, jack-hammering, etc.)
5. The use of powered equipment
6. The use of scaffolds
7. Work at elevations of 6 feet or more above lower levels (i.e., fall protection))
8. Electrical work
9. Work involving high noise levels
10. Work requiring lock-out/tag-out (i.e. controlling hazardous energy)

B. References: In addition to publications referenced in the Construction Contract Clauses, the following Code of Federal Regulations (CFR) and publications apply to the conduct of the work. State and local safety and health regulations that apply are not cited herein. Current editions at the date of the agreement apply. The more stringent requirements shall apply.

1. 29 CFR Part 1910 Occupational Safety and Health Administration (OSHA) Occupational Safety and Health Standards for General Industry.
2. 29 CFR Part 1926 OSHA "Safety and Health Regulations for Construction"
3. 40 CFR 260 - 279 EPA Resource Conservation and Recovery Act (RCRA)
4. 40 CFR, Part 761 EPA Polychlorinated Biphenyls (PCBs), Manufacturing, Processing, Distribution in Commerce and Use Prohibitions.
5. National Fire Protection Association (NFPA) 70E Electrical Safety Requirements for Workplace Safety
6. National Fire Protection Association (NFPA) 241 Standard for Safeguarding Construction, Alteration, and Demolition Operations
7. GSA Public Buildings Service (PBS) Asbestos Management policy (P1000.1A)
8. GSA PBS Fuel Storage Tank Management policy (1095.2)
9. GSA PBS Indoor Air Quality Management policy (1000.8)
10. GSA PBS Safety and Health Management policy (5940.3)

11. GSA PBS P-100 Facilities Standards for the Public Buildings Service

12. ANSI/IICRC S500: Professional Water Damage Restoration

13. ANSI/IICRC S520: Professional Mold Remediation

14. EPA 402-K-01-001: Mold Remediation in Schools and Commercial Facilities

15. Applicable Federal, State, and local safety & health regulations.

C. Acquisition of Publications:

1. Codes of Federal Regulations (CFR) may be obtained online (https://www.govinfo.gov/app/collection/cfr).

2. NFPA publications may be purchased from the National Fire Protection Association (https://www.nfpa.org/).

3. ANSI publications may be purchased online from the ANSI Webstore (https://ansi.org/).

1.2 SUBMITTALS

A. The Contractor shall submit a Site-specific Construction Safety and Health Plan (CSHP) to GSA, at least 7 days prior to the pre-construction meeting. The CSHP shall be accepted by GSA prior to the issuance of the Notice to Proceed.

Site-specific CSHP as defined below:

The Site-specific CSHP is a written document that describes the process for identifying the physical and health hazards that could harm workers, procedures to reduce these hazards and prevent accidents, and steps to take when accidents occur. The written CSHP is the Contractor's blueprint for keeping their workers, our employees, tenants, and the public safe.

The CSHP shall be a site-specific document, not a generic shelf plan, that is adapted to the specific safety and contractual needs of the project. The larger and more complex the project, the larger and more complex the safety plan. Every task in a project should be reviewed to identify known hazards, and shall provide general guidance for those hazards that are unexpected or unpredictable and how those will be mitigated. These shall be in the form of a job hazard analysis and shall include job steps, potential occupational hazards, and the action/procedure to control, minimize or eliminate the potential hazards and risks, as well as any additional information that serves to increase the safety and health of workers performing the specific job. Plans shall address the following conditions or hazards and are not limited to:

1. The Contractor shall include the project name, the project description, the project location, and which safety features of the safety and health plan will apply to this project based on scope.

2. The Contractor shall designate a site safety and health officer (SSHO), who is responsible for and has the authority to ensure this plan is adhered to throughout the project, along with applicable safety & health regulations and this specification section. The SSHO shall have a minimum of a valid OSHA 30-hour Construction Safety card received within the last five years. The designated SSHO will be listed in the safety and health plan, along with a contact number.

3. The Contractor shall also establish and list in the safety and health plan any required competent person and/or designated person when required by OSHA regulations for fall protection, demolition, lock-out/tag-out, ladders, and scaffolds, as well as the following work:

a. Asbestos competent person

b. Silica work exposure plan competent person

c. Lead competent person

d. Crane competent person

e. Energized electrical qualified workers

f. Excavation and trenching competent person

g. Lead-paint competent person

h. Scaffolding qualified and/or competent person

4. The CSHP shall include those controls and accident prevention procedures to address each of the following as required based on the site-specific scope of the project:

a. Overall electrical safety-related work practices

b. Control of Hazardous Energy (Lockout / Tag-out procedures)

c. Fall Protection (scaffolds, roofs, ladders, building façade)

d. Personal Protective Equipment (hard hats, shoes, glasses, earplugs, respirators, etc.)

e. Safeguarding of powered tools and equipment

f. Equipment Guarding

g. Dust and odor control

h. Asbestos abatement controls

i. Lead-paint abatement controls

j. PCB abatement controls

k. Silica Work Exposure plans

l. Hazard Communication Plans and working with chemicals

m. Spill Response procedures

n. Emergency and first-aid procedures

o. Hazardous waste cleanup and disposal safeguards

p. Occupational Noise Exposure

q. Hot Work permitting procedure (e.g., welding, brazing, etc.)

r. Crane Hoisting Inspection Program/Critical Lift Plan

NOTE: The above are safety and health issues commonly encountered during construction work, but are not a comprehensive list of all potential project risks.

5. The plan shall include the Contractor's reporting procedures in the event of an accident and a call-down tree containing contact information for all project staff.

6. The Contractor shall provide to the Contracting Officer or their representative GSA, local, city, and/or state permits for the following as applicable: asbestos abatement, lead abatement, PCB abatement, hazardous waste cleanup, and disposal.

7. The Contractor shall provide the CO and the GSA property manager's office with a list of chemical products and/or hazardous materials expected to be used on the project site. The list shall include the Safety Data Sheets (SDS) for each product and shall be a part of the Contractor's Hazard Communication Plan (HCP). The Contractor shall review and update the product list at a regular interval for the duration of the project.

   The Contractor's Hazard Communication Plan (HCP) with the accompanying Chemical product list and/or hazardous materials shall be submitted to GSA with the CHSP.

   The HCP shall describe the proper use, quantities, location, safety, SDS, storage, security, and access of all chemical products and/or hazardous chemicals. The HCP shall be accessible to all subcontractors and other 3rd parties on the project site.

   The Hazard Communication Plan shall clearly and concisely describe the methods used to provide all on-site personnel access to their on-site SDSs, and how they will inform the other employer(s) of any precautionary measures that they need to consider.

1.3 SAFETY MEETING

A. Pre-Construction Meeting: The General Contractor and Subcontractors shall meet with the GSA project team and other GSA representatives as appropriate after the Contract Award and before the issuance of the Notice to Proceed. The meeting shall cover:

1. The Contractors' site-specific CSHP, SDS list, HCP and other related Health and Safety information.

2. Specific safety and health features for the project are intended to protect the safety of employees, Government representatives, and others while on-site throughout the project.

3. The Contractors shall resolve any questions or concerns raised in a manner satisfactory to the GSA representatives.

B. Ongoing Meeting: The general contractor and subcontractors shall conduct regular safety meetings with the GSA project manager and other GSA representatives. Weekly meetings throughout the duration are typical for most projects The Contractor shall review and update the CSHP, SDS list, HCP and other related Health and Safety information and distribute to project stakeholders on an on-going basis. The Contractor shall submit revisions to GSA for review prior to distribution.

C. The Contractor shall prepare meeting minutes for each meeting and upload them into PMIS. The Contractor's project manager, safety officer, project superintendent, and any other supervisors shall be required to attend these meetings with the Government and its designated on-site representatives.

1.4 SAFETY AND HEALTH PROGRAM

A. Contractor Responsibility: The Contractor shall assume full responsibility and liability for compliance with applicable codes, standards and regulations about the health and safety of personnel during execution of the Work, and shall hold the Government harmless for any action on the Contractor's part, or that of the Contractor's employees or Subcontractors, that results in illness, injury or death.

B. Site Safety and Health Officer: A trained and experienced individual shall be delegated in writing as the Site Safety and Health Officer (SSHO). The SSHO shall have a minimum of a valid OSHA 30-

hour Construction Safety card received within the last five years. Projects over $10 million require a full-time on-site SSHO. The SSHO shall be responsible for the development, implementation, oversight, and enforcement of the Contractor's Accident Prevention Plan (APP) on-site, which shall address all activities for which the Contractor is responsible. The Contractor may appoint as many individuals as he or she deems appropriate to accomplish the provisions of this section. The SSHO shall typically remain on-site full-time during activities conducted under this contract. The SSHO may be an individual with other responsibilities, already identified to be on-site and who has the authority and appropriate knowledge to oversee and act on the provisions of this section.

C. The Contractor shall provide for site visitors Personal Protective Equipment (PPE) per OSHA for use during their visits. Provide a minimum of 10 sets with replacements for items not suitable for reuse.

PART 2 PRODUCTS

2.1 PROTECTIVE EQUIPMENT

A. Special facilities, devices, equipment, and similar items used by the Contractor in the execution of the Work shall comply with the applicable regulations.

PART 3 EXECUTION

The Contractor shall assume full responsibility and liability for compliance with applicable codes, standards and regulations pertaining to the health and safety of personnel during the execution of the project, and shall hold the Government harmless for any action on the Contractor's part, or that of the Contractor's employees or Subcontractors, that results in illness, injury or death. The Contractor is also responsible for the safety of GSA staff, FOB employees, regulators, Federal agency officials, and any other visitors while present on the construction site.

3.1 HAZARDOUS MATERIALS AND CONDITIONS

A. The Contractor shall advise GSA of any hazardous material and/or hazardous conditions encountered during the execution of the work. GSA shall determine if the Contractor must perform additional tests and if the work for the particular material or condition shall cease, at the direction of the Contracting Officer. Work shall recommence at the direction of GSA. The SSHO shall take measures to protect all personnel on-site until GSA has rendered its decision.

3.2 EMERGENCY SUSPENSION OF WORK

A. If any employees of the Contractor or Subcontractor observe any unsafe act or hazard which could jeopardize their personal safety or the safety of others, that employee must take steps to resolve the issue, including notifying the supervisor/foreman of the hazard. The supervisor/foreman has the ability to ensure the hazardous condition is corrected, prevent exposure to the hazard, and/or stop the work until that hazardous condition is corrected. Unsafe acts and or hazards that cannot be immediately corrected in these manners will be brought to the attention of the GSA project manager and GSA project contracting officer.

B. When the Contractor is notified by GSA of non-compliance with the safety or health provisions of the contract, the Contractor shall immediately cease work in the subject area unless otherwise instructed by the Contracting Officer or their representative, and correct the unsafe or unhealthy condition.

1. If the Contractor fails to comply promptly, all or part of the work will be stopped by notice from the GSA contracting officer or their representative.

2. When GSA determines that satisfactory corrective action has been taken by the Contractor, work shall resume.

3. The Contractor shall not be allowed any extension of time or compensation for damages

in connection with a work stoppage for an unsafe or unhealthy condition.

3.3 PROTECTION OF PERSONNEL

A. The Contractor shall take necessary precautions to prevent injury to the public, occupants, and project staff on the site or in close proximity to be affected by the project. The public and occupants include all persons not employed by the Contractor or a Subcontractor.

B. The work area shall be isolated from unauthorized entry through the use of signage, barrier tape, fences, barricades, or similar means. Control by authorized personnel shall be done where passage through is necessary for the work.

1. Provide traffic barricades and traffic control signage where construction activities occur in vehicular areas.

2. Corridors, aisles, stairways, doors, and exit ways shall not be obstructed or used in a manner to encroach upon routes of ingress or egress utilized by the public or occupants or to present an unsafe or unhealthy condition to the public or occupants.

3. Store, position, and use equipment, tools, and materials, in a manner that does not present a hazard to the public or occupants.

4. Store and transport refuse and debris in a manner to prevent unsafe and unhealthy conditions for the public and occupants. Cover refuse containers and remove refuse on a frequent regular basis acceptable to GSA. Use tarpaulins or other means to prevent loose transported materials from dropping from trucks.

3.4 EMERGENCIES AND FIRST AID

A. The Contractor shall provide for use on-site: emergency first aid equipment, an ABC-Rated Fire Extinguishers per NFPA 10 and NFPA 241, and absorbent material of sufficient quantity to collect any spill which might occur. The Contractor shall also maintain and post on-site a list of emergency phone numbers and points of contact for fire, hospital, police, and ambulance. All corrosive chemicals used that require a 15-minute eye flush as listed in the first aid section of the Safety Data Sheet require the contractor to bring a portable ANSI/ISEA Z358.1 rated eyewash on site if one is not available.

B. The Contractor shall submit an electronic copy of each accident report to the GSA project manager that the Contractor or Subcontractors submits to their insurance carriers, within seven calendar days after the date of the accident. Any accident or occupational illness that requires reporting to OSHA must be reported to GSA within 48 hours following the incident. The Contractor will complete the GSA Form 3620 (include a copy of this form as part of the submittal). In addition, if the Contractor causes any damage to GSA property this information must also be recorded on the 3620. The Contractor is responsible for reporting to OSHA all recordable injuries or illnesses of their employees within all required timeframes and methods, including those that result in hospitalization, amputation, death, or loss of an eye.

3.5 ENVIRONMENTAL PROTECTION

A. In addition to the unique provisions required for environmental remediation work (asbestos, lead-based paint, PCBs, hazardous waste), the Contractor shall dispose of any other contaminant waste per EPA, state, and local requirements.

B. The Contractor shall comply with applicable laws and ordinances regarding noise control, including but not limited to 29 CFR 1910.95 and 29 CFR 1926.52.

3.6 WATER INTRUSION AND MOLD REMEDIATION

A. Should any project-related incident result in water damage to building materials, it shall be the Contractor's responsibility to bring such information to the attention of the Contracting Officer, both verbally and in writing, as quickly as possible for resolution.

B. The Contractor shall immediately respond using a professional company that is trained in water remediation that has the knowledge, equipment, and resources to employ industry-related standard practices following ANSI/IICRC S500 Professional Water Damage Restoration & S520 Professional Mold Remediation along with EPA Mold Remediation in Schools and Commercial Facilities.

C. After each event, a separate visual inspection and non-invasive assessment of the space must take place and the results provided to the Contracting Officer along with a detailed action plan to address the issues within 24 hours of the incident.

D. Mold remediation that is required as a result of the Contractor not fully addressing the situation promptly will be the financial responsibility of the Contractor. Remediation shall be completed by a qualified mold remediation contractor using industry-standard practices following ANSI/IICRC S500 Professional Water Damage Restoration & S520 Professional Mold Remediation along with EPA Mold Remediation in Schools and Commercial Facilities. This work is required to be monitored and clearance provided by an independent third-party consultant at no cost to the government.

END OF SECTION 015950

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GSA BASE ASBESTOS ABATEMENT REQUIREMENTS
STATE OF SOUTH DAKOTA

NOTE: This document provides the minimum (base) GSA requirements for all asbestos abatement activities in the State of South Dakota. Specific requirements for the disturbance or removal of asbestos containing materials may vary due to field conditions, types or quantities of involved asbestos materials, proposed abatement methodologies, etc. For project-specific requirements please consult with the GSA OFM Industrial Hygiene Group for guidance.

1. PROJECT OBJECTIVES

1.1. The contractor shall provide all labor, materials, equipment and supervision necessary to perform abatement of the asbestos-containing materials (ACM).

2. PERMITTING/REGULATIONS/CODES

2.1. Contractor shall be responsible for obtaining all necessary local, state, and federal permits and licenses and payment of related fees.

2.2. Contractor shall comply with all applicable federal, state, and local regulations including but not limited to:

2.2.1. Occupational Safety & Health Administration (OSHA) Asbestos in Construction Standard - 29 CFR 1926.1101

2.2.2. OSHA Asbestos in General Industry Standard – 29 CFR 1910.1001

2.2.3. OSHA Respiratory Protection Standard - 29 CFR 1910.134

2.2.4. U.S. Environmental Protection Agency (EPA) National Emission Standards for Hazardous Air Pollutants (NESHAP) - 40 CFR 61 Subpart M

2.2.5. EPA Asbestos Hazard Emergency Response Act (AHERA) - 40 CFR 763

2.2.6. Federal Management Regulation, Real Property, Safety and Environmental Management, Asbestos - 41 CFR 102-80.15

2.2.7. U.S. Department of Transportation Hazardous Material Transportation Regulations – 49 CFR 171 and 172

2.2.8. South Dakota Emission Standards for Asbestos Air Pollutants - Administrative Rules of South Dakota (ARSD) 74:36:08:02

2.2.9. South Dakota Asbestos Control Program - ARSD Article 74:31

2.2.10. South Dakota Solid Waste Program – ARSD Article 74:27

2.3. All work shall comply with codes and standards applicable to each type of work through the course of this project. The contractor shall also comply with the requirements of GSA BuildGreen standards, and PBS P-100.

3. ASBESTOS ABATEMENT REQUIREMENTS

3.1. General

3.1.1. All regulated asbestos abatement activities shall be conducted by a South Dakota licensed asbestos abatement contractor in good standing with South Dakota Department of Agriculture & Natural

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Resources (DANR) and utilizing properly trained and certified asbestos abatement supervisors and workers.

3.1.2. Contractor shall field verify all conditions, requirements, and quantity of asbestos containing material (ACM) to be abated at time of pre-bid walk through.

3.1.3. Contractor to coordinate schedule of work with the GSA Building and Project Manager. Asbestos abatement shall be performed during off-hours.

3.2. Abatement Work Practices and Control Requirements

3.2.1. All asbestos abatement work shall follow applicable DANR requirements and OSHA Asbestos in Construction Standard requirements of 29 CFR 1926.1101.

3.2.2. Contractor shall not seek or apply for any variance or alternative work procedures from any authority having jurisdiction (AHJ) unless previously approved in writing by GSA. Once approved by GSA, Contractor may request a variance or alternative work procedures in writing from any AHJ and must receive written approval from the AHJ prior to the commencement of abatement activities. Written AHJ approval of any variance or alternative work procedures shall be provided to GSA.

3.2.3. Negative air machine (NAM) exhaust shall be exhausted to the exterior of the building if feasible. If it is not practicable for the NAM to be exhausted to the exterior of the building, additional air sampling at the point of exhaust may be required.

3.2.4. Contractor shall take care to control the generation of odors in occupied buildings. If mastic remover is utilized, product shall be low odor and meet California Air Resources Board (CARB) volatile organic compound (VOC) content requirements.

3.2.5. When performing asbestos abatement activities in or around occupied areas, or otherwise accessible areas, the Contractor shall use floor to ceiling black poly sheeting or equivalent methods to shield abatement staging area, decon entrance, required abatement warning signage on airlock, etc. from plain view in the hallway or other areas of public access. Contractor shall put “Danger Construction Area Authorized Personnel Only” signage or equivalent on the outside of the viewshed barrier.

3.2.6. Final visual clearance and air sampling will be conducted by a third-party qualified industrial hygienist independent of the asbestos abatement contractor. Final air clearance sampling shall be done in accordance with the clearance criteria of 40 CFR 763.90(i)(5). GSA reserves the right to prescribe specific sampling protocols type based on abated material and building occupancy.

3.2.7. If the area does not pass final visual inspection or final air clearance sampling, the abatement Contractor shall re-clean the area at no additional cost, and the process will be repeated until clearance is achieved.

3.3. Asbestos-Containing Waste Material Disposal Requirements

3.3.1. Transportation and disposal of friable and non-friable asbestos-containing waste material shall be conducted in accordance with all applicable requirements including but not limited to ARSD Article 74:27; 40 CFR 61.150; and 49 CFR Parts 171 & 172.

3.3.2. Asbestos-containing waste material shall be properly packaged, labeled, manifested, and transported.

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4. SUBMITTAL AND DELIVERABLE REQUIREMENTS

4.1. Asbestos Abatement Specific Pre-Abatement Submittals

4.1.1. Prior to the commencement of asbestos abatement actions, the Contractor shall provide the following documentation to GSA for review and approval:

4.1.2. Contractor shall provide a written method of procedure (MOP) describing the following at a minimum:

4.1.2.1. Statement of contractor's qualifications and copies of the firm's relevant licenses or certifications, as applicable

4.1.2.2. Types, quantities, and locations of asbestos materials to be removed

4.1.2.3. Engineering controls and work methods to be employed

4.1.2.4. Number and types of regulated areas (e.g., glove bag, full containment, mini-enclosure, etc.)

4.1.2.5. Project phasing and tentative schedule

4.1.2.6. Name and address of disposal facility

4.1.2.7. Copies of safety data sheets (SDSs) for all chemical products to be used etc.

4.1.3. Copy of 10-day notification and/or permit to the appropriate authorities (e.g., EPA, DANR, local fire department, etc.). If notification and/or permit are not required, the Contractor shall state why.

4.2. Asbestos Abatement Specific Close-Out Deliverables

4.2.1. Upon completion of abatement activities, the Contractor shall provide the following documentation in a closure report:

4.2.1.1. A written statement by the asbestos abatement contractor on their company letterhead describing the abatement activities, types, quantities and location of asbestos containing material abated, controls and work methods that were used, waste bagging and handling, and name and address of disposal facility.

4.2.1.2. Copy of 10-day notification and/or permit to the appropriate authorities (e.g., EPA, DANR, local fire department, etc.). If notification and/or permit are not required, the abatement contractor shall state why.

4.2.1.3. Copies of current certification and/or licenses for all asbestos supervisors and workers working onsite.

4.2.1.4. OSHA-required respirator fit testing and medical clearance documentation for each person entering the regulated area.

4.2.1.5. Copies of personal air monitoring data or supporting Negative Exposure Assessment (NEA).

4.2.1.6. Legible copies of all daily logs.

4.2.1.7. Legible copies of the final signed waste manifests or other shipping documentation.

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GSA ASBESTOS ABATEMENT THIRD PARTY CLEARANCE TESTING REQUIREMENTS STATE OF SOUTH DAKOTA

1. PROJECT OBJECTIVES

1.1. The Contractor shall provide labor, materials, and equipment necessary to perform the onsite clearance testing of the asbestos abatement activities, to include visual inspection and air sampling.

1.2. All work shall be conducted by a qualified industrial hygienist from an asbestos consulting firm that is independent of the asbestos abatement contractor.

2. PERMITTING/REGULATIONS/CODES

2.1. Contractor shall be responsible for obtaining all necessary local, state, and federal permits and licenses and payment of related fees.

2.2. Contractor shall comply with all applicable federal, state, and local regulations, guidance documents and standards including but not limited to:

2.2.1. Occupational Safety & Health Administration (OSHA) Asbestos in Construction Standard - 29 CFR 1926.1101

2.2.2. OSHA Asbestos in General Industry Standard – 29 CFR 1910.1001

2.2.3. OSHA Respiratory Protection Standard - 29 CFR 1910.134

2.2.4. U.S. Environmental Protection Agency (EPA) National Emission Standards for Hazardous Air Pollutants (NESHAP) - 40 CFR 61 Subpart M

2.2.5. EPA Asbestos Hazard Emergency Response Act (AHERA) - 40 CFR 763

2.2.6. Federal Management Regulation, Real Property, Safety and Environmental Management, Asbestos - 41 CFR 102-80.15

2.2.7. U.S. Department of Transportation Hazardous Material Transportation Regulations – 49 CFR 171 and 172

2.2.8. South Dakota Emission Standards for Asbestos Air Pollutants - Administrative Rules of South Dakota (ARSD) 74:36:08:02

2.2.9. South Dakota Asbestos Control Program - ARSD Article 74:31

2.2.10. ASTM Standard E1368-14 – *Standard Practice for Visual Inspection of Asbestos Abatement Projects*

2.2.11. EPA Guidance Document – *Guidance for Controlling Asbestos-Containing Materials* (EPA 560/5-85-024)

2.2.12. National Institute for Occupational Safety and Health (NIOSH) Method 7400 – *Asbestos and Other Fibers by Phase Contrast Microscopy (PCM)*, Current Issue.

2.3. All work shall comply with codes and standards applicable to each type of work through the course of this project. The contractor shall also comply with the requirements of GSA BuildGreen standards, and PBS P-100.

3. VISUAL CLEARANCE INSPECTION REQUIREMENTS

3.1. Visual inspections of the work area(s) shall be conducted in accordance with Section 6.4.1 of the EPA *Guidance for Controlling Asbestos-Containing Materials* (EPA 560/5-85-024) and the Completeness of Removal inspection in ASTM Standard E1368-14 *Standard Practice for Visual Inspection of Asbestos Abatement Projects*.

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3.2. Final visual inspections shall be completed upon conclusion of the asbestos abatement activities to ensure the effectiveness of the controls, confirm job completeness, to ensure that the work area is visibly clean of debris, and to ensure the abatement work methods complied with applicable regulations and GSA protocols.

3.3. Final visual inspections shall include the entire work area(s) including all surfaces, ceilings, walls, flooring, decontamination units, remaining plastic sheeting / critical barriers, etc. looking for debris from any source, residue on surfaces, dust, or other matter.

3.4. If the area does not pass visual inspection, the abatement contractor shall be directed to re-clean the area at no additional cost, and the process will be repeated until clearance is achieved.

4. FINAL AIR MONITORING CLEARANCE REQUIREMENTS

4.1. Where feasible, five (5) aggressive air clearance samples per containment / regulated area shall be collected. For smaller work areas and multiple glove bags in a single functional space, please consult with the GSA OFM Industrial Hygiene Group for clearance sample requirements.

4.2. Air samples collection methodology shall be in accordance with the NIOSH 7400 PCM method.

4.3. Air samples shall be collected on open-faced, 0.8-micron, 25-millimeter (mm), mixed cellulose ester (MCE) filter air sampling cassettes using electric high-volume sampling pumps.

4.4. Air sampling cassettes shall be placed on a sampling stand to achieve cassette heights between 3 to 5 feet above floor level and with the cassette opening orientated downward at a 45° angle.

4.5. Each air sampling pump shall be calibrated with the cassette in-line with a rotameter before and after air sampling; adjusting the flow as necessary to obtain the desired flow rate. Rotameters shall be properly calibrated against a primary standard.

4.6. Sample flow rates shall be approximately 10 liters (L) per minute.

4.7. A minimum sample volume of 1,200 liters (L) per sample shall be collected.

4.8. An appropriate number of field blanks shall be used pursuant with the NIOSH Method 7400.

4.9. Asbestos air sample analysis shall be conducted either onsite by a NIOSH 582 trained microscopist participating in the American Industrial Hygiene Association Proficiency Analytical Testing (PAT) Program for PCM or performed by an American Industrial Hygiene Association (AIHA) and/or National Institute of Standards and Technology (NIST) National Voluntary Laboratory Accreditation Program (NVLAP) -accredited analytical laboratory.

4.10. Final clearance sample results shall be compared to the AHERA PCM clearance criteria threshold of 0.01 fibers per cubic centimeter (f/cc).

4.11. Work area shall not be cleared or abatement contractor released until all final air clearance samples collected are less than the clearance criteria. If clearance samples fail, please contact GSA Project Manager and Regional Industrial Hygienist for direction. The regulated area may have to be re-cleaned or re-cleared or samples reanalyzed by TEM.

5. DELIVERABLE REQUIREMENTS

5.1.1. The third-party IH shall provide a written letter report including the following at a minimum.

5.1.2. Written report narrative

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5.1.2.1. A summary of the abatement activity including the building, location within the building, type of asbestos material, quantity removed, and number and types of containments / regulated work areas.

5.1.2.2. A description of sample collection, including number and types of samples collected, and samples analysis methodologies.

5.1.2.3. Observations, findings, and conclusions.

5.1.3. Table of final air clearance results

5.1.3.1. A table including sample identification, location, and result compared to clearance thresholds at a minimum.

5.1.4. Attachments

5.1.4.1. Air sample collection data sheets or laboratory analytical data, with chain-of-custody documentation and lab accreditation

5.1.4.2. Copies of firm/personnel certifications

5.1.4.3. Daily logs, clearance checklists, and all other field paperwork

5.1.4.4. Figure depicting containment configuration (i.e., critical barriers, NAM, exhaust, decon/waste loadout) and air sample locations)

5.1.4.5. Photographic log

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GSA BASE LEAD MATERIAL DISTURBANCE REQUIREMENTS

NOTE: This document provides the minimum (base) GSA requirements for all lead disturbing activities at a GSA-administered building. Lead disturbing activities includes but is not limited to any sanding, burning, welding, cutting, sawing, abrading, scraping, or otherwise impacting materials with lead containing paints or coatings or other building materials containing lead. Specific requirements for the disturbance or removal of lead containing materials may vary due to field conditions, types or quantities of involved lead materials, lead content, proposed work activity methodologies, controls, etc. For activity-specific requirements please consult with the GSA Region 8 Regional Industrial Hygienist. *NOTE: If the building contains pre-1978 residential dwellings or child-occupied facilities, then additional requirements from EPA, HUD and the state environmental protection agency may also apply.*

1. PROJECT OBJECTIVES

1.1. The contractor shall provide all labor, materials, equipment and supervision necessary to perform disturbance of materials with lead containing paints or coatings ("Lead containing paint" or "LCP") or other lead containing materials.

2. DEFINITIONS

2.1. "Lead Disturbing Activities" includes but is not limited to any demolition or renovation activity that includes the sanding, burning, welding, cutting, sawing, abrading, scraping, or otherwise impacting materials with lead containing paints or coatings, or other building materials containing lead.

2.2. "Lead Containing Paint." Under the OSHA Lead in Construction Standard disturbance of paints and coatings with any detectable level of lead are regulated, not just the EPA/HUD definition of lead based paint of 0.5% by weight. **Therefore, all paints and coatings with any lead content shall be considered as Lead Containing Paint (LCP) and managed as such**.

3. PERMITTING/REGULATIONS/CODES

3.1. Contractor shall be responsible for obtaining all necessary local, state, and federal permits and licenses and payment of related fees.

3.2. Contractor shall comply with all applicable federal, state, and local regulations including but not limited to:

3.2.1. Occupational Safety & Health Administration (OSHA) Lead Occupational Safety and Health General Industry Standard - 29 CFR 1910.1025

3.2.2. OSHA Lead Safety and Health Regulations for Construction Standard – 29 CFR 1926.62

3.2.3. OSHA Respiratory Protection Standard - 29 CFR 1910.134

3.2.4. U.S. Environmental Protection Agency (EPA) Resource Conservation and Recovery Act Regulations - 40 CFR 260 et seq.

3.2.5. Federal Management Regulation, Real Property, Safety and Environmental Management, Lead - 41 CFR 102-80.30

3.2.6. U.S. Department of Transportation Hazardous Material Transportation Regulations – 49 CFR 171 and 172

3.2.7. State environmental protection agency's hazardous waste management rules and regulations.

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3.3. All work shall comply with codes and standards applicable to each type of work through the course of this project. The contractor shall also comply with the requirements of GSA BuildGreen standards, and PBS P-100.

4. LEAD DISTRUBANCE REQUIREMENTS

4.1. General

4.1.1. All regulated lead disturbing activities shall be conducted by a qualified contractor with the proper licenses, certification, training, experience, personnel, and equipment necessary to properly conduct the work.

4.1.2. Contractor shall field verify all conditions, requirements, and quantity of lead containing material to be disturbed at time of pre-bid walk through.

4.1.3. Contractor to coordinate schedule of work with the GSA Building and Project Manager.

4.2. Lead Disturbing Work Practices and Control Requirements

4.2.1. The Contractor and their OSHA-defined Competent Person shall evaluate and implement all necessary measures to comply with the OSHA Lead in Construction Standard (29 CFR 1926.62) and ensure that any building occupants or other non-lead workers are not exposed to lead or lead dust per 29 CFR 1910.1025. This shall include but is not limited to:

4.2.1.1. All workers engaging in lead disturbing activities shall be properly trained per the OSHA standards.

4.2.1.2. Proper personal protective equipment (PPE) shall be used as determined by hazard evaluations conducted by the Contractor's OSHA-defined Competent Person. Workers shall have the proper training, medical surveillance and clearance, and fitting testing.

4.2.1.3. Work areas shall be marked and demarcated with the proper signage, and access shall be restricted.

4.2.1.4. Work areas shall be isolated and proper engineering controls implemented to minimize the potential for lead dust to migrate out of the work areas, as appropriate. This can include:

4.2.1.4.1. Floors in the work area covered with 6-millimeter polyethylene sheeting and walls covered with 4-millimeter or greater polyethylene sheeting.

4.2.1.4.2. Protection of the HVAC system through 6-millimeter polyethylene critical barriers over air supply and return ducts

4.2.1.4.3. Critical barriers over all openings into the work area

4.2.1.4.4. Establishment of negative pressure in the work area using high efficiency particulate air (HEPA) filter equipped negative air machines (NAM)

4.2.1.5. Proper equipment and work practices shall be implemented to minimize the potential for lead dust generation. This includes but is not limited to:

4.2.1.5.1. Use of HEPA-shrouded equipment

4.2.1.5.2. Application of water at point of cut

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4.2.1.5.3. Prohibition on dry sweeping, compressed air, etc.

4.2.1.5.4. All vacuums shall be industrial grade equipped with true HEPA filters

4.2.1.5.5. Structural steel, piping or other metal substrates with LCP that needs to be cut, welded, or heated shall be stripped of paint in the affected area prior to cutting, welding or heating

4.2.1.5.6. If LCP needs to be scrapped off, Contractor shall use wet scraping with a HEPA vacuum or shroud at point of scrape

4.2.1.5.7. For the removal or disturbance of unpainted copper piping, cut the piping above or below the solder joint and avoid heating up the pipe

4.2.1.6. The Contractor shall conduct an initial exposure assessment and ongoing monitoring as required.

4.2.1.7. Promptly clean up dust and debris on an ongoing basis in the work areas during lead disturbing activities and ensuring that proper engineering controls and hygiene practices are continuously implemented to prevent migration or tracking out of dust and debris from the regulated areas. Discovery of dust and debris outside of regulated areas will require an immediate assessment, response, and cleanup.

4.2.1.8. Workers shall practice good hygiene practices in accordance with the OSHA standard

4.2.2. Any welding, cutting or heating of lead containing materials shall also meet applicable requirements of 29 CFR 1926.353(c)(2)(i) and 29 CFR 1926.354(c)(1) if performed in an enclosed space.

4.2.3. Contractor shall not seek or apply for any variance or alternative work procedures from any authority having jurisdiction (AHJ) unless previously approved in writing by the GSA Regional Industrial Hygienist. Once approved by GSA, Contractor may request a variance or alternative work procedures in writing from any AHJ and must receive written approval from the AHJ prior to the commencement of lead disturbing activities. Written AHJ approval of any variance or alternative work procedures shall be provided to GSA.

4.2.4. Negative air machine (NAM) exhaust shall be exhausted to the exterior of the building, if feasible.

4.3. Final Clean and Oversight Requirements

4.3.1. Depending upon site-specific factors, including but not limited to the extent and type of lead disturbing activities, lead content of the affected materials, work methods and engineering controls, proximity to occupied areas, etc., the GSA Region 8 Regional Industrial Hygienist may require third-party oversight of the lead disturbing activities in accordance with this section.

4.3.2. In each work area upon the completion of disturbing activities, the Contractor shall perform final cleaning of the regulated areas including on top of ductwork, conduits, other horizontal surfaces, etc., by wet wiping and use of HEPA filtered vacuums, as directed.

4.3.3. Third-party oversight shall be conducted by a qualified industrial hygienist, as directed. This can include visual observations of work practices and controls, ambient air sampling, final visual clearances, and final wipe clearances.

4.3.4. If the area does not pass final clearances, the Contractor shall re-clean the area at no additional cost, and the process will be repeated until clearance is achieved.

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4.3.5. Upon successful clearances, the Contractor shall deregulate the area by properly removing all waste, remaining items and equipment, controls, and signage.

4.4. Lead Bearing Waste Material Disposal Requirements

4.4.1. All lead containing debris shall be double bagged in 6-millimeter, labeled polyethylene bags, containerized, and transported and properly disposed of off-site at an appropriate facility.

4.4.2. Contractor shall be responsible for the proper characterization and management of lead bearing waste in accordance with applicable federal, state, and local hazardous waste regulations including 40 CFR 260-299, and 49 CFR Parts 171 & 172.

4.4.3. Lead bearing waste shall be assumed to be hazardous waste due to the characteristic of toxicity (Lead, EPA Waste Code D008) or have representative wastestream samples submitted to an accredited analytical laboratory for analysis via EPA Method SW-846 Test Method 1311: Toxicity Characteristic Leaching Procedure (TCLP).

4.4.4. Metal building materials containing lead or covered with LCP may be recycled provided all applicable regulations are met, the recycling destination facility accepts lead painted metal, and the presence the lead painted metal is disclosed to the recycling destination facility.

5. SUBMITTAL AND DELIVERABLE REQUIREMENTS

5.1. Lead Disturbance Specific Pre-Work Submittals

5.1.1. Prior to the commencement of lead disturbing actions, the Contractor shall provide the following documentation to GSA for review and approval by the GSA Project Manager and GSA Regional Industrial Hygienist:

5.1.2. Contractor shall provide a written method of procedure (MOP) providing the following at a minimum:

5.1.2.1. Statement of contractor's qualifications and copies of the firm's relevant licenses or certifications, worker certification and training, as applicable

5.1.2.2. Types, quantities, and locations of lead disturbing work to occur

5.1.2.3. A very detailed description of specific controls and work methods to be employed for each type of lead disturbing work

5.1.2.4. Number and types of regulated areas

5.1.2.5. Project phasing and tentative schedule

5.1.2.6. Waste characterization and management including how lead bearing will be bagged, managed, characterized, and the name and address of disposal or recycling facility(ies) to be used

5.1.2.7. Copies of safety data sheets (SDSs) for all chemical products to be used.

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5.2. Lead Disturbance Specific Close-Out Deliverables

5.2.1. Upon completion of lead disturbing activities, the Contractor shall provide the following documentation in a closure report:

5.2.1.1. A written statement by the Contractor on their company letterhead describing the lead disturbing activities, types, quantities and location of disturbing, controls and work methods that were used, waste bagging and handling, and name and address of disposal or recycling facility(ies).

5.2.1.2. Copies of firm's licenses and certifications

5.2.1.3. Copies of current certification, licenses, training for all lead workers

5.2.1.4. OSHA-required respirator fit testing and medical clearance documentation for all lead workers

5.2.1.5. Copies of personal air monitoring data

5.2.1.6. Legible copies of all daily logs.

5.2.1.7. Legible copies of waste characterization data, final signed waste manifests or all other related shipping and disposal documentation.

U.S. GENERAL SERVICES ADMINISTRATION
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SOUTH DAKOTA
ASBESTOS PRE-ALTERATION ASSESSMENT
STATEMENT OF WORK

In order to comply with 40 CFR 61.145(a), 41 CFR 102-80.15(c), Administrative Rules of South Dakota 74:36:08:02 and Section 1.7.4.1.2 of the GSA PBS-P100, a pre-alteration asbestos assessment will be required before any demolition or renovation activity that impacts suspect building materials. A state certified asbestos building inspector must inspect and assess all areas within this scope and test all suspect materials for asbestos content that may be disturbed by the proposed renovation or demolition activity. GSA will provide construction scopes of work, specification, and drawings related to the proposed demolition/renovation activity. The following must be adhered to.

Permitting/Regulations/Codes

- The assessment shall be conducted in accordance with the "Pre-Construction Survey" requirements of ASTM E2356 - 14 *Standard Practice for Comprehensive Building Asbestos Surveys*
- The assessment shall be conduct pursuant with applicable federal, state, and local asbestos regulations as well as GSA policy including but not limited to:
    1. U.S. Environmental Protection Agency (EPA) National Emission Standards for Hazardous Air Pollutants (NESHAP) - 40 CFR 61 Subpart M
    2. EPA Asbestos Hazard Emergency Response Act (AHERA) and Asbestos School Hazard Abatement Reauthorization Act (ASHARA), as well as associated implemented regulations under the Toxic Substance Control Act regulations codified at 40 CFR 763
    3. Occupational Safety and Health Administration (OSHA) General Industry Asbestos Standard – 29 CFR 1910.1001
    4. OSHA Construction Industry Asbestos Standard - 29 CFR 1926.1101
    5. Federal Management Regulation, Real Property, Safety and Environmental Management, Asbestos – 41 CFR 102-80.15
    6. Administrative Rules of South Dakota 74:36:08:02
    7. Administrative Rules of South Dakota Article 74:31
    8. GSA PBS-P100 Facilities Standards for the Public Building Service. Latest Issue
- All work shall comply with codes and standards applicable to each type of work through the course of this project. The contractor shall also comply with the requirements of GSA BuildGreen standards, and PBS P-100.

Asbestos Pre-Alteration Inspection and Assessment

- Asbestos pre-alteration inspection and assessment shall be completed by a State of South Dakota Certified Asbestos Building Inspector.
- The assessment shall include any and all materials to be impacted by the proposed GSA repair, alteration or demolition project including the exterior and interior of the building.
- Destructive sampling of materials that will be disturbed as a result of the proposed project is required and authorized. Sample holes shall be temporarily patched or covered with puddy, tape, etc., as appropriate.
- Follow sampling protocols per ASTM E2356 – 14 and AHERA sampling protocols at 40 CFR 763.86. Please note the following:
    1. For Miscellaneous Materials, collect a minimum of two (2) samples per each Homogeneous Area.

Asbestos Sample Analysis

- Bulk samples shall not be composited for analysis and shall be analyzed by polarized light microscopy (PLM) via Method EPA/600/R-93/116.
- All separable layers within a bulk sample must be analyzed individually. Drywall system samples shall also be analyzed as a composite for EPA/SD DANR compliance.
- Progressive sampling (positive stop) for each HA is allowed.
- If a sample is estimated to be 1% asbestos or less, but greater than 0% by EPA/600/R-93/116, the sample shall be re-analyzed by EPA/600/R-93/116 with a 400 Point Count. If a result obtained by point count is different from a result obtained by visual estimation, the point count result must be used.
- Asbestos bulk sample analysis shall be performed by a laboratory that participates in the National Institute of Standards and Technology (NIST), National Voluntary Laboratory Accreditation Program (NVLAP) for asbestos bulk sample analysis.

Inspection Report Deliverable Requirements

- Contractor shall provide a written report including the following at a minimum:

1. The name and address of the building, structure of facility that was inspected. If less than the entire building, structure, or facility was inspection, the exact location of the area or component(s) inspected shall be listed.
2. The South Dakota certified asbestos building inspector's name, signature, contact information, and individual certification number.
3. The date(s) the inspection/assessment was performed.
4. General description of building and its physical components, dates of construction and any known renovations, description of mechanical systems such as HVAC and plumbing systems.
5. Description of the proposed repair, alteration, or demolition activities
6. Description of assessment protocols, sample collection and analytical procedures
7. Summary of findings and a table including:
    - Homogenous area/material designation
    - Detailed material description
    - Sample numbers
    - Description of sample locations
    - Sample results / asbestos percentage
    - Estimated quantity
    - Friability
    - Material condition assessment
8. Summary of determined or assumed ACM materials that would be disturbed by proposed project activities and recommendations. Contractor shall also denote any non-ACM materials that would still be OSHA regulated (1% asbestos or less).
9. Figures
    - Site location figure
    - Sample location figure(s)
    - Extent of each HA determined or assumed ACM and OSHA regulated materials figure(s)
10. Photographic log with representative photos of each HA determined or assumed to be ACM or OSHA regulated.
11. Field notes
12. COC / laboratory data packages / lab accreditations
13. Inspector and firm certifications.

U.S. GENERAL SERVICES ADMINISTRATION
REGION 8 PUBLIC BUILDINGS SERVICE
LEAD CONTAINING PAINT PRE-ALTERATION ASSESSMENT
STATEMENT OF WORK

In order to comply with 29 CFR 1910.1025. 29 CFR 1926.62, 41 CFR 102-80.30 and Section 1.7.4.2 of the GSA PBS-P100, a pre-alteration lead containing paint (LCP) assessment will be required before any demolition or renovation activity where LCP coating and surfaces may be sanded, burned, welded, scraped or otherwise impacted in the project area. **Under the OSHA Lead in Construction Standard, all detectable levels of lead in paints and coatings are regulated, not just the EPA/HUD definition of lead based paint (LBP) of 0.5% by weight. Therefore, all paints/coatings with any lead content will be considered LCP.** All coatings and paints in buildings built prior 1978 are suspect LCP and will be assumed as such unless assessed and sampled. GSA shall provide any relevant renovation project scope information. The following shall be adhered to:

A. Destructive Testing and Patching. Destructive chip sampling of materials that will be disturbed as a result of the proposed project is authorized. Sample points shall be temporarily patched or covered with tape, etc.

B. Regulatory and Policy Requirements. The assessment shall be conduct in pursuant with applicable federal, state, and local lead regulations as well as GSA policy including but not limited to:

1. EPA Lead Renovation, Repair, and Painting Rule (RRP) as well as associated implemented regulations under the Toxic Substance Control Act (TSCA) regulations codified at 40 CFR 745‡
2. U.S. Department of Housing and Urban Development (HUD) Lead-Based Paint Poisoning Prevention in Certain Residential Structures - 24 CFR 35‡
3. HUD *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing*. Second Edition, July 2012‡
4. Occupational Safety and Health Administration (OSHA) General Industry Toxic and Hazardous Substances, Lead Standard - 29 CFR 1910.1025
5. OSHA Lead in Construction Standard - 29 CFR 1926.62
6. Federal Management Regulation, Real Property, Safety and Environmental Management – 41 CFR 102-80.30
7. GSA PBS-P100 Facilities Standards for the Public Building Service. 2017

‡ Although EPA/HUD lead based paint regulations and guidance do not currently apply to non-child occupied commercial and public buildings, GSA does incorporate relevant substantive requirements of these standards to ensure the safety and health of tenants and employees.

C. Contractor Qualifications. All sampling and assessment activities shall be performed by individuals with appropriate levels of OSHA lead awareness and certified/licensed through the EPA RRP Rule or through the State of Colorado as lead inspections or risk assessors. If an X-ray fluorescence (XRF) instrument is used, all inspectors/risk assessors must possess current training, certification and licensing in the use of the XRF equipment under appropriate federal, state or local authority.

D. Assessment and Sampling Protocols. Contractor shall delineate and group painted or coated surfaces into homogenous areas by component type, substrate, visible color, and texture. All accessible areas within the scope of the renovation project shall be inspected and assessed. The assessment and sampling of suspect LCP via XRF screening and paint chip analysis shall be conducted in accordance with 40 CFR 745.227(b), 40 CFR 745.227(f), and Chapter 7 of the HUD *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing*.

I X-Ray Fluorescence (XRF) Screening

a If XRF screening is used, only XRF devices with a posted and current Performance Characteristic Sheet (PCS) with EPA and HUD shall be used.

b An appropriate number of calibration checks shall be taken, including a minimum of three checks prior to the beginning of the inspection, at least every four hours, and after inspection work has been completed, or in accordance with manufacturer's instructions, whichever is most frequent.

c XRF screening methodology of suspect LCP shall be in accordance with Chapter 7 of the HUD *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing*. Contractor shall take a minimum of one individual XRF reading on each testing combination in each room equivalent. For walls, contractor shall take at least four readings (one reading per wall) in each room equivalent.

d For any irregular painted/coated surfaces or any other circumstance in which an accurate XRF reading is not feasible, the Contractor shall collect a representative paint chip sample in accordance with Section D.II of this SOW.

e For any XRF result of less than 1.0 mg/m^2 or within the XRF instrument's inclusive or negative range, the Contractor shall collect a representative confirmatory paint chip sample in accordance with Section D.II of this SOW.

II Paint Chip Assessment

a A minimum of one representative paint chip sample of each homogenous area delineated and grouped by component type, substrate, visible color, and texture that may be impacted by renovation project shall be collected in accordance with 40 CFR 745.227(b), 40 CFR 745.227(f), and Chapter 7 of the HUD *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing. NOTE: If XRF is utilized to screen positive results in accordance with Section I.D, then only representative confirmatory paint chip samples of XRF readings less than 1.0 mg/m^2 or otherwise in the inclusive or negative range of the instrument are required.*

b Lead chip samples shall be submitted under chain-of-custody protocols to an accredited analytical laboratory for flame atomic absorption spectroscopy (FAAS) analysis via EPA Method SW 846 3050B/7000B.

c All lead paint chip samples shall be analyzed by an analytical laboratory accredited by the EPA National Lead Laboratory Accreditation Program (NLLAP) or AIHA Environmental Lead Laboratory Accreditation Program (ELLAP), and participating in the AIHA Environmental Lead Proficiency Analytical Testing (ELPAT).

d Lead paint chip results shall be reported as percent by weight.

E. Deliverable Requirements. Contractor shall provide a written report for GSA's review and comment documenting the inspection and assessment. The deliverable shall include the following at a minimum:

I The name and address of the building, structure of facility that was inspected. If less than the entire building, structure, or facility was inspection, the exact location of the area or component(s) inspected shall be listed.

II The lead inspector's or risk assessor's inspector's name, signature, contact information, individual certification number.

III The date(s) the inspection/assessment was performed.

IV General description of building and its physical components, dates of construction and any known renovations, description of mechanical systems such as HVAC and plumbing systems. Description of area to be affected by the planned renovation activity.

V Description of each assessment and testing method, device, or sampling procedure utilized for paint analysis, including quality control data, and if used, the serial number of any XRF device used.

VI Specific locations of each painted or coated component tested for the presence of lead-containing paint.

VII Summary of findings and table including material description / HA / location in building / sample numbers / lead concentration / estimated quantity / material condition-assessment.

VIII Summary of determined or assumed LCP materials that would be disturbed by proposed project activities and recommendations.

IX Figures

a Site location figure

b Sample location figure(s)

c Extent of each HA determined or assumed to be LCP

X Photographic log with representative photos of each HA determined or assumed to be LCP

XI Field notes

XII Inspector's / Risk Assessor's credentials and certifications including XRF training and certification, as applicable

XIII COC / laboratory data packages / lab accreditations, as applicable

XIV XRF Performance Characteristic Sheet, as applicable

XV XRF sample data output, as applicable

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "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 that is current as of date of the Contract Documents.
   2. New Products: Items that have not previously been incorporated into another project or facility. Salvaged items or items reused from other projects are not considered new products. Items that are manufactured or fabricated to include recycled content materials are considered new products, unless indicated otherwise.
   3. Comparable Product: Product by named manufacturer that is demonstrated and approved through the comparable product submittal process described in Part 2 "Comparable Products" Article, to have the 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. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. Published attributes and characteristics of basis-of-design product establish salient characteristics of products.
   1. Evaluation of Comparable Products: In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification. Manufacturer's published attributes and characteristics of basis-of-design product also establish salient characteristics of products for purposes of evaluating comparable products.

C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications; submit a comparable product request or substitution request, if applicable.

D. Comparable Product Request Submittal: An action submittal requesting consideration of a comparable product, including the following information:
   1. Identification of basis-of-design product or fabrication or installation method to be replaced, including Specification Section number and title and Drawing numbers and titles.
   2. Data indicating compliance with the requirements specified in Part 2 "Comparable Products" Article.

E. Basis-of-Design Product Specification Submittal: An action submittal complying with requirements in Section 013300 "Submittal Procedures."

F. Substitution: Refer to Section 012500 "Substitution Procedures" for definition and limitations on substitutions.

1.3 COORDINATION

A. Modify or adjust affected work as necessary to integrate work of approved comparable products and approved substitutions.

PART 2 - PRODUCTS

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 017350 - FIRE PREVENTION PRECAUTIONS FOR HOT WORK

PART 1 GENERAL

1.1 SUMMARY

A. This section applies to safeguards to be observed in performing hot work, including welding, soldering, brazing and other operations where open flames or implements utilizing heat are used.

B. Hot Work Permit: Comply with NFPA 51B. Do not conduct operations involving the use of open-flame, electrical arc equipment, or flammable substances until a permit for welding, cutting, and burning has been issued by the Government.

1. GSA will identify and delineate the responsibilities of the Government permit authorizing individuals before or during the Preconstruction Meeting.

C. Hot work permit duration shall be one work shift for a specific location unless otherwise agreed to by the Government and Contractor.

1.2 SAFETY PRECAUTIONS

A. Prior to operations, the site shall be visited and suitable locations established for the portable equipment storage during non-working hours. The Contractor and the Government shall coordinate and designate such locations.

B. The Contractor shall ensure that operations involving the use of open-flame, electrical arc equipment or flammable substances are not conducted until a permit for welding, cutting, and burning has been completed, signed and issued by the GSA Building Manager.

C. Prior to commencing operations, a positive determination shall be made that it is impractical to conduct the hot work in a shop area or outside of the building. Coordinate suitable locations for hot equipment operations agreeable to the Contracting Officer's Representative.

1.3 NOTIFICATION

A. The Contractor shall notify GSA's Building Manager at least *24* hours in advance of the area of operations for each day and of all subsequent changes that occur.

B. The Contractor shall notify the GSA Building Manager of all locations where hot work has been performed not less than 30 minutes before the work or no more than 90 minutes after work is completed or stopped for the day.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 INSPECTION

A. Before starting operations, the Contractor shall furnish trained personnel to provide fire watches for locations

where hot work is to be performed. One fire watcher may observe no more than two (2) locations if in a relatively small contiguous area if approved by the Contracting Officer's Representative and in compliance with applicable fire codes. Contractor shall furnish a suitable type, fully-charged, operable portable fire extinguisher to each fire watcher.

1. The Contractor shall provide fire watchers who know how to operate the fire extinguisher, how to initiate a fire alarm and how to summon the fire department.

B. Before starting operations, take suitable precautions to minimize the hazard of a fire communicating to the opposite side of walls, floors, ceilings and roofs from the operations.

3.2 SAFETY MEASURES

A. Hot work shall not be done in or near rooms or areas where flammable liquids or explosive vapors are present or thought to be present. A combustible gas indicator (explosimeter) test shall be conducted to assure that each area is safe. The Contractor is responsible for arranging and paying for each test.

B. Insofar as possible, the Contractor shall remove and keep the area free from all combustibles, including rubbish, paper and waste within a radius of 25 feet (7.62 m) from hot operations.

1. If combustible material cannot be removed, the Contractor shall furnish fireproof blankets to cover such materials. At the direction of the Building Manager or Contracting Officer's Representative, floors, walls, and ceilings of combustible material shall be wetted thoroughly with water before, during, and after operations sufficiently to afford adequate protection.

2. Where possible, the Contractor shall furnish and use baffles of metal or gypsum board to prevent the spraying of sparks, hot slag and other hot particles into surrounding combustible material.

C. The Contractor shall prevent the spread of sparks and particles of hot metal through open windows, doors, and holes and cracks in floors, walls, ceilings and roofs.

D. Cylinders of gas used in hot work shall be placed a safe distance from the work. The Contractor shall provide hoses and equipment free of deterioration, malfunction and leaks. Suitable supports shall be provided to prevent accidental overturning of cylinders. All cylinder control valves shall be shut off while in use with the gas pressure regulator set at 15 psi (103 kPa) or less.

E. When hot work operations are completed or ended for the day, each location of the day's work shall be inspected by the Contractor 60 minutes after completion of operations to detect for hidden or smoldering fires and to ensure that proper housekeeping is maintained. Contractor shall clean up the area of work at the end of each shift or workday. Contractor shall provide a continuous fire watch at least 24 hours after the burning work has been completed

F. Where sprinkler protection exists, the sprinkler system shall be maintained without interruption while operations are being performed. If operations are performed close to automatic sprinkler heads, gypsum board sheets or damp cloth guards may be used to shield the individual heads temporarily. The heads shall be inspected by the Contractor immediately after hot work operations cease, to ensure all materials have been removed from the heads and that the heads have not been damaged.

G. Suitable type, fully-charged, operable portable fire extinguisher shall be available at all times during hot work operations.

H. If any of the above safeguards are not employed or are violated, the Government may verbally stop the Work followed by written notice until compliance is obtained. Such stoppage shall not relieve the Contractor from performing his work within the Contract period for the Contract price.

END OF SECTION 017350

SECTION 017410 - CONSTRUCTION INDOOR AIR QUALITY (IAQ) MANAGEMENT

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

1. This Section includes requirements for the development of a Construction Indoor Air Quality Management Plan (alternately referred to as the Plan). The Plan shall be developed by the Contractor or other qualified party under contract to the Contractor as approved by the Owner and Architect. The Plan shall be implemented by the Contractor and the trade contractors throughout the duration of the project construction, and shall be documented per the Submittal Requirements of this Section.

1.3 RELATED SECTIONS

1. All sections of the Specifications related to interior construction, MEP systems, and items affecting indoor air quality.

2. GSA FY23 01 81 11 SUSTAINABLE DESIGN REQUIREMENTS

3. GSA F23 01 91 13 GENERAL COMMISSIONING (Cx) REQUIREMENTS

1.4 REFERENCE STANDARDS

1. The Steel Metal and Air Conditioner National Contractors Association (SMACNA) IAQ guidelines for Occupied Buildings under Construction, 2nd Edition 2007, ANSI/SMACNA 008- 2008, www.smacna.org.

2. ANSI / ASHRAE 52.2-1999, "Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size", www.ashrae.org

3. United States Environmental Protection Agency, "Compendium of Methods for the Determination of Air Pollutants in Indoor Air"

1.5 CONSTRUCTION IAQ MANAGEMENT PLAN - OVERVIEW

1. The General Contractor or other qualified party as noted in Section 1.2.A shall prepare and submit a Construction IAQ Management Plan to the Owner and Architect for approval. The Construction IAQ Management Plan shall meet the following criteria, based on the criteria of LEED NC v.3.0:

    1. Construction activities shall be planned to meet or exceed the standards included in Chapter

3 of the Sheet Metal and Air Conditioning National Contractors' Association (SMACNA) "IAQ Guidelines for Occupied Buildings under Construction", 2nd Edition 2007.

2. Absorptive materials shall be protected from moisture damage when stored on-site and after installation.

3. Filtration media shall be installed to protect ductwork and/or equipment used during the construction process.

4. A Sequence of Finish Installation Plan shall be developed, highlighting measures to reduce the absorption of VOCs by materials that act as 'sinks'.

5. Immediately prior to occupancy, the building shall be subject to an outside air flush out, OR, shall be subject to pre-occupancy air quality testing.

1.6 SUBMITTALS

1. LEED Submittal Requirements: The Contractor and/or sub-contractor shall submit the following required records and documents:

    1. A copy of the draft and final versions of the Construction IAQ Management Plan, as defined in articles 1.5 and 3.1 of this Section. The draft Plan shall be submitted to the Owner and Architect for review and approval at least 30 days prior to the commencement of work.

    2. A construction log identifying the start-up date and duration of all major Construction IAQ Management Plan control measures.

        a. If HVAC systems are used during construction, include a schedule of filter replacements or change-outs. Filter information shall include manufacturer, model number, MERV rating, and location of where it was installed.

    3. Photographs that document the implementation of the Construction IAQ Management Plan throughout the course of the project construction. Examples include photographs of ductwork sealing and protection, temporary ventilation measures, and conditions of on-site materials storage (to prevent moisture damage). Photographs shall include integral date stamping, and shall be submitted with brief descriptions, or be referenced to project meeting minutes or similar project documents. A minimum of 30 photographs shall be submitted per building, showing conditions on at least five different occasions.

    4. Product Cut Sheets for filtration media used during construction and installed immediately prior to occupancy, with MERV values highlighted. Cut sheets shall be submitted with the Contractor or sub-contractor's stamp, as confirmation that the submitted products are the products installed in the project.

    5. A construction log identifying the procedures and conditions of the building flush-out or air quality testing.

a. For flush-outs, provide the start dates and the flush-out duration, plus the air flow rates, air temperatures, and relative humidity ranges maintained. If the flush-out is done in stages, identify the building locations as part of the log.

b. For air quality testing, provide the dates of testing, the sampling locations, and the test results from the air quality testing agency. If retesting is required due to non- compliance with the referenced standard, provide a log of the flush-out procedures used prior to retesting, as well as the new retesting results.

1.7 DEFINITIONS

1. Type 1 Materials: Materials and finishes that act as sources of VOC or particulate contamination.

   Type 1 materials can include "wet" products, such as paints, sealants, adhesives, caulks, sealers and fireproofing materials as well as "dry" products such floor coverings with plasticizers, and engineered wood with formaldehyde.

2. Type 2 Materials: Materials and finishes which are woven, fibrous, or porous in nature, and tend to absorb chemicals or particulates released by Type 1 materials. Examples include textiles, carpeting, acoustical ceiling tiles and gypsum board. Type 2 materials can become "sinks" for deleterious substances which may be released later, or collectors of contaminants that may promote subsequent bacterial growth.

PART 2 PRODUCTS

2.1 FILTRATION MEDIA

A. If air handlers are used during construction, filtration media must be installed at the ends of return air ductwork, at return air grilles in an open plenum or chase, and at return air openings at mechanical rooms housing the air handling units. The filtration media shall have a Minimum Efficiency Reporting Value (MERV) of 8, as determined by ASHRAE 52.2-1999.

B. Filters at air handling units used during construction shall be MERV 10 or better.

C. Building flush-outs, as defined in article 3.3 below, shall be conducted with new MERV 13 filtration media installed at the air handling units used for the flush-outs. Upon completion of the flush-outs, the Construction Manager shall inspect the condition of the MERV 13 filters and replace any that have collected significant dust and particulates through the flush-out process.

PART 3 EXECUTION

3.1 CONSTRUCTION IAQ MANAGEMENT PLAN - DETAILED REQUIREMENTS

A. Compliance with SMACNA Guidelines:

1. Chapter 3 of the referenced "IAQ Guidelines for Occupied Buildings under Construction"

outlines IAQ measures in five categories as listed below. The Construction IAQ Management Plan shall be organized in accordance with the SMACNA format, and shall address measures to be implemented by the Contractor and/or Subcontractors in each of the five categories, including subsections. All Subsections shall be listed in the Plan; items that are not applicable for this project should be listed as such by the contractor.

a. HVAC Protection

1) Return Side

2) Central Filtration

3) Supply Side

4) Duct Cleaning

a. Source Control

1) Product Substitution

2) Modifying Equipment Operation

3) Changing Work Practices

4) Local Exhaust

5) Air Cleaning

6) Cover or Seal

c. Pathway Interruption

1) Depressurize Work Area

2) Pressurize Occupied Space

3) Erect Barriers to Contain Construction Areas

4) Relocate Pollutant Sources

5) Temporarily Seal the Building

d. Housekeeping

1) Routine Jobsite Cleaning

2) Protection of Stored Materials

3) Protection of Materials During and After Installation

4) Scheduling

5) Airing-Out of New Materials

6) Sequencing of Finish Applications

7) Proper Curing of Concrete before Covering

8) Installation During Unoccupied Periods

9) Avoidance of Building Occupancy While Pollutants Are Present

B. Protection of Materials from Moisture Damage:

1. As part of the Housekeeping section of the Construction IAQ Management Plan, measures to prevent installed materials or material stored on-site from moisture damage shall be described. This section should also describe measures to be taken if moisture damage does occur to absorptive materials during the course of construction.

C. Installation and Replacement of Filtration Media:

1. Under the HVAC Protection section of the Construction IAQ Management Plan, a description of the filtration media in all ventilation equipment shall be provided. The description shall include replacement criteria for filtration media during construction and confirmation of filtration media replacement for all equipment immediately prior to occupancy. Filtration media shall meet the requirements of article 2.01 of this Section.

D. Sequence of Finish Installation for Materials:

1. Where feasible, absorptive materials (referred to herein as "Type 2" products) shall be installed after the installation of materials or finishes which have high short-term emissions of VOCs, formaldehyde, particulates, or other air-borne compounds (referred to herein as "Type 1" products).

a. Type 2 materials include, but are not limited to: carpets; acoustical ceiling panels; fabric wall coverings; insulations (exposed to the airstream); upholstered furnishings; and other woven, fibrous or porous materials.

b. Type 1 materials include, but are not limited to: adhesives, sealants and glazing compounds (specifically those with petrochemical vehicles or carriers); paints, wood preservatives and finishes; control and /or expansion joint fillers; hard finishes requiring adhesive installation; gypsum board (with associated finish processes and products); and composite or engineered wood products with formaldehyde binders.

2. The Contractor shall develop a separate sequencing plan that identifies possible opportunities to meet the above-stated goals for the project. The plan shall be submitted to the Architect and Owner in accordance with the Submittal Requirements of this specification.

3.2 IMPLEMENTATION AND COORDINATION

A. The Contractor shall be responsible for implementation of the Construction IAQ Management Plan, and for the coordination of the Plan with all affected trades. The Contractor shall designate one individual as their Construction IAQ Representative, who will be responsible for communicating the progress of the Plan with the Owner and Architect on a regular basis, and for assembling the required documentation. The Contractor shall include provisions in the Construction IAQ Management Plan for addressing conditions in the field that do not adhere to the Plan, including provisions to implement a stop work order, or to rectify non-compliant conditions.

B. Sub-contractors shall be responsible for the implementation of specific control measures, as specified in the Construction IAQ Management Plan. Sub-contractors shall coordinate their responsibilities through the Contractor's designated Construction IAQ Representative.

3.3 BUILDING FLUSH-OUTS AND PRE-OCCUPANCY INDOOR AIR QUALITY TESTING

A. All occupied spaces the building must undergo either a Flush-out or Air Quality Testing. Contractor shall submit a written request to the Contracting Officer for approval prior to conducting the Building Flush Out and/or Air Quality Testing. Any such requests shall not be submitted until all interior finishes have been installed. A combination of the two strategies can be used in the same building. The Contractor shall provide a:

1. Flush-out:

a. A total of 14,000 cubic feet of outside air per square foot of floor area must be supplied to all occupied spaces of the buildings. A total of 3,500 cubic feet of outside air per square foot of floor area must be supplied to all spaces prior to occupancy.

b. A minimum of 0.30 cfm/sf of outside air, or the design minimum outside air rate, must be provided during the flush-out. Higher amounts of outside air may be provided to reduce the duration of the flush-out period.

c. During the flush-out, an internal temperature of at least 60 degrees F must be maintained, and the relative humidity can be no higher than 60%.

d. If a space is occupied prior to the completion of the flush-out (but after the initial 3,500 cubic feet of outside air per square foot of floor area is supplied), the flush- out ventilation rates shall begin at least three hours prior to occupancy each day, until the flush-out of the space is complete.

2. Air Quality Testing:

a. Conduct baseline IAQ testing using the protocols consistent with the United States Environmental Protection Agency, "Compendium of Methods for the Determination of Air Pollutants in Indoor Air". Demonstrate that the following contaminant maximum concentrations are not exceeded:

1) Formaldehyde: 27 parts per billion

2) Particulates (PM10): 50 micrograms per cubic meter

3) Total Volatile Organic Compounds (TVOC): 500 micrograms per cubic meter

4) 4-Phenylcyclohexene (4-PCH): 6.5 micrograms per cubic meter*

5) Carbon Monoxide (CO): 9 parts per million and no greater than 2 parts per million above outdoor levels

* This test is only required if carpets and fabrics with styrene butadiene rubber (SBR) latex backing material are installed.

b. For each sampling point where the maximum concentration limits are exceeded conduct additional flush-out with outside air and retest the specific parameter(s) exceeded to indicate the requirements are achieved. Repeat the procedure until all requirements have been met. When retesting non-complying building areas, take samples from the same locations as in the first test.

c. The air sample testing shall be conducted as follows:

1) All measurements shall be conducted prior to occupancy, but during normal occupied hours, and with the building ventilation system starting at the normal daily start time and operated at the minimum outside air flow rate for the occupied mode throughout the duration of the air testing.

2) The building shall have all interior finishes installed, including but not limited to millwork, doors, paint, carpet and acoustic tiles. Non-fixed furnishings such as workstations and partitions are encouraged, but not required, to be in place for the testing.

3) The number of sampling locations will vary depending upon the size of the building and number of ventilation systems. For each portion of the building served by a separate ventilation system, the number of sampling points shall not be less than one per 25,000 sq.ft., or for each contiguous floor area, whichever is larger, and include areas with the least ventilation and greatest presumed source strength.

4) Air samples shall be collected between 3 feet and 6 feet from the floor to represent the breathing zone of occupants, and over a minimum 4-hour period.

d. The flush-out and/or air quality testing shall be documented in accordance with part 1.6 Submittals of this Section.

END OF SECTION 017410

SECTION 017419 - CONSTRUCTION NONHAZARDOUS WASTE MANAGEMENT & DISPOSAL

PART 1 GENERAL

1.1 SUMMARY

A. Drawings and general provisions of the Contract, including Federal Acquisition Regulation (FAR) and General Services Administration Acquisition Regulation (GSAR) contract clauses, and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Salvaging non hazardous construction and/or demolition ("C&D") waste.
2. Recycling non hazardous construction and/or demolition waste.
3. Disposing of non hazardous construction and/or demolition waste.

B. Related Requirements:

1. Division 02 Section "Structure Demolition" for disposition of waste resulting from demolition of buildings, structures, and site improvements**,** *and for disposition of hazardous waste*.
2. Division 02 Section "Selective Structure Demolition" for disposition of waste resulting from partial demolition of buildings, structures, and site improvements**,** *and for disposition of hazardous waste*.
3. Division 04 Section "Unit Masonry" for disposition of waste resulting from demolition products in the course of the Work.

1.3 DEFINITIONS

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

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

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

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

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

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

1.4 PERFORMANCE REQUIREMENTS

Each year, GSA diverts at least 50% of its total non-hazardous solid waste, including construction and demolition (C&D) debris. Executive Order 14057 section 207 establishes this goal for all Federal agencies. GSA achieves this goal by estimating current diversion rates, identifying strategies and practices to increase diversion rates, and changing current C&D waste management practices.

A. General: Achieve end-of-Project rates for salvage/recycling of 100 [50] percent minimum by weight of total waste generated by the Work unless additional rates are indicated. Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials.

1.5 ACTION SUBMITTALS

A. WASTE MANAGEMENT PLAN

1. General: Use GSA's *C&D Waste Management Plan and Report* template, or develop a waste management plan according to the requirements of this Section.

2. Waste Management Plan shall consist of waste identification, waste reduction work plan, and, if available, cost/revenue analysis. Revenue from recycling/ scrap proceeds shall be retained by the contractor, and factored into their bids with GSA, to reduce the government's contract cost. Indicate anticipated quantities by weight or volume, using the same units of measure throughout the waste management plan. Submit plan within *14 or [X_]* days of date established for the Notice to Proceed.

   a. List recycling facilities, reuse facilities, municipal waste landfills and other disposal area(s) to be used. Include:

      1) Name, location, and phone number.

      2) Copy of permit or license for each facility.

   b. Revise and resubmit Plan if required by GSA.

      1) Approval of Contractor's Waste Management Plan will not relieve the Contractor of responsibility for compliance with applicable environmental regulations.

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

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

   a. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into

the Work.

b. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include a list of their names, addresses, and telephone numbers.

c. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include a list of their names, addresses, and telephone numbers.

d. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.

e. Disposed Materials: Identify materials that cannot be recycled or reused. Provide explanation or justification. Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incineration facility.

f. Handling and Transportation Procedures: Include methods that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.

1.6 INFORMATIONAL SUBMITTALS

A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, electronically submit reports in PMIS for construction waste and for demolition waste. Include the following information:

1. Material category.

2. Generation point of waste. (Building address)

3. Total quantity of waste in tons.

4. Quantity of waste salvaged, both estimated and actual in tons.

5. Quantity of waste recycled, both estimated and actual in tons.

6. Total quantity of waste recovered (salvaged plus recycled) in tons.

7. List of Materials made from recycled materials/bio-based materials and their cost (not including installation costs) purchased for use on this project.

8. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.

B. Waste Reduction Calculations: Before request for Substantial Completion, submit final Waste Diversion Report indicating total tons of waste generated, and how many of those tons were diverted from landfills or incinerators (e.g. salvaged, recycled, donated, or reused).

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

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

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

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

G. LEED Submittal: LEED letter template, signed by Contractor, tabulating total waste material, quantities diverted and means by which it is diverted, and statement that requirements for the credit have been met.

1.7 QUALITY ASSURANCE

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

B. Waste Management Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review and discuss methods and procedures related to waste management including, but not limited to, the following:

1. Waste management plans including responsibilities of waste management coordinator.

2. Requirements for documenting quantities of each type of waste and its disposition.

3. Finalized procedures for materials separation. Verify availability of containers and bins needed to avoid delays. Inspection of containers and bins for contamination and removal of any contaminated materials found.

4. Procedures for periodic waste collection and transportation to recycling and disposal facilities.

5. Waste management requirements for each trade.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 PLAN IMPLEMENTATION

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

1. Comply with GSA FY23 01 50 00 TEMPORARY FACILITIES and CONTROLS for operation, termination, and removal requirements.

B. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.

1. Distribute waste management plan to everyone concerned within *3 or [_X_]* days of submittal return.

2. Distribute Waste Management Plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

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

1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.

2. Comply with Division 01 Section "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

D. Waste Management in Historic Zones or Areas: Hauling equipment and other materials shall be of sizes that clear surfaces within historic spaces, areas, rooms, and openings, by [300 mm (12 inches)] or more.

3.2 SALVAGING DEMOLITION WASTE

Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:

1. Clean salvaged items.

2. Pack or crate items after cleaning. Identify contents of containers with labels indicating elements, date of removal, quantity, and location where removed.

3. Store items in a secure area until installation.

4. Protect items from damage during transport and storage.

5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.

B. Salvaged Items for sale and/or donation are not permitted on the Project site.

C. Salvaged Items for the Government's Use: Salvage items for the Government's use and handle as follows:

1. Clean salvaged items.

2. Pack or crate items after cleaning. Identify contents of containers with labels indicating elements, date of removal, quantity, and location where removed.

3. Store items in a secure area until delivery to GSA.

4. Transport items to the Government's storage area *[on-site] [off-site] [designated by GSA]*.

5. Protect items from damage during transport and storage.

D. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.

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

F. Plumbing Fixtures: Separate by type and size.

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

H. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panel-boards, circuit breakers, and other devices by type.

3.3 RECYCLING CONSTRUCTION AND DEMOLITION WASTE

A. General: Recycle paper (bond or newsprint) and beverage containers (glass, plastic or aluminum) used by on-site workers.

B. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling proc

C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.

1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from the Project site. Include a 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 the construction area. Do not store within the drip line of remaining trees.

4. Store components off the ground and protect from the weather.

5. Remove recyclable waste from the work site, and transport it to a recycling receiver or processor.

3.4 RECYCLING DEMOLITION WASTE

A. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.

1. Pulverize concrete to maximum [38-mm (1-1/2-inch)] [100-mm (4-inch)] size.

2. Crush concrete and screen to comply with requirements in Division 31 Section "Earth Moving" for use as satisfactory soil for fill or subbase. Recycle onsite as aggregate in new concrete or other products, if possible.

B. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.

1. Pulverize masonry to maximum [19-mm (3/4-inch)] [25-mm (1-inch)] [38-mm (1-1/2-inch)] [100-mm (4-inch)] size.

a. Crush masonry and screen to comply with requirements in Division 31 Section "Earth Moving" for use as fill or subbase. OR

b. Crush masonry and screen to comply with requirements in Division 32 Section "Plants" for use as mineral mulch.

2. Clean and stack undamaged, whole masonry units on wood pallets.

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

D. 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.

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

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

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

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

I. Carpet Tile: Remove debris, trash, and adhesive.

1. Stack tile on pallet and store clean, dry carpet in a closed container or trailer provided by carpet reclamation or recycling organization.

J. Carpet [and Pad]: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.

1. Store clean, dry carpet and pad in a closed container or trailer provided by carpet reclamation or recycling organization.

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

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

3.5 RECYCLING CONSTRUCTION WASTE

A. Packaging:

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.

2. Polystyrene Packaging: Separate and bag materials.

3. Pallets: As much as possible, require deliveries using pallets to remove pallets from the

Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.

4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Wood Materials:

1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.

2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

a. Comply with requirements in Division 32 Section "Plants" for use of clean sawdust as organic mulch.

C. Gypsum Board: Stack large clean pieces on wood pallets or in containers and store in a dry location.

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

a. Comply with requirements in Division 32 Section "Plants" for use of clean ground gypsum board as inorganic soil amendment.

3.6 DISPOSAL OF WASTE

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

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.

2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

3. [Other requirements]

B. Burning: Do not burn waste materials.

C. Disposal: Transport waste materials and dispose of at designated spoil areas on the Government's property.

D. Disposal: Remove waste materials from the Government's property and legally dispose of them.

END OF SECTION 017419

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DEFINITIONS

A. List of Incomplete Items: Contractor-prepared list of items to be completed or corrected, prepared for the Architect's use prior to Architect's inspection, to determine if the Work is substantially complete.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION

SECTION 017810 - PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.1 SUMMARY

A. This section includes administrative and procedural requirements that the Contractor must perform with regards to Project Record Documents. These include but are not limited to those defined in Part B. Electronic records that show identifiable changes shall be done. The following normally must be included, and the Contractor is required to show any other changes not listed below:

B. All electronic project record documents shall be uploaded to PMIS.

1. Marked-up copies of Contract Drawings.
2. Marked-up copies of Shop Drawings.
3. Newly prepared record drawings.
4. Marked-up copies of Specifications, addenda, and Change Orders.
5. Marked-up Product Data submittals.
6. Record Samples.
7. Field records for variable and concealed conditions.
8. Record information on Work that is recorded only schematically.
9. Building Design Standard
10. Operating manuals with a schematic diagram, sequence of operation, and system operating criteria for each system installed. Training materials and videos. Equipment maintenance manuals with complete information for all major components.
11. LEED certification documentation.
12. Computer Aided Design (CAD) drawings.
13. Building Information Model(s) (BIM): Complete BIM Submission as required by the GSA National BIM Standard and CDX v2.0.0 in effect for this project. This submission includes all native-software model files (i.e. REVIT), corrected to as-built conditions; matching IFC files; Navisworks files; COBie spreadsheets derived from model with asset, SDM & equipment information encoded; asset-linked warranties, cut sheets, and other documentation in the Standard.

C. Maintenance of Documents and Samples: Store both electronic media and hard copy Record Documents and samples in the field office apart from the Contract Documents used for construction in clean, dry conditions. They shall be readily accessible. Do not use Project Record Documents for construction purposes. All electronic Project Record Documents should be uploaded to PMIS.

1.2 RECORD BUILDING INFORMATION MODEL (BIM)

A. All BIM models shall be accessible to the GSA throughout project delivery, and final BIM

submissions are the property of the GSA. See the GSA BIM & CObBe Standard for Record Modeling Requirements.

1.3 RECORD DRAWINGS

A. Markup Procedure: During construction, the Contractor shall maintain a set of black-line white prints of Contract Drawings and Shop Drawings for Project Record Document purposes. Contractor shall mark these Drawings to show all changes that have been done. If BIM is not used, the Contractor shall maintain a copy of the Contract Document CAD files showing these changes to the physical conditions.

1. Mark record prints of Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions sufficient to construct the changes. Where Shop Drawings are marked, show cross-reference on Contract Drawings location. Identify each change to coordinate with accompanying, if any, Record Documents.

2. Mark hard copy record sets with red erasable colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.

3. Both the bound, organized, and labeled hard copies and the electronic media shall be submitted prior to Final Acceptance.

4. The Contractor is responsible for any printing costs associated with Project Record Drawings. The Contractor shall submit a preliminary set of record drawings (BIM or CAD) for review and acceptance. Before copying and distributing, submit corrected documents and the original marked-up prints to the Government for review and acceptance. If acceptable, the government will return the original marked-up prints to the Contractor for organizing into sets, printing, binding, and final submittal.

B. Copies Distribution: After completing the preparation of [BIM or CAD] Record Documents, the Contractor shall provide electronic media of each drawing, whether or not changes and additional information were recorded. These full sets will be the hard copy of record drawings for filing purposes; they are not intended for use in later maintenance on the facility. Organize the copies into manageable sets. Include appropriate identification, including titles, dates, and other information on the cover sheets.

1. Organize and bind original marked-up sets of prints that were maintained during the construction period in the same manner.

2. Organize records into sets matching the print sets. Place these sets in durable tube-type drawing containers with end caps. Mark the end cap of each container with suitable identification.

3. Submit the marked-up record set, transparencies, and the copy sets to the Contracting Officer for the Government's records.

B. Newly Prepared Construction Drawings into Record Drawings: When neither the original Contract Drawings nor Shop Drawings are not suitable for converting into ion, record drawings prepare new drawings instead of following procedures specified in part A. These new drawings will be fully developed as contract drawings. New drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.

1. Provide Drawings in a scale that allows for the scope of detailing and notations required to record the actual physical installation and its relationship to other construction.

2. When completed and accepted, integrate newly prepared Drawings with procedures specified for organizing, copying, binding and submitting record drawings.

1.4 RECORD SPECIFICATIONS

A. During the construction period, the Contractor shall maintain the Project Specifications, including addenda and other modifications issued, for Project Record Document purposes.

1. Mark the Specifications or provide new or edited Specifications to indicate the actual installation where the installation varies from that indicated in Specifications. Provide dates and other identifying information to discriminate them from the existing Specifications. These shall be fully coordinated with the other contract documents.

a. In each Specification section where products, materials or units of equipment are specified or scheduled, mark the copy with the proprietary name and model number of the product furnished.

b. Record the name of the manufacturer, supplier, installer, and other information necessary to provide a record of selections made and to document coordination with record Product Data submittals and maintenance manuals.

c. Give particular attention to substitutions, selection of product options, and information on concealed installations that would be difficult to identify or measure and record later.

2. Upon completion of markup, submit above mentioned Record Specifications to the Government in electronic *and hard copy* mediums.

1.5 RECORD PRODUCT DATA

A. During the construction period, maintain one copy of each Product Data submittal.

1. Mark Product Data to indicate the actual product installation where the installation varies from that indicated in Product Data submitted. Include changes in the product delivered to the site and changes in manufacturer's instructions and recommendations for installation.

2. Give particular attention to information about concealed products and installations that cannot be readily identified and recorded later.

3. Note related Change Orders and markup of Record Drawings, where applicable.

4. Upon completion of markup, submit a complete set of record Product Data to the Government. Where record Product Data is required as part of maintenance manuals, submit marked-up Product Data as an insert in the manual instead of submittal as record Product Data.

5. Where BIM is used, individual Product Data in PDF format shall be linked to individual components in the record BIM and shall be compliant to section 017825 Building Information & Modeling

B. BIM Files: Provide the Government the BIM that has been established and updated throughout the course of construction. The final BIM submissions must comply with the GSA National BIM Standard and CDX v2.0.0

1.6 RECORD SAMPLE SUBMITTAL

A. Immediately prior to the date of Substantial Completion, the Contractor shall meet with the Contracting Officer's Representative at the site who shall determine which of the Samples maintained during the construction period shall be transmitted to the Government for record purposes.

B. Comply with the Government's instructions for packaging, identification marking and delivery to the Government's sample storage space. Dispose of other samples in a manner specified for disposing

of surplus and waste materials.

1.7 MISCELLANEOUS RECORD SUBMITTALS

A. Refer to other Specification sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Prior to Final Acceptance, complete Miscellaneous Records and place them in good order, properly identified and bound or otherwise organized to allow for use and reference.

B. Miscellaneous Records include, but are not limited to, the following:

1. Field records on excavations and foundations.
2. Field records on underground construction and similar work.
3. Survey showing locations and elevations of underground lines.
4. Invert elevations of drainage piping.
5. Surveys establishing building lines and levels.
6. Authorized measurements utilizing unit prices or allowances.
7. Records of plant treatment.
8. Ambient and substrate condition tests.
9. Certifications received in lieu of labels on bulk products.
10. Batch mixing and bulk delivery records.
11. Testing and qualification of tradespersons.
12. Documented qualification of installation firms.
13. Load and performance testing.
14. Inspections and certifications by governing authorities.
15. Leakage and water-penetration tests.
16. Fire-resistance and flame-spread test results.
17. Final inspection and correction procedures.
18. Energy and daylighting modeling documentation.
19. Waste management records.
20. LEED certification documentation.

C. Submit to the Government.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

END OF SECTION 01 78 10

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Demolition and removal of selected portions of building or structure.

B. Related Requirements:
   1. Section 011000 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.

1.2 DEFINITIONS

A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.

B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse .

C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.

D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.3 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
   1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.4 PREINSTALLATION MEETINGS

A. Predemolition Conference: Conduct conference at [Project site] <Insert location>.
   1. Inspect and discuss condition of construction to be selectively demolished.
   2. Review structural load limitations of existing structure.
   3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
   4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
   5. Review areas where existing construction is to remain and requires protection.

1.5 INFORMATIONAL SUBMITTALS

A. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for dust control and , for noise control. Indicate proposed locations and construction of barriers.

B. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's building manager's and other tenants' on-site operations are uninterrupted.
2. Interruption of utility services. Indicate how long utility services will be interrupted.
3. Coordination for shutoff, capping, and continuation of utility services.
4. Use of elevator and stairs for material transport is to be avoided, coordinate with building occupants if necessary.
5. Coordination of Owner's continuing occupancy of existing building.
6. Provision for moving furniture and equipment to facilitate the Work and to return it to its original position.

C. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by salvage and demolition operations. Comply with Section 013233 "Photographic Documentation." Submit before Work begins.

D. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

1.6 FIELD CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: Hazardous Materials are to be removed per the provisions of this specification.
1. Prior to the start of work, test for hazardous materials.
2. Remove hazardous materials per Specifications.

E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
1. Maintain fire-protection facilities in service during selective demolition operations.

1.7 COORDINATION

A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSP A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video.
1. Inventory and record the condition of items to be removed and salvaged.

2. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

3.2 PROTECTION

A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
4. Cover and protect furniture, furnishings, and equipment that have not been removed.
5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."

B. Remove temporary barricades and protections where hazards no longer exist.

3.3 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. 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. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
7. Dispose of demolished items and materials promptly.[Comply with requirements in Section 017419 "Construction Waste Management and Disposal."]

B. 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.

C. Work in Historic Areas: Selective demolition may be performed only in areas of Project that are not designated as historic. In historic spaces, areas, and rooms, or on historic surfaces, the terms "demolish" or "remove" shall mean historic "removal" or "dismantling" as specified in Section 024296 "Historic Removal and Dismantling."
1. Aluminum windows (glass, framing and accessories) are not historic
2. Sealants are not historic
3. Treat other material as historic

D. 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 Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

E. Removed and Reinstalled Items:
1. Clean and repair 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 indicated.

F. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, 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.

3.4 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project site [and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.] [and recycle or dispose of them according to Section 017419 "Construction Waste Management and Disposal."]
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.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
4. Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."

B. Burning: Do not burn demolished materials.

3.5 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

SECTION 024296 - HISTORIC REMOVAL AND DISMANTLING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Historic treatment procedures for removal and dismantling work for designated historic spaces, areas, rooms, and surfaces and the following specific work:
      a. Removal and dismantling of indicated portions of building or structure and debris hauling.
      b. Removal and dismantling of indicated site elements and debris hauling.
      c. Salvage of existing items to be reused or recycled.

1.2 DEFINITIONS

A. Dismantle: To disassemble or detach a historic item from a surface, or a nonhistoric item from a historic surface, using gentle methods and equipment to prevent damage to historic items and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

B. Existing to Remain: Existing items that are not to be removed or dismantled, except to the degree indicated for performing required Work.

C. Remove: To take down or detach a nonhistoric item located within a historic space, area, or room, using methods and equipment to prevent damage to historic items and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

D. Retain: To keep an element or detail secure and intact.

E. Salvage: To protect removed or dismantled items and deliver them to Owner.

1.3 FIELD CONDITIONS

A. Conditions existing at time of inspection for bidding purposes will be maintained by Owner as long as practicable.

B. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with removal and dismantling work.

A. Hazardous Materials: Hazardous Materials are to be removed per the provisions of this specification.
   1. Prior to the start of work, test for hazardous materials.
   2. Remove hazardous materials per Specifications.

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

PART 2 - PRODUCTS - (Not Used)

PART 3 - EXECUTION

3.1 HISTORIC REMOVAL AND DISMANTLING EQUIPMENT

A. Removal Equipment: Use manual, handheld tools. Handheld power tools may be permitted on a case-by-case basis with approval by Architect.

B. Dismantling Equipment: Use manual, handheld tools, except as follows or otherwise approved by Architect on a case-by-case basis:
   1. Handheld power tools are permitted only as submitted in the historic treatment program. They must be adjustable so as to penetrate or cut only the thickness of material being removed.

2. Pry bars more than 18 inches long and hammers weighing more than 2 lb are not permitted for dismantling work.

3.2 EXAMINATION

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

B. Perform surveys as the Work progresses to detect hazards resulting from historic removal and dismantling procedures.

3.3 HISTORIC REMOVAL AND DISMANTLING

A. General: Have removal and dismantling work performed by a qualified historic removal and dismantling specialist. Ensure that historic removal and dismantling specialist's field supervisors are present when removal and dismantling work begins and during its progress.

B. Unacceptable Equipment: Keep equipment that is not permitted for historic removal or dismantling work away from the vicinity where such work is being performed.

C. Removing and Dismantling Items on or Near Historic Surfaces:
   1. Use only dismantling equipment and procedures within 12 inches of historic surface. Protect historic surface from contact with or damage by tools.
   2. Wherever possible, unfasten items in the opposite order from which they were installed.
   3. Support each item as it becomes loosened to prevent stress and damage to the historic surface.
   4. Dismantle anchorages.

END OF SECTION

SECTION 040342 - HISTORIC STONE MASONRY REPAIR

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes historic treatment work consisting of repairing historic stone assemblies as follows:
   1. Repairing stone masonry, including replacing partial units (dutchman).
   2. Removing abandoned anchors.
   3. Painting steel uncovered during the Work.

1.3 DEFINITIONS

A. Low-Pressure Spray: 100 to 400 psi 4 to 6 gpm.

B. Face Bedding: Setting of stone with the rift or natural bedding planes (strata) vertical and parallel to the wall plane rather than horizontal or "naturally bedded," which holds bedding planes together by gravity.

C. Repointing mortar: Mortar installed after masonry is set in place.

D. Rift: The most pronounced direction of splitting or cleavage of a stone.

E. Stone Terminology: ASTM C 119.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review methods and procedures related to repairing historic stone masonry including, but not limited to, the following:
      a. Installation of dutchman.
      b. Repairing stones damaged during mortar removal.

1.5 FIELD CONDITIONS

A. Temperature Limits, General: Repair stone units only when air temperature is between 40 and 90 deg F (4 and 32 deg C) and is predicted to remain so for at least seven days after completion of the Work unless otherwise indicated.

PART 2 - PRODUCTS

2.1 MASONRY MATERIALS

A. Stone Matching Existing: Provide natural building stone of variety, color, texture, grain, veining, finish, size, and shape to match existing stone.

2.2 ACCESSORY MATERIALS

A. Epoxy: Set partial stone dutchman with sanded 2-part epoxy.

B. Masking Tape: Nonstaining, nonabsorbent material; compatible with mortar, joint primers, sealants, and surfaces adjacent to joints; and that easily comes off entirely, including adhesive.

PART 3 - EXECUTION

3.1 PROTECTION

A. Prevent epoxy from staining face of surrounding stone and other surfaces.
   1. Cover sills, ledges, and other adjacent building components to protect them during work.

3.2 STONE REPAIR, GENERAL

A. Repair Appearance Standard: Repaired surfaces are to have a uniform appearance as viewed from 20 feet away by Architect.

3.3 TEMPORARY ANCHOR REMOVAL

A. Remove temporary anchors, brackets, wood nailers, and other extraneous items installed in mortar joints as part of construction to anchor scaffolding etc. and repoint damaged mortar joint per Specification Section 040343 Historic Stone Masonry Repointing.

B. Temporary anchors should NOT have been installed in stone. Consult Architect if anchors were accidentally installed, or discovered in stones for coring and plugging procedures.

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3.4 PARTIAL STONE REMOVAL AND REPLACEMENT (dutchman repair)

A. At locations where stones were damaged during construction, remove portions of stone and affected mortar without damaging surrounding masonry.

B. Support and protect remaining masonry that was supported by removed stone.

C. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition.

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

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

F. Replace removed portion of stone with new stone matching existing stone.

G. Rift: Do not allow face bedding of stone. Before setting, inspect to verify that each stone has been cut so that, when it is set in final position, the rift or natural bedding planes are predominantly horizontal except for arches, where bedding planes are predominantly radial or vertical, but perpendicular to the wall. Reject stone with vertical bedding planes except as required for arches, lintels, and copings.

H. Set replacement stone with epoxy completely filled bed, head, and collar joints.

3.5 PAINTING STEEL/ANCHORS UNCOVERED DURING THE WORK

A. Surface Preparation: Remove paint, rust, and other contaminants according to SSPC-SP 2, "Hand Tool Cleaning SSPC-SP 3, "Power Tool Cleaning" as applicable to comply with paint manufacturer's recommended preparation.
   1. Antirust Coating: Immediately paint exposed steel with two coats of antirust coating, following coating manufacturer's written instructions.

3.6 FINAL CLEANING

A. Cleaning epoxy off stone surfaces is impossible after it cures. Clean epoxy off adjacent surfaces immediately.

B. Remove masking materials, leaving no residues that could trap dirt.

END OF SECTION

SECTION 040343 - HISTORIC STONE MASONRY REPOINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes historic treatment work consisting of repointing stone masonry joints with mortar and sealant.

1.3 UNIT PRICES

A. specified in Section 012200 "Unit Prices."
   1. Unit prices apply to authorized work covered.
   2. Unit prices apply to additions to and deletions from Work as authorized by Change Orders.

1.4 DEFINITIONS

A. Low-Pressure Spray: 100 to 400 psi; 4 to 6 gpm.

B. Rift: The most pronounced direction of splitting or cleavage of a stone. Rift may be obscure in igneous rocks such as granite. Often it is obvious, as with bedding planes in many sedimentary stones.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Discuss methods and procedures related to repointing historic stone masonry including, but not limited to, the following:
      a. Mock up
      b. Mortar mix design, mortar application, sequencing, tolerances, and required clearances
      c. Quality-control program.
      d. Stone historic treatment program.
      e. Coordination with building occupants.

1.6 SEQUENCING AND SCHEDULING

A. Order materials (sand and portland cement) or bag mix for pointing mortar immediately after approval of samples and mockups. Take delivery of and store at Project site a sufficient quantity to complete Project.

B. Work Sequence: Perform stone historic treatment work in the following sequence, which includes work specified in this and other Sections:
   1. Rake out mortar from joints surrounding stone to be replaced and from joints adjacent to stone repairs along joints.
   2. Repair stonework, including replacing existing stone with new stone.
   3. Rake out mortar from joints to be repointed.
   4. Point mortar and sealant joints.
   5. After repairs and repointing have been completed and cured, perform a final cleaning to remove residues from this work.
   6. Where water repellents are to be used on or near stonework, delay application of these chemicals until after pointing and cleaning.

C. As scaffolding is removed, patch anchor holes used to attach scaffolding. Patch holes in stone according to Section 040342 "Historic Stone Masonry Repair." Patch holes in mortar joints according to "Repointing Stonework" Article.

1.7 SUBMITTALS

A. Product Data: For each mortar component.

B. Samples for Initial Selection: For the following:
   1. Pointing Mortar: Submit samples based on mortar analysis that visually match existing mortar in the form of sample mortar strips, 6 inches long in plastic channels.
   2. Submit mortar mix design including gradations, and sources of sands from which each sample was made.

C. Samples for Verification: For the following:
   1. Mix design of pointing mortar base on mortar analysis and selected from approved mock up.

1.8 PRECONSTRUCTION TESTING

A. Preconstruction Testing: Mortar analysis has been performed. Repointing mortar will be based on the mortar analysis and field mock up.
   1. Refer to the end of this section for mortar analysis.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver packaged materials to Project site in manufacturer's original and unopened containers, labeled with manufacturer's name and type of products.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store hydrated lime in manufacturer's original and unopened containers. Discard lime if containers have been damaged or have been opened for more than two days.

D. Store lime putty covered with water in sealed containers.

E. Store sand where grading and other required characteristics can be maintained, and contamination avoided.

1.10 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit repointing work to be performed according to product manufacturers' written instructions and specified requirements.

B. Temperature Limits, General: Repoint mortar joints only when air temperature is between 40 and 90 deg F and is predicted to remain so for at least seven days after completion of the Work unless otherwise indicated.

C. Cold-Weather Requirements: Comply with the following procedures for mortar-joint pointing unless otherwise indicated:
   1. When air temperature is below 40 deg F, heat mortar ingredients and existing stone to produce temperatures between 40 and 120 deg F.
   2. When mean daily air temperature is below 40 deg F, provide enclosure and heat to maintain temperatures above 32 deg F within the enclosure for seven days after pointing.

D. Hot-Weather Requirements: Protect mortar-joint pointing when temperature and humidity conditions produce excessive evaporation of water from mortar materials. Provide artificial shade and wind breaks and use cooled materials as required to minimize evaporation. Do not apply mortar to substrates with temperatures of 90 deg F and above unless otherwise indicated.

E. For manufactured repair materials, perform work within the environmental limits set by each manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Source Limitations: Obtain each type of material for repointing historic masonry (cement, sand, etc.) from single source with resources to provide materials of consistent quality in appearance and physical properties.

2.2 MORTAR MATERIALS

A. Portland Cement: ASTM C 150/C 150M, Type I or Type II; white or gray or both where required for color matching of exposed mortar.
   1. Provide cement containing not more than 0.60 percent total alkali when tested according to ASTM C 114.

B. Hydrated Lime: ASTM C 207, Type S.

C. Factory-Prepared Lime Putty: ASTM C 1489.

D. Quicklime: ASTM C 5, pulverized lime.

E. Mortar Sand: ASTM C 144 unless otherwise indicated.
   1. Match size, texture, and gradation of existing mortar sand as closely as possible. Blend several sands if necessary to achieve suitable match.
   2. Color: Provide natural sand or ground stone of color necessary to produce required mortar color.
   3. Provide sand with rounded edges.

F. Mortar Pigments: ASTM C 979/C 979M, compounded for use in mortar mixes, and having a record of satisfactory performance in masonry mortars

G. Water: Potable.

2.3 ACCESSORY MATERIALS

A. Sealant Materials: Refer to Section 079200.
   1. Ground-Mortar Aggregate: Custom crushed and ground pointing mortar sand or existing mortar retrieved from joints. Grind to a particle size that matches the adjacent mortar aggregate and color.
   2. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
   3. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended in writing 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.

B. Masking Tape: Nonstaining, nonabsorbent material; compatible with mortar, joint primers, sealants, and surfaces adjacent to joints; and that easily comes off entirely, including adhesive.

C. Other Products: Select materials and methods of use based on the following, subject to approval of a mockup:
   1. Previous effectiveness in performing work involved.
   2. Minimal possibility of damaging exposed surfaces.
   3. Consistency of each application.
   4. Uniformity of the resulting overall appearance.
   5. Do not use products or tools that could do the following:
      a. Remove, alter, or harm the present condition or future preservation of existing surfaces, including surrounding surfaces not in contract.
      b. Leave residue on surfaces.

2.4 MORTAR MIXES

A. Preparing Lime Putty: Slake quicklime and prepare lime putty according to appendix in ASTM C 5 and to manufacturer's written instructions.

B. Measurement and Mixing: Measure cementitious materials and sand in a dry condition by volume or equivalent weight. Do not measure by shovel; use known measure. Mix materials in a clean, mechanical batch mixer.
   1. Mixing Pointing Mortar: Thoroughly mix cementitious materials and sand together before adding any water. Then mix again adding only enough water to produce a damp, unworkable mix that will retain its form when pressed into a ball. Maintain mortar in this dampened condition for 15 to 30

minutes. Add remaining water in small portions until mortar reaches desired consistency. Use mortar within one hour of final mixing; do not retemper or use partially hardened material.

C. Colored Mortar: Produce mortar of color required by using specified ingredients. Do not alter specified proportions without Architect's approval.
   1. Mortar Pigments: Where mortar pigments are indicated, do not add pigment exceeding 10 percent by weight of the cementitious or binder materials, except for carbon black which is limited to 2 percent, unless otherwise demonstrated by a satisfactory history of performance. Where mortar pigments are indicated, do not exceed a pigment-to-cement ratio of 1:10 by weight.
   2. Do not use admixtures in mortar unless otherwise indicated.

D. Mixes: Mortar, mixed at the site or pre bagged, shall be per the approved Submittal.

PART 3 - EXECUTION

3.1 PROTECTION

A. Prevent mortar from staining face of surrounding stone and other surfaces.
   1. Cover sills, ledges, and other projecting items to protect them from mortar droppings.
   2. Keep wall area wet below rebuilding and pointing work to discourage mortar from adhering.
   3. Immediately remove mortar splatters in contact with exposed stone and other surfaces.

B. Remove Protect grade and building components adjacent to areas repointed. Clean mortar splash from grade and building components when repointing is complete.

3.2 STONE REPOINTING

A. Appearance Standard: Repointed surfaces are to have a uniform appearance as viewed from 20 feet.

3.3 REPOINTING STONEWORK

A. Rake out and repoint joints where not required e out and repoint deteriorated mortar joints in exposed portions of the exterior stone masonry in areas indicated.

B. Rake out joints as follows, according to procedures demonstrated in approved mockup:
   1. Remove mortar from stone surfaces within raked-out joints to provide reveals with square backs and to expose stone for contact with pointing mortar. Brush, vacuum, or flush joints to remove dirt and loose debris.
   2. Do not spall edges of stone units or widen joints. Replace or patch damaged stone units as directed by Architect.
      a. Cut out mortar by hand with chisel and resilient mallet or power-operated grinders.

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

D. Pointing with Mortar:
   1. Rinse joint surfaces with water to remove dust and mortar particles. Time rinsing application so, at time of pointing, joint surfaces are damp but free of standing water. If rinse water dries, dampen joint surfaces before pointing.
   2. Apply pointing mortar first to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8 inch until a uniform depth is formed. Fully compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.
   3. After deep areas have been filled to same depth as remaining joints, point joints by placing mortar in layers not greater than 3/8 inch.
   4. Fully compact each layer and allow it to become thumbprint hard before applying next layer. Where existing stone has worn or rounded edges, slightly recess finished mortar surface below face of stone to avoid widened joint faces. Take care not to spread mortar beyond joint edges onto exposed stone surfaces or to featheredge the mortar.
   5. When mortar is thumbprint hard, tool joints to match original appearance of joints as demonstrated in approved mockup. Remove excess mortar from edge of joint by brushing.
   6. Cure mortar by maintaining in thoroughly damp condition for at least 72 consecutive hours, including weekends and holidays.

3.4 FINAL CLEANING

A. After mortar has fully hardened, thoroughly clean exposed stone surfaces of excess mortar and foreign matter; use wood scrapers, stiff-nylon or -fiber brushes, and clean water applied by low-pressure spray.
   1. Do not use metal scrapers or brushes.
   2. Do not use acidic or alkaline cleaners.

B. Clean adjacent non stone surfaces. Use detergent and soft brushes or cloths.

C. Clean mortar and debris from roof; remove debris from gutters and downspouts. Rinse off roof and flush gutters and downspouts.

D. Remove masking materials, leaving no residues that could trap dirt.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage qualified testing agencies to perform tests and inspections. Allow inspectors use of lift devices and scaffolding, as needed, to perform inspections.

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

C. Notify testing agency and Architect's Project representatives in advance of times when lift devices and scaffolding will be relocated. Do not relocate lift devices and scaffolding until inspectors and Architect's Project representatives have had reasonable opportunity to make inspections and observations of work areas at lift device or scaffold location.

3.6 MORTAR ANALYSIS

A. Refer to the report of mortar mix design on the next page.

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TCC Materials • Corporate Office
2025 Centre Pointe Blvd, Suite 300
Mendota Heights, MN
tccmaterials.com

Report of Mortar Mix Design

Mortar Type, Mix Designation:		Type N, proportion
Mix Designation:		BOM 105615.1 (3000#)
Recommended Location:		Exterior at or above grade
Materials:		
Portland Cement		ASTM C 150, Type I
Hydrated Lime		ASTM C 207, Type S
Masonry Sand		ASTM C 144

Conformance		
Portland Cement	1 Part	94#
Hydrated Lime	1 Part	40#
Masonry Sand	6 Part	480#

Remarks: The unit weights of materials are those stated in ASTM C 270.
The sand weight is based on loose and damp condition.
This mix does not contain any freeze- thaw resisting, air entrainment admixtures.

Reviewed By:

Signature of file

David W. Morlock, P.E.
Technical Services Manager

END OF SECTION

SECTION 072726 - FLUID-APPLIED MEMBRANE AIR BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes fluid-applied, and vapor-permeable membrane air barriers.

B. Related Requirements:
1. Section for wall sheathings and wall sheathing joint-and-penetration treatments.

1.2 DEFINITIONS

A. Air-Barrier Material: A primary element that provides a continuous barrier to the movement of air.

B. Air-Barrier Accessory: A transitional component of the air barrier that provides continuity.

C. Air-Barrier Assembly: The collection of air-barrier materials and accessory materials applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
1. Include installers of other construction connecting to air barrier, including masonry, sealants, windows, and door frames.
2. Review air barrier requirements including surface preparation, substrate condition and pretreatment, minimum substrate curing period, forecasted weather conditions, special details and sheet flashings, mockups, installation procedures, sequence of installation, testing and inspecting procedures, materials approved for use, compatibility of materials, coordination with installation of adjacent and covering materials, and protection and repairs.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; and tested physical and performance properties of air barrier.
1. Include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; and tested physical and performance properties of products.
2. Submit letter from primary materials manufacturer indicating approval of products not manufactured by primary manufacturer.
3. Include statement that materials are compatible with adjacent materials proposed for use and the following.
   a. For materials that the air barrier system will bond to, provide letters as necessary from each manufacturer confirming materials and substrates for the air barrier system is chemically and adhesively compatible with the air barrier system and the bonded to material.
   b. For materials that are proposed to bond to the air barrier system, provide letters as necessary from each manufacturer confirming materials proposed to bond to the air barrier system are chemically and adhesively compatible with the air barrier system.
4. Submit reports indicating that field peel-adhesion test on all materials to which sealants are adhered have been performed and the changes made, if required, to other approved materials, in order to achieve successful adhesion.

B. Shop Drawings: For air-barrier assemblies.
1. Show locations and extent of air barrier. Include project specific details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
2. Indicate total area (sq. ft.) of air barrier to be installed.
3. Include project specific details of interfaces with other materials that form part of the air barrier.

4. Include letter from manufacturer indicating that the project specific details and shop drawings have been reviewed and are approved for use.

C. Samples: Submit clearly labeled samples, 3 by 4 inch minimum size of each material specified.

D. Field Test Results: Submit mockup and in-situ test results of air leakage test and water leakage test with specified standards, including retesting if initial results are not satisfactory.

E. Qualification Data: For Installer. Include list of ABAA-certified installers and supervisors employed by the Installer, who work on Project.
1. Provide evidence from the manufacturer that the firm is approved, authorized, or licensed to install the specified products and is eligible to receive manufacturer's special warranty.
2. Provide evidence that the installing firm is experienced in applying air barrier materials similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
3. Provide a manual that describes Installers and Manufacturers Quality Assurance / Quality Control program and procedures.
4. Sample of Installers Daily Work Sheet.

F. Product Certificates: From air-barrier manufacturer, certifying permanent chemical and adhesive compatibility of air barriers and accessory materials with Project materials that connect to or that come in contact with the barrier, and certifying that cleaning materials used during installation are chemically compatible with each of the adjacent materials proposed for use.

G. Product Test Reports: For each air-barrier assembly, for tests performed by a qualified testing agency.

H. Sample Warranty: Manufacturer and Installer sample warranty.

I. ABAA Audit Schedule: Submit number of ABAA audits planned based on the QAP requirements and total area of installed air barrier. Indicate anticipated timeframe of audits.

J. Installation Reports: Provide ABAA Audit Reports and Installer Daily Worksheet for project record. Provide reports weekly to Architect for each week installation of air barrier system occurs.

1.5 QUALITY ASSURANCE

A. Installer Qualifications:
1. A qualified firm that is approved, authorized, or licensed by the manufacturer to install manufacturer's product, that is eligible to receive manufacturer's special warranty, and is experienced in applying air barrier materials similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
2. A firm that is an ABAA-licensed contractor and employs certified and registered installers.
3. A firm that complies with ABAA's Quality Assurance Program.
4. Installer shall be licensed by ABAA according to ABAA's Quality Assurance Program and shall employ ABAA-certified installers and supervisors on Project.

B. Manufacturer Qualifications: A qualified manufacturer regularly engaged in manufacturing air barrier membranes.

C. Quality Assurance / Quality Control Program:
1. Implement the ABAA Quality Assurance Program requirements. Cooperate with ABAA inspectors and independent testing and inspection agencies engaged by the Owner. Do not cover air barrier until it has been inspected, tested and accepted.
2. Notify Architect seven days in advance of the dates and times when ABAA Audits are performed.
3. Daily Inspection:
   a. Visual inspection of the substrate prior to the application of membrane to confirm the substrate is in accordance with the manufacturer’s instructions.
   b. Visual inspection on the completed air barrier for that day and fix any deficiencies.
   c. Verification of manufactures specific Wet film thickness of installed work.

d. Adhesion Test as indicated in Field Quality Control.

4. Daily Work Sheet: Include requirements of the ABAA QAP and the following:
   a. Listing of installers
   b. Project name
   c. Type of air barrier installed
   d. Air barrier product name and lot/batch number
   e. Primer product name and lot/batch number
   f. Substrate type
   g. Substrate preparation required
   h. Installation locations (gridlines, elevations, etc)
   i. Results of visual inspection
   j. Results of verification of wet film thickness, include photo documentation
   k. Results of verification of adhesion testing, include photo documentation
   l. Document and photograph observed deficiencies and corrective actions preformed
   m. Date and Time of installation
   n. Substrate moisture content
   o. Weather Conditions including but not limited to ambient temperature, relative humidity, and precipitation.
5. Testing, Inspection, and Reporting as indicated in the Field Quality control.

1.6 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Owner will engage a qualified testing agency to perform preconstruction testing on field mockups.

B. Mockup Testing: Air-barrier assemblies shall comply with performance requirements indicated, as evidenced by reports based on mockup testing by a qualified testing agency.
   1. Qualitative Air-Leakage Testing: Mockups will be tested for evidence of air leakage according to ASTM E 1186, chamber depressurization with detection liquids.
      a. Test Locations: For each substrate type, provide three tests for each penetration type.
      b. Test Pressure: 500 Pa.
      c. Pass/Fail Criteria: Visual observation of air leakage evidenced by continuous foaming "bubbling" of detection liquid is considered a failed test.
      d. Provide an inspection report that indicates results.
   2. Qualitative Air-Leakage-Location Testing: Air-barrier assemblies will be tested for evidence of air leakage according to ASTM E 1186, chamber pressurization or depressurization with smoke tracers.
      a. Testing to be performed concurrent with Water Penetration Testing indicated below.
      b. Testing to be performed after cladding attachment system is installed but prior to cladding installation.
      c. Test Pressure: 6.24 lbf/sq.ft.
      d. Failure Criteria: Visual evidence of air leakage by means of observations of smoke infiltration or exfiltration.
      e. Provide an inspection report that indicates results.
   3. Qualitative Water Infiltration Testing: Perform testing prior to installation of the cladding, but after cladding attachment systems have been installed. Air barrier systems shall be tested according to ASTM E 1105 at a minimum static-air-pressure differential of 6.24 lbf/sq. ft., and shall not evidence water infiltration.
      a. Test Locations: Perform one test for each wall assembly type.
      b. Test Size: 100 sq. ft. minimum.
      c. Perform tests after cladding attachments have been installed but prior to the installation of cladding/veneer material.
      d. Water Infiltration Failure Criteria:
         1) Water leakage to the interior of the building is a failure.
         2) Water observed on interior surfaces of the system is a failure.
         3) Water observed on interior surfaces of adjacent systems, originating from the wall system or the transition to the adjacent systems, is a failure.
      e. Provide an inspection report that indicates results.
   4. Water Spray Test: Areas designated by the Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.
      a. Perform tests at transitions to adjacent exterior enclosure assemblies, deflection joints, and expansion joints.

b. Perform tests at a representative sample of each condition.
c. Water Penetration Failure Criteria:
1) Water leakage to the interior of the building is a failure.
2) Water observed on interior surfaces of the system is a failure.
3) Water observed on interior surfaces of adjacent systems, originating from the wall system or the transition to the adjacent systems, is a failure.
d. Provide an inspection report that indicates results.

5. Adhesion Testing: Mockups will be tested for minimum air-barrier adhesion of 16 lbf/sq. in. or to manufacturer's minimum adhesion level per substrates, whichever is greater, according to ABAA T0002. Perform test after curing period recommended by the manufacturer. Record mode of failure and area which failed in accordance with referenced standard.
a. Test Locations: Perform 1 test per substrate type. (Each test site includes 3 pull tests)
b. Provide an inspection report that indicates results.
6. Wet Film Thickness Test (to be performed by installer at time of installation and included on ABAA QAP daily worksheet):
a. Test material using wet film gauge to confirm that membrane meets manufacturer's indicated wet film thickness requirements.
b. Minimum one per coat per substrate type.
c. Failure Criteria:
1) A measurement less than manufacturer's required wet film thickness is considered a failure.
d. Provide an inspection report indicating results and include photo documentation.
7. Dry Film Thickness Test:
a. Test material in accordance with manufacturer's requirements to confirm that cured membrane meets manufacturer's indicated dry film thickness requirements.
b. Three 1 inch x 4 inch samples removed from separate areas with gypsum facer intact to avoid stretching membrane.
c. Failure Criteria:
1) A measurement less than manufacturer's required dry film thickness is considered a failure.
d. Provide an inspection report indicating results and include photo documentation.
8. Air barriers will be considered defective if they do not pass tests and inspections.
a. Wet Film Thickness: Apply additional air-barrier material, according to manufacturer's written instructions, where inspection results indicate insufficient thickness.
b. Upon failure of Dry Film Testing or Adhesion Testing:
1) Determine cause of failure.
2) Provide one additional test for each occurrence of failure on the mockup.
3) Repair deficient air barrier components per manufacturer's recommendations.
4) Repair tested areas per manufacturer's recommendations.
c. Upon failure of E1186 and E1105 testing:
1) Determine cause of failure.
2) Repair per manufacturer's recommendations and retest deficient air barrier components.
9. Notify Architect 14 days in advance of the dates and times when mockups will be tested.
10. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.
11. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Remove and replace liquid materials that cannot be applied within their stated shelf life.

B. Protect stored materials from direct sunlight.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended by air-barrier manufacturer.
1. Protect substrates from environmental conditions that affect air-barrier performance.
2. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

1.9 WARRANTY

A. Manufacturer's Warranty: Provide manufacturer's standard product warranty, for a minimum 10 years from date of Substantial Completion.

B. Special Installer's Warranty: Provide air barrier installer's 2 year warranty from date of Substantial Completion, including all components of the air barrier assembly, against failures including loss of air tight seal, loss of watertight seal, loss of adhesion, loss of cohesion, failure to cure properly.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Source Limitations: Obtain primary ABAA evaluated materials and air-barrier accessories from single source ABAA evaluated manufacturer. Additional accessory products are acceptable for use provided they are approved by the primary air barrier manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. General: Air barrier shall be capable of performing as a continuous vapor-permeable air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

B. Air-Barrier Assembly Air Leakage: Maximum 0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft., when tested according to ASTM E 2357.

C. Provide an air barrier assembly that withstands combined positive and negative design wind, fan and stack pressures on the envelope without damage or displacement, that transfers the load to the structure, and that does not displace adjacent materials under full load. Join air barrier system materials in an airtight and flexible manner to adjacent assemblies, allowing for the relative movement of assemblies due to thermal and moisture variations and creep, and anticipated seismic movement.

2.3 VAPOR-PERMEABLE MEMBRANE AIR-BARRIER

A. Fluid-Applied, Vapor-Permeable Membrane Air Barrier:
1. Silicone Based Technology Products: Subject to compliance with requirements, provide one of the following:
   a. Dow Corning Corp.; Defend Air 200.
   b. Momentive Performance Materials; Elemax 2600 AWB.
2. Physical and Performance Properties:
   a. Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. pressure difference; ASTM E 2178.
   b. Vapor Permeance: Minimum 10 perms; ASTM E 96/E 96M.
   c. Ultimate Elongation: Minimum 200 percent; ASTM D 412, Die C.
   d. Structural-Test Performance: Test according to ASTM E 330 or ASTM E1233 at a positive or negative pressure of 30psf.
      1) No cracking within the field of the panel, substrate joints and at interface of flashing.
   e. Water Penetration under Static Pressure: No evidence of water penetration through the air barrier assembly when tested according to ASTM E 331 at a minimum static-air-pressure differential of 6.24 lbf/sq.ft..
      1) Water Penetration: Water leakage to the interior of the building is a failure. Water observed on interior surfaces of the system or adjacent wall systems is a failure.

2.4 ACCESSORY MATERIALS

A. General: Accessory materials recommended by air-barrier manufacturer to produce a complete air-barrier assembly and compatible with primary air-barrier material.

B. Transition Membrane: Between Air Barrier Membrane and Other Adjacent Materials: Comply with both air barrier manufacturer's recommendations and adjacent material manufacturer's recommendations.
   1. Fluid-Applied Flashing: Manufacturer's standard trowel grade liquid flashing.
      a. Joint Reinforcing Strip: Air-barrier manufacturer's glass-fiber-mesh tape.
   2. High Temperature Modified Bituminous Strip: 40 mils thick, smooth surfaced, self-adhering; consisting of 36 mils of rubberized asphalt laminated to a 4-mil- thick polyethylene film with release liner backing.
      a. For use under metal copings and flashings directly exposed to the exterior.
   3. Foil Faced Modified Bituminous Strip: 40 mils thick, smooth surfaced, self-adhering; consisting of 36 mils of rubberized asphalt laminated to a 4-mil- thick polyethylene film with release liner backing.
   4. Preformed Silicone-Sealant Extrusion: Manufacturer's standard system consisting of cured low-modulus silicone extrusion, sized to fit opening widths, with a single-component, neutral-curing, Class 100/50 (low-modulus) silicone sealant for bonding extrusions to substrates.
      a. Dow Corning Corporation; Silicone Transition Strip System.
      b. Momentive Performance Materials Inc.; US11000 UltraSpan.
      c. Tremco Incorporated; Proglaze ETA Connections.
   5. Self-Adhering Stainless Steel Flexible Flashing:
      a. Subject to compliance with requirements, provide the following:
         1) York Manufacturing Inc.; York 304.
      b. Characteristics:
         1) Type: Stainless steel with one stainless steel face (facing outwards) with a butyl block co-polymer adhesive (inward facing).
         2) Stainless Steel: Type 304, ASTM A240. Domestically sourced per DF ARS 252.225-7008 and/or DF ARS 252.225-7009.

C. Primer: Liquid primer recommended for substrate by air-barrier material manufacturer.

D. Substrate-Patching Membrane: Manufacturer's standard trowel-grade substrate filler.

E. Adhesive and Tape: Air-barrier manufacturer's standard adhesive and pressure-sensitive adhesive tape.

F. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, 0.0187 inch thick, and Series 300 stainless-steel fasteners.

G. Sprayed Polyurethane Foam Sealant: One- or two-component, foamed-in-place, polyurethane foam sealant, 1.5- to 2.0-lb/cu. ft density; flame-spread index of 25 or less according to ASTM E 162; with primer and noncorrosive substrate cleaner recommended by foam sealant manufacturer.

H. Joint Sealant: ASTM C 920, single-component, neutral-curing silicone; Class 100/50 (low modulus), Grade NS, Use NT related to exposure, and, as applicable to joint substrates indicated, Use O. Comply with Section 079200 "Joint Sealants."

I. CMU Block Filler: Manufacturer's standard filler.

J. Concrete Filler: Manufacturer's standard filler.

K. Termination Mastic: Air-barrier manufacturer's standard cold fluid-applied elastomeric liquid; trowel grade.

L. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchor spacing of 9" on center minimum unless otherwise required by the manufacturer. Provide galvanized sheet metal backup plate at locations where adequate substrate is not available for securing the termination bar.

M. Provide galvanized sheet metal backup plate at locations where adequate substrate is not available for securing the cladding accessories and attachments, flashings, and termination bars.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
   1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
   2. Provide verification in writing from the air-barrier manufacturer that concrete has cured and aged for minimum time period required by air-barrier manufacturer.
   3. Perform moisture testing as required by air-barrier manufacturer for test type, rate, and quantity to validate that substrate is acceptable, dry, and free of moisture.
   4. Verify sealants used in sheathing are compatible with membrane proposed for use. Perform field peel-adhesion test on materials to which sealants are adhered.
   5. Verify that metal strapping has been installed where required for securing accessories such as termination bars and flashings.

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

3.2 SURFACE PREPARATION

A. Clean, prepare, treat, and seal substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air-barrier application.

B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.

C. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching membrane.

D. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.

E. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.

3.3 JOINT TREATMENT

A. Concrete and Masonry: Prepare, treat, rout, and fill joints and cracks in substrate according to ASTM C 1193 and air-barrier manufacturer's written instructions. Remove dust and dirt from joints and cracks complying with ASTM D 4258 before coating surfaces.
   1. Prime substrate and apply air-barrier manufacturer's recommended thickness, number of coats, and reinforcement extending a minimum of 3 inches along each side of joints and cracks. Apply a double thickness of fluid air-barrier material and embed a joint reinforcing strip in preparation coat.

B. Gypsum Sheathing: Fill joints greater than 1/4 inch with sealant according to ASTM C 1193 and air-barrier manufacturer's written instructions. Apply first layer of fluid air-barrier material at joints. Tape joints with joint reinforcing strip after first layer is dry. Apply a second layer of fluid air-barrier material over joint reinforcing strip.

3.4 TRANSITION MEMBRANE INSTALLATION

A. General: Install transition membrane and accessory materials according to air-barrier manufacturer's written instructions to form a seal with adjacent construction and maintain a continuous air barrier.
   1. Coordinate the installation of air barrier with installation of roofing membrane, below grade waterproofing, and base flashing to ensure continuity of air barrier with roofing membrane.
   2. Install manufacturer's recommended transition strip on roofing membrane or base flashing so that a minimum of 3 inches of coverage is achieved over each substrate.

B. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by fluid air-barrier material on same day. Reprime areas exposed for more than 24 hours.

C. Connect and seal exterior wall air-barrier material continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials as recommended by manufacturer.

D. At end of each working day, seal top edge of transition membrane to substrate with termination mastic.

E. Apply joint sealants forming part of air-barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

F. Wall Openings: Prime concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition membrane so that a minimum of 3 inches of coverage is achieved over each substrate. Maintain 3 inches of full contact over firm bearing surface.
1. Provide fluid-applied membranes for manufacturer's that offer it as part of the air barrier system.
2. For manufacturers that do not offer a liquid flashing, use transition membrane method that is acceptable to the air barrier manufacturer and that is chemically and adhesively compatible with the adjacent construction.
    a. Self-Adhering Stainless Steel Flexible Flashing Transition Strip: Roll firmly to enhance adhesion.
    b. Preformed Silicone-Sealant Extrusion: Set in full bed of silicone sealant applied to walls, frame, and air-barrier material. Tool sealant along edges of extrusion.

G. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, and doors, and miscellaneous penetrations of air-barrier material with foam sealant.

H. Seal transition membrane around masonry reinforcing or ties and penetrations with termination mastic.

I. Seal top of through-wall flashings to air barrier with an additional 6-inch- wide, transition membrane.

J. Seal exposed edges of transition membrane at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.

K. Repair punctures, voids, and deficient lapped seams in transition membrane. Slit and flatten fishmouths and blisters. Patch with transition strips extending 6 inches beyond repaired areas in strip direction.

3.5 FLUID AIR-BARRIER MEMBRANE INSTALLATION

A. General: Apply fluid air-barrier material to form a seal with transition membrane and to achieve a continuous air barrier according to air-barrier manufacturer's written instructions. Apply fluid air-barrier material within manufacturer's recommended application temperature ranges.
1. Apply primer to substrates at required rate and allow it to dry.
2. Limit priming to areas that will be covered by fluid air-barrier material on same day. Reprime areas exposed for more than 24 hours.
3. Prime glass-fiber-surfaced gypsum sheathing with number of prime coats as recommended by the manufacturer and as needed to achieve required bond, with adequate drying time between coats.

B. Membrane Air Barriers: Apply a continuous unbroken air-barrier membrane to substrates according to the following thickness. Apply air-barrier membrane in full contact around protrusions such as masonry ties.
1. Apply to a total wet film thickness as required by the membrane manufacturer to meet the performance requirements indicated.

C. Apply transition membrane according to air-barrier manufacturer's written instructions.

D. Provide air barrier and accessories that are acceptable for use at horizontal surfaces without detrimental effects to material.

E. For exterior cladding and veneer attachment devices and accessories such as clips, thermal breaks, brick ties, flashings, stone/metal coping fasteners, and metal panel anchors:
1. Set device in a full bed of sealant after air barrier is cured.
2. Seal over fastener heads after device is secured.
3. Seal top edge of accessories installed in the horizontal orientation.

F. Do not cover air barrier until it has been tested and inspected by Owner's testing agency.

G. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.

3.6 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Owner's Inspection and Testing/ABAA Audits: Cooperate with Owner's testing agency and ABAA auditors. Allow access to work areas and staging. Notify Owner's testing agency/ABAA auditor in writing of schedule for Work of this Section to allow sufficient time for testing and inspection. Daily inspection and testing may be required. Do not cover Work of this Section until testing and inspection is accepted.

C. Periodic Inspections: Provide for air barrier system manufacturer's technical personnel to inspect installation weekly during periods of ongoing installation.

D. Inspections: Air-barrier materials, accessories, and installation are subject to inspection for compliance with requirements. Inspections may include the following:
1. Continuity of air-barrier system has been achieved throughout the building envelope with no gaps or holes.
2. Air-barrier dry film thickness.
3. Air-barrier wet film thickness (to be performed by installer at time of installation and included on ABAA QAP daily worksheet).
4. Continuous structural support of air-barrier system has been provided.
5. Masonry and concrete surfaces are smooth, clean, and free of cavities, protrusions, and mortar droppings.
6. Site conditions for application temperature and dryness of substrates have been maintained.
7. Maximum exposure time of materials to UV deterioration has not been exceeded.
8. Surfaces have been primed, if applicable.
9. Laps in transition membranes have complied with minimum requirements and have been shingled in the correct direction (or mastic has been applied on exposed edges), with no fishmouths.
10. Termination mastic has been applied on cut edges.
11. Transition membranes are firmly adhered to substrate.
12. Compatible materials have been used.
13. Transitions at changes in direction and structural support at gaps have been provided.
14. Connections between assemblies (air-barrier and sealants) have complied with requirements for cleanliness, surface preparation and priming, structural support, integrity, and continuity of seal.
15. All penetrations have been sealed.

E. Field Tests:
1. Allow sufficient time for testing and inspection and provide a schedule in advance to the Testing Agency.
2. Whenever Work is to be done, notify Testing Agency in sufficient time to provide inspections.
3. Provide to the Owner copies of Quality Assurance Program documentation including daily site reports completed by installers.
4. Submit test results in accordance with specified standards, including retesting if initial results are not satisfactory.
5. Test to be distributed uniformly across all elevations.
6. Membrane Adhesion Test: Test materials for a minimum air-barrier adhesion of 16 lbf/sq. in. or to manufacturer's minimum adhesion level per substrates, whichever is greater in accordance with ABAA T0002. Perform test after curing period recommended by the manufacturer. Record mode of failure and area which failed in accordance with referenced standard. To be performed by installer and included on ABAA QAP daily worksheet.

a. Test Site Locations: Perform 1 test once daily per substrate during installation and a minimum of 4 test sites per major elevation per substrate. (Each test site includes 3 pull tests).
   1) Perform one test for the first 2500 sq. ft. of installed material for each wall assembly type.
b. Provide an inspection report in accordance with referenced standard that indicates whether or not the air barrier material has met the minimum adhesion level requirement and include photo documentation.
c. Provide reports within 3 days of test completion.

7. Qualitative Air-Leakage-Location Testing: Air-barrier assemblies will be tested for evidence of air leakage according to ASTM E 1186, chamber depressurization using detection liquids.
   a. Test Locations: Provide ten tests for each penetration type per 2500 sq. ft. of each substrate. Distribute test locations across all elevations.
   b. Test Pressure: 500 Pa.
   c. Pass/Fail Criteria: Visual observation of air leakage evidenced by continuous foaming "bubbling" of detection liquid is considered a failed test.
   d. Provide an inspection report that indicates results and include photo documentation.
8. Qualitative Air-Leakage-Location Testing: Air-barrier assemblies will be tested for evidence of air leakage according to ASTM E 1186, chamber pressurization or depressurization with smoke tracers.
   a. Testing to be performed concurrent with Qualitative Water Infiltration Testing below.
   b. Pass/Fail Criteria: Visual observation of air leakage evidenced by smoke tracer penetrating air barrier system is considered a failed test.
   c. Provide an inspection report that indicates results, including photos.
9. Qualitative Water Infiltration Testing: Perform testing prior to installation of the cladding, but after cladding attachment systems have been installed. Air barrier systems shall be tested according to ASTM E 1105 at a minimum static-air-pressure differential of 6.24 lbf/sq. ft., and shall not evidence water infiltration.
   a. Test Locations:
      1) Perform one test for the first 2500 sq. ft. of installed material for each wall assembly type.
      2) Perform one subsequent test for every 5000 sq. ft. of installed material for each wall assembly type.
      3) Test locations to be selected by Architect.
   b. Test Size: 100 sq. ft. minimum.
   c. Perform tests after cladding attachments have been installed but prior to the installation of cladding/veneer material.
   d. Pass/Fail Criteria:
      1) Water infiltration/leakage to the interior of the building which is not controlled by a weep/drainage system that is integral to the system is a failure.
      2) Water observed on interior surfaces of the systems is a failure.
      3) Water observed on interior surfaces of the adjacent systems, originating from the wall system or the transition to the adjacent systems, is a failure.
   e. Provide an inspection report that indicates results and include photo documentation.
10. Water Spray Test: Before installation of interior finishes has begun, areas designated by the Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.
   a. Perform tests at transitions to adjacent wall assemblies, control joints, deflection joints, and expansion joints.
   b. Test 250 linear feet of all joint locations.
   c. Water Infiltration:
      1) Water leakage to the interior of the building is a failure.
      2) Water observed on interior surfaces of the system is a failure.
      3) Water observed on interior surfaces of adjacent systems, originating from the wall system or the transition to the adjacent systems, is a failure.
11. Wet Film Thickness Test (to be performed by installer at time of installation and included on ABAA QAP daily worksheet):
      1) Test material using wet film gauge to confirm that membrane meets manufacturer's indicated wet film thickness requirements.
      2) Regularly check per coat per substrate type during installation per ABAA QAP.
      3) Failure Criteria:
         a) A measurement less than manufacturer's required wet film thickness is considered a failure.

b) Provide an inspection report indicating results and include photo documentation.

4) Provide inspection report indicating results and include photo documentation.

12. Dry Film Thickness Test:
    a. Test material in accordance with manufacturer's requirements to confirm that cured membrane meets manufacturer's indicated dry film thickness requirements.
    b. Three 1 inch x 4 inch samples removed from separate areas with gypsum facer intact to avoid stretching membrane.
    c. Test Locations: Once daily per substrate during installation and a minimum of 1 test per major elevation per substrate.
        1) Perform one test for the first 2500 sq. ft. of installed material for each wall assembly type.
        2) Provide an inspection report in accordance with referenced standard that indicates whether or not the air barrier material has met the minimum adhesion level requirement and include photo documentation.
        3) Provide reports within 3 days of test completion.
    d. Failure Criteria:
        1) A measurement less than manufacturer's required dry film thickness is considered a failure.
    e. Provide an inspection report indicating results and include photo documentation.
13. Infrared Evaluation:
    a. In general accordance with ASTM E1186 to evaluate air leakage related to the wall assemblies in locations such as but not limited to transitions to adjacent exterior enclosure assemblies, penetrations, and terminations.
        1) If anomalies are identified, provide proposed plan to confirm source of anomalies.
        2) If deficiencies are identified during confirmation process, notify design team, manufacturer, and Owner of cause and extent of deficiencies.
        3) Submit manufacturer approved corrective action plan for Owner and Architect's review and approval.
        4) Perform infrared evaluation to confirm that deficiencies have been corrected.
14. Air barriers will be considered defective if they do not pass tests and inspections.
    a. Wet Film Thickness: Apply additional air-barrier material, according to manufacturer's written instructions, where inspection results indicate insufficient thickness.
    b. Upon failure of dry film testing or Adhesion Testing:
        1) Determine cause of failure.
        2) Provide one additional test for each occurrence of failure.
        3) Repair deficient air barrier components per manufacturer's recommendations.
        4) Repair tested areas per manufacturer's recommendations.
    c. Upon failure of E1186 and E1105 testing:
        1) Determine cause of failure.
        2) Repair per manufacturer's recommendations and retest deficient air barrier components.
        3) Determine if deficient conditions are present elsewhere on the building and repair per manufacturer's recommendations.
        4) Provide two additional tests for each occurrence of failure.

F. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.

G. Clean air barrier materials that were affected by testing procedures to a level equal to or better than the original condition after testing is complete using cleaning agents and procedures recommended by manufacturer of affected construction.

H. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.

3.7 CLEANING AND PROTECTION

A. Protect air-barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.

1. Protect air barrier from exposure to UV light and harmful weather exposure as required by manufacturer. If exposed to these conditions for longer than allowed by manufacturer, remove and replace air barrier or install additional, full-thickness, air-barrier application after repairing and preparing the overexposed membrane according to air-barrier manufacturer's written instructions.
2. Protect air barrier from contact with incompatible materials and sealants not approved by air-barrier manufacturer.

B. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended by manufacturer of affected construction.

C. Remove masking materials after installation.

END OF SECTION

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 COORDINATION

A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.

B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.2 ACTION SUBMITTALS

A. Product Data: For each of the following
1. Underlayment materials.
2. Elastomeric sealant.
3. Butyl sealant.
4. Epoxy seam sealer.

B. Shop Drawings: For sheet metal flashing and trim.
1. Include plans, elevations, sections, and attachment details.
2. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled Work.
3. Include identification of material, thickness, weight, and finish for each item and location in Project.
4. Include details for forming, including profiles, shapes, seams, and dimensions.
5. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
6. Include details of termination points and assemblies.
7. Include details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction from fixed points.
8. Include details of roof-penetration flashing.
9. Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, flashings, and counterflashings.
10. Include details of special conditions.
11. Include details of connections to adjoining work.
12. Detail formed flashing and trim at scale of not less than [1-1/2 inches per 12 inches] [3 inches per 12 inches] <Insert scale>.

C. Samples: For each exposed product and for each color and texture specified, 12 inches long by actual width.

D. Samples for Initial Selection: For each type of sheet metal and accessory indicated with factory-applied finishes.

E. Samples for Verification: For each type of exposed finish.
1. Sheet Metal Flashing: 12 inches long by actual width of unit, including finished seam and in required profile. Include fasteners, cleats, clips, closures, and other attachments.
2. Trim, Metal Closures, Expansion Joints, Joint Intersections, and Miscellaneous Fabrications: 12 inches long and in required profile. Include fasteners and other exposed accessories.
3. Unit-Type Accessories and Miscellaneous Materials: Full-size Sample.
4. Anodized Aluminum Samples: Samples to show full range to be expected for each color required.

1.3 QUALITY ASSURANCE

A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
1. For copings and roof edge flashings that are ANSI/SPRI/FM 4435/ES-1 tested [and] [FM Approvals approved], shop is to be listed as able to fabricate required details as tested and approved.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.
1. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
2. Protect stored sheet metal flashing and trim from contact with water.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

1.5 WARRANTY

A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Sheet metal flashing and trim assemblies, including cleats, anchors, and fasteners, are to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim are not to rattle, leak, or loosen, and are to remain watertight.

B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual: Architectural Metal Flashing, Condensation and Air Leakage Control, and Reroofing" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

C. Sheet Metal Standard for Copper: Comply with CDA's "Copper in Architecture Handbook." Conform to dimensions and profiles shown unless more stringent requirements are indicated.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 SHEET METALS

A. Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.

B. Copper Sheet: ASTM B370, cold-rolled copper sheet, H00 or H01 temper.
1. http://www.specagent.com/LookUp/?ulid=7006&mf=&src=wd
a. |http://www.specagent.com/LookUp/?uid=123457232464&mf=04&src=wdhttp://www.specagent.com/LookUp/?uid=123457232465&mf=04&src=wd
b. |
2. |
3. Nonpatinated, Exposed Finish: Mill.

C. Aluminum Sheet: ASTM B209, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; with [smooth, flat] [embossed] surface.
1. Color Anodic Finish, Coil Coated: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.

a. Color: Dark bronze.
b. Color Range: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil.

D. Stainless Steel Sheet: ASTM A240/A240M, Type 304, dead soft, fully annealed; with smooth, flat surface.
1. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than <Insert value> percent.
2. Finish: ASTM A480/A480M, No. 2D (dull, cold rolled).

2.3 UNDERLAYMENT MATERIALS

A. Felt: ASTM D226/D226M, Type II, asphalt-saturated organic felt; nonperforated.

B. Self-Adhering, High-Temperature Sheet Underlayment: Minimum 30 mils thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer in accordance with underlayment manufacturer's written instructions.
1. http://www.specagent.com/LookUp/?ulid=5139&mf=&src=wd
a. |http://www.specagent.com/LookUp/?uid=123457232451&mf=04&src=wdhttp://www.specagent.com/LookUp/?uid=123457232442&mf=04&src=wd
b. |http://www.specagent.com/LookUp/?uid=123457232443&mf=04&src=wdhttp://www.specagent.com/LookUp/?uid=123457232444&mf=04&src=wd
c. |http://www.specagent.com/LookUp/?uid=123457232445&mf=04&src=wd
d. |http://www.specagent.com/LookUp/?uid=123457232450&mf=04&src=wdhttp://www.specagent.com/LookUp/?uid=123457232446&mf=04&src=wd
e. |http://www.specagent.com/LookUp/?uid=123457232447&mf=04&src=wd
f. |
2. |
3. |

C. Slip Sheet: Rosin-sized building paper, 3 lb/100 sq. ft. minimum.

2.4 MISCELLANEOUS MATERIALS

A. Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal[or manufactured item] unless otherwise indicated.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal[or manufactured item].
1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
b. Blind Fasteners: High-strength aluminum or stainless steel rivets suitable for metal being fastened.
c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
3. Fasteners for Stainless Steel Sheet: Series 300 stainless steel.

C. Solder:
1. For Stainless Steel: ASTM B32, Grade Sn60, with acid flux of type recommended by stainless steel sheet manufacturer.

D. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.

E. Elastomeric Sealant: ASTM C920, elastomeric [polyurethane] [polysulfide] [silicone] polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

F. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

H. Bituminous Coating: Cold-applied asphalt emulsion in accordance with ASTM D1187/D1187M.

I. Asphalt Roofing Cement: ASTM D4586, asbestos free, of consistency required for application.

2.5 FABRICATION, GENERAL

A. Custom fabricate sheet metal flashing and trim to comply with details indicated and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required.
1. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
2. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
3. Verify shapes and dimensions of surfaces to be covered and obtain field measurements for accurate fit before shop fabrication.
4. Form sheet metal flashing and trim to fit substrates without excessive oil-canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
5. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

B. Fabrication Tolerances:
1. Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
2. Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified.

C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
2. Use lapped expansion joints only where indicated on Drawings.

D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal in accordance with cited sheet metal standard to provide for proper installation of elastomeric sealant.

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

F. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.

G. Seams:
1. Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.
2. Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.

3. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints where necessary for strength.

H. Do not use graphite pencils to mark metal surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.
1. Verify compliance with requirements for installation tolerances of substrates.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

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

3.2 INSTALLATION, GENERAL

A. Install sheet metal flashing and trim to comply with details indicated and recommendations of cited sheet metal standard that apply to installation characteristics required unless otherwise indicated on Drawings.
1. Install fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
2. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder or sealant.
3. Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement.
4. Install sheet metal flashing and trim to fit substrates and to result in watertight performance.
5. Install continuous cleats with fasteners spaced not more than 12 inches o.c.
6. Space individual cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
7. Install exposed sheet metal flashing and trim with limited oil-canning, and free of buckling and tool marks.
8. Do not field cut sheet metal flashing and trim by torch.
9. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
1. Coat concealed side of uncoated-aluminum and stainless steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim.
1. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.
2. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
3. Use lapped expansion joints only where indicated on Drawings.

D. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

E. Seal joints as required for watertight construction.
1. Use sealant-filled joints unless otherwise indicated.
a. Embed hooked flanges of joint members not less than 1 inch into sealant.

b. Form joints to completely conceal sealant.
c. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way.
d. Adjust setting proportionately for installation at higher ambient temperatures.
1) Do not install sealant-type joints at temperatures below 40 deg F.

2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."

F. Rivets: Rivet joints in uncoated aluminum where necessary for strength.

3.3 INSTALLATION OF ROOF-DRAINAGE SYSTEM

A. Install sheet metal roof-drainage items to produce complete roof-drainage system in accordance with cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.

3.4 INSTALLATION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.5 CLEANING

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder.

C. Clean off excess sealants.

3.6 PROTECTION

A. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.

B. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended in writing by sheet metal flashing and trim manufacturer.

C. Maintain sheet metal flashing and trim in clean condition during construction.

D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures, as determined by Architect.

END OF SECTION

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Silicone joint sealants.
2. Butyl rubber joint sealants.

B. Related Requirements:
1. Section 088000 "Glazing" for glazing sealants.

1.2 PRECONSTRUCTION TESTING

A. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.
1. Use manufacturer's standard test method to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
2. Submit not fewer than eight pieces of each kind of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.
3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
4. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures including use of specially formulated primers.
5. Testing will not be required if joint-sealant manufacturers submit joint preparation data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.

B. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:
1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.
2. Conduct field tests for each application indicated below:
   a. Each kind of sealant and joint substrate indicated.
3. Notify Architect seven days in advance of dates and times when test joints will be erected.
4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.
   a. Test Method: Test joint sealants in accordance with 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.
      1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
5. 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, retest until satisfactory adhesion is obtained.
6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.3 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

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

C. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- wide joints formed between two 6-inch- long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

D. Joint-Sealant Schedule: Include the following information:
1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.4 INFORMATIONAL SUBMITTALS

A. Preconstruction Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

B. Preconstruction Field-Adhesion Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.

C. Product Testing: Test joint sealants using a qualified testing agency.
1. Testing Agency Qualifications: An independent testing agency qualified in accordance with ASTM C 1021 to conduct the testing indicated.
2. Test in accordance with SWRI's Sealant Validation Program for compliance with requirements specified by reference to ASTM C 920 for adhesion and cohesion under cyclic movement, adhesion-in-peel, and indentation hardness.

D. Provide the following upon request:
1. Qualification Data: For qualified Installer and testing agency.
2. Product Certificates: For each kind of joint sealant and accessory, from manufacturer.
3. Sealant, Waterproofing, and Restoration Institute (SWRI) Validation Certificate: For each sealant specified to be validated by SWRI's Sealant Validation Program.
4. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.

E. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

F. Preinstallation Conference: Conduct conference at Project site.

1.6 PROJECT CONDITIONS

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

1.7 WARRANTY

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

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
1. Suitability for Immersion in Liquids. Where sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing in accordance with ASTM C 1247. Liquid used for testing sealants is deionized water, unless otherwise indicated.

C. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing in accordance with ASTM C 1248 and have not stained porous joint substrates indicated for Project.

D. Colors of Exposed Joint Sealants: Match Architect's samples.

2.2 SILICONE JOINT SEALANTS

A. Sealant JS-S1 - Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 50, for Use NT.
1. Products: Subject to compliance with requirements, provide products from the following table that has a validation certificate from the Sealant, Waterproofing and Restoration Institute (SWRI).

			Substrate Primer Required: Yes/No/Test			
Manufacturer	Product	Manufacturer Rated Movement Capability (CLASS)	Mortar*	Anod. Alum.	Uncoated Glass	Other**
Dow Inc.	Dowsil 756 SMS	± 50%	No	Yes	No	Test
Momentive Performance Materials, Inc.	SCS9000 Silpruf NB	± 50%	Yes	Test	No	Test

Table Notes:
* Indicates substrates with a cement component, such as concrete, that require use of a primer.

Table Notes:
* Indicates substrates with a cement component, such as concrete, that require use of a primer.
** Indicates that other substrates shall be tested for adhesion to determine if a primer will be required.

2.3 BUTYL RUBBER JOINT SEALANTS

A. Sealant JS-B1 - Butyl-Rubber-Based Joint Sealant: ASTM C 1311.
1. Products: Subject to compliance with requirements, provide one of the following:
a. Bostik, Inc.; Chem-Calk 300.
b. Pecora Corporation; BC-158.
c. Tremco Incorporated; Tremco Butyl Sealant.

2.4 JOINT SEALANT BACKING

A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, Type O (open-cell material) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.5 MISCELLANEOUS MATERIALS

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

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 joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

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

PART 3 - EXECUTION

3.1 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.

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

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including 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, water, surface dirt, and frost.

2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
   a. Concrete.
   b. Masonry.
   c. Quartzite.
3. Remove laitance and form-release agents from concrete.
4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
   a. Metal.
   b. Glass.
   c. .

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer 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 written installation instructions for products and applications indicated, unless more stringent requirements apply.

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

C. Do not extend exterior sealants and primers into building interior (that is, inside the weatherproofing system) unless first verifying compliance with VOC requirements.

D. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
   1. Do not leave gaps between ends of sealant backings.
   2. Do not stretch, twist, puncture, or tear sealant backings.
   3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

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

F. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
   1. Place sealants so they directly contact and fully wet joint substrates.
   2. Completely fill recesses in each joint configuration.
   3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

G. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants in accordance with requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
   1. Remove excess sealant from surfaces adjacent to joints.
   2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces. Water-based tooling agents are unacceptable.

3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
4. Provide flush joint profile where indicated per Figure 8B in ASTM C 1193.
5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 8C in ASTM C 1193.
    a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:
1. Extent of Testing: Test completed and cured sealant joints as follows:
    a. Perform 10 tests for the first 1000 feet of joint length for each kind of sealant and joint substrate.
    b. Perform 1 test for each 1000 feet of joint length thereafter or 1 test per each floor per elevation.
2. Test Method: Test joint sealants in accordance with 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.
3. Inspect tested joints and report on the following:
    a. Whether sealants filled joint cavities and are free of voids.
    b. Whether sealant dimensions and configurations comply with specified requirements.
    c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.
4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

B. Evaluation of Field-Adhesion Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

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

3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION

SECTION 080352 - HISTORIC TREATMENT OF WOOD WINDOWS (Options 1 & 2)

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes historic treatment of wood windows in the form of the following:
   1. Repairing wood frames and trim.
   2. Providing new frame elements, double hung sashes, window hardware and glazing.

B. Related Requirements:
   1. Section 013591 "Historic Treatment Procedures" for general historic treatment requirements.
   2. Section 024296 "Historic Removal and Dismantling" for historic removal and dismantling work.
   3. Section 085200 "Wood Windows" for replacement wood windows or new replacement sash not included in this Section.

1.2 DEFINITIONS

A. Glazing: Includes glass, glazing points, glazing tapes, glazing sealants, and glazing compounds.

B. Window: Includes window frame, sash, hardware, storm window, and exterior and interior shutters unless otherwise indicated by context.

C. Wood Window Component Terminology: Wood window components for historic treatment work include the following classifications:
   1. Frame Components: Head, jambs, and sill.
   2. Sash Components: Stiles and rails, parting bead, stop, and muntins.
   3. Exterior Trim: Exterior casing, brick mold, and cornice or drip cap.
   4. Interior Trim: Casing, stool, and apron.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review minutes of Preliminary Historic Treatment Conference that pertain to historic treatment of wood windows.
   2. Review methods and procedures related to historic treatment of wood windows including, but not limited to, the following:
      a. Historic treatment specialist's personnel, equipment, and facilities needed to make progress and avoid delays.
      b. Materials, material application, sequencing, tolerances, and required clearances.
      c. Fire-protection plan.
      d. Wood window historic treatment program.
      e. Coordination with building occupants.

1.4 SEQUENCING AND SCHEDULING

A. Perform historic treatment of wood windows in the following sequence, which includes work specified in this and other Sections:
   1. Label each window frame with permanent opening-identification number in inconspicuous location.
   2. Tag existing window sash, storm windows, and shutters with opening-identification numbers and remove for on-site or off-site repair. Indicate on tags the locations on window of each component, such as "top sash," "bottom sash," "left shutter," and "right shutter."
   3. Remove window, dismantle hardware, and tag hardware with opening-identification numbers.
   4. Install temporary protection and security at window openings.
   5. In the shop, label each sash, storm window, shutter, and louvered blind unit with permanent opening-identification number in inconspicuous location and remove site-applied tags.
   6. Sort units by condition, separating those that need extensive repair.
   7. Clean surfaces.
   8. General Wood-Repair Sequence:
      a. Remove paint to bare wood.

b. Rack frames slightly to inject adhesive into mortise and tenon joints; square frames to proper fit before adhesive sets.
c. If thicker than original glass is required, rout existing muntins to required rebate size.
d. Repair wood by consolidation, member replacement, partial member replacement, and patching.
e. Sand, prime, fill, sand again, and prime surfaces again for refinishing.

9. Repair, refinish, and replace hardware if required. Reinstall operating hardware.
10. Install glazing.
11. Remove temporary protection and security at window openings.
12. Reinstall units.
13. Apply finish coats.
14. Install remaining hardware and weather stripping.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.
1. Include recommendations for product application and use. Include test data substantiating that products comply with requirements.

B. Shop Drawings:
1. Include plans, elevations, and sections showing locations and extent of repair and replacement work, with enlarged details of replacement parts indicating materials, profiles, joinery, reinforcing, method of splicing into or attaching to existing wood window, accessory items, and finishes.
2. Include field-verified dimensions and the following:
a. Full-size shapes and profiles with complete dimensions for replacement components and their jointing, showing relation of existing to new components.
b. Templates and directions for installing hardware and anchorages.
c. Identification of each new unit and its corresponding window locations in the building on annotated plans and elevations.
d. Provisions for [sealant joints] [flashing] [and] <Insert item> as required for location.

C. Samples for Initial Selection: For each type of exposed wood and finish.
1. Identify wood species, cut, and other features.
2. Include Samples of hardware and accessories involving color selection.

D. Samples for Verification: For the following products in manufacturer's standard sizes unless otherwise indicated, finished as required for use in the Work:
1. Replacement Units: 12-inch- long, full-size [frame] [and] [sash] sections with applied finish.
2. Replacement Members: 12 inches long for each replacement member, including parts of frame, sash, exterior trim, and interior trim.
a. Additional Samples of replacement members that show fabrication techniques, materials, and finishes as requested by Architect.
3. Repaired Wood Window Members: Prepare Samples using existing wood window members removed from site, repaired, and prepared for refinishing.
4. Refinished Wood Window Members: Prepare Samples using existing wood window members removed from site, repaired, and refinished.
5. Hardware: Full-size units with each factory-applied or restored finish.
6. Weather Stripping: 12-inch- long sections.
7. Glass: [Full-size] <Insert dimensions> units of each type and appearance.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For [historic treatment specialist] [including workers] [and] [wood-repair-material manufacturer].

B. Wood Window Historic Treatment Program: Submit before work begins.

C. Preconstruction Test Reports: For historic treatment of wood windows.

1.7 QUALITY ASSURANCE

A. Historic Treatment Specialist Qualifications: A qualified historic wood window specialist, experienced in repairing, refinishing, and replacing wood windows in whole and in part. Experience only in fabricating and installing new wood windows is insufficient experience for wood-window historic treatment work.

B. Wood-Repair-Material Manufacturer Qualifications: A firm regularly engaged in producing [wood consolidant] [and] [wood-patching compound] that have been used for similar historic wood-treatment applications with successful results, and with factory-authorized service representatives who are available for consultation and Project-site inspection and on-site assistance.

C. Wood Window Historic Treatment Program: Prepare a written, detailed description of materials, methods, equipment, and sequence of operations to be used for historic treatment work, including protection of surrounding materials and Project site.
1. If materials and methods other than those indicated are proposed for any phase of historic treatment work, add a written description of such materials and methods, including evidence of successful use on comparable projects, and demonstrations to show their effectiveness for this Project.

D. Mockups: Prepare mockups of historic treatment repair processes to demonstrate aesthetic effects and to set quality standards for materials and execution and for fabrication and installation. Prepare mockups so they are as inconspicuous as practicable.
1. Locate mockups [on existing windows where directed by Architect] [in locations that enable viewing under same conditions as the completed Work] <Insert requirement>.
2. Wood Window Repair: Prepare one entire window unit to serve as mockup to demonstrate samples of each type of repair of wood window members including frame, sash, glazing, and hardware.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified historic treatment specialist to perform preconstruction testing on historic wood windows.
1. Provide test specimens representative of proposed materials and existing construction.
2. Test historic treatment products and methods for effectiveness and compliance with specified requirements.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Pack, deliver, and store products in suitable packs, heavy-duty cartons, or wooden crates; surround with sufficient packing material to ensure that products are not deformed, broken, or otherwise damaged.

B. Store products inside a well-ventilated area and protect from weather, moisture, soiling, abrasion, extreme temperatures, and humidity, and where environmental conditions comply with manufacturer's requirements.

1.10 FIELD CONDITIONS

A. Weather Limitations: Proceed with historic treatment of wood windows only when existing and forecasted weather conditions are within the environmental limits set by each manufacturer's written instructions and specified requirements.

PART 2 - PRODUCTS

2.1 HISTORIC TREATMENT OF WOOD WINDOWS, GENERAL

A. Quality Standard: Comply with applicable requirements in Section 12, "Historic Restoration Work," and related requirements in AWI/AWMAC/WI's "Architectural Woodwork Standards" for construction, finishes, grades of wood windows, and other requirements unless otherwise indicated.
1. Exception: Industry practices cited in Section 12, Article 1.5, Industry Practices, of the Architectural Woodwork Standards do not apply to the work of this Section.
2. <Double click here to find, evaluate, and insert list of manufacturers and products.>

2.2 WOOD-REPLACEMENT MATERIALS

A. Wood, General: Clear fine-grained lumber; kiln dried to a moisture content of 6 to 12 percent at time of fabrication; free of visible finger joints, blue stain, knots, pitch pockets, and surface checks larger than 1/32 inch deep by 2 inches wide.
1. Species: Match species of each existing type of wood component or assembly unless otherwise indicated.

B. Frame Heads and Jambs[and Exterior Trim]: Match existing species.

C. Exterior Trim: Match existing species.

D. Sills: Match existing species .

E. Interior Trim: Match existing species.

2.3 WOOD-REPAIR MATERIALS

A. Source Limitations: Obtain wood consolidant and wood-patching compound from single source from single manufacturer.

B. Wood Consolidant: Ready-to-use product designed to penetrate, consolidate, and strengthen soft fibers of wood materials that have deteriorated due to weathering and decay and designed specifically to enhance the bond of wood-patching compound to existing wood.
1.

C. Wood-Patching Compound: Two-part epoxy-resin wood-patching compound; knife-grade formulation as recommended in writing by manufacturer for type of wood repair indicated, tooling time required for the detail of work, and site conditions. Compound shall be designed for filling voids in damaged wood materials that have deteriorated due to weathering and decay. Compound shall be capable of filling deep holes and spreading to feather edge.
1.

2.4 MISCELLANEOUS MATERIALS

A. Cleaning Materials:
1. Detergent Solution: Solution prepared by mixing 2 cups of tetrasodium pyrophosphate (TSPP), 1/2 cup of laundry detergent that contains no ammonia, 5 quarts of 5 percent sodium hypochlorite bleach, and 15 quarts of warm water for each 5 gal. of solution required.
2. Mildewcide: Commercial, proprietary mildewcide or a solution prepared by mixing 1/3 cup of household detergent that contains no ammonia, 1 quart of 5 percent sodium hypochlorite bleach, and 3 quarts of warm water.

B. Adhesives: Wood adhesives for exterior exposure, with minimum 15- to 45-minute cure at 70 deg F, in gunnable and liquid formulations as recommended in writing by adhesive manufacturer for each type of repair.

C. Fasteners: Use fastener metals that are noncorrosive and compatible with each material joined.
1. Match existing fasteners in material and type of fastener unless otherwise indicated.

2. Use concealed fasteners for interconnecting wood components.
3. Use concealed fasteners for attaching items to other work unless exposed fasteners are [unavoidable] [or] [the existing fastening method].
4. For fastening metals, use fasteners of same basic metal as fastened metal unless otherwise indicated.
5. For exposed fasteners, use Phillips-type machine screws of head profile flush with metal surface unless otherwise indicated.
6. Finish exposed fasteners to match finish of metal fastened unless otherwise indicated.

D. Anchors, Clips, and Accessories: Fabricate anchors, clips, and window accessories of aluminum, nonmagnetic stainless steel, or hot-dip zinc-coated steel complying with requirements in ASTM B 633 for SC 3 (Severe) service condition.

PART 3 - EXECUTION

3.1 HISTORIC TREATMENT SPECIALIST

A. Historic Treatment Specialist Firms: Subject to compliance with requirements, :

3.2 PREPARATION

A. Protect adjacent materials from damage by historic treatment of wood windows.

B. Clean wood windows of mildew, algae, moss, plant material, loose paint, grease, dirt, and other debris by scrubbing with bristle brush or sponge and detergent solution. Scrub mildewed areas with mildewcide. After cleaning, rinse thoroughly with fresh water. Allow to dry before repairing or painting.

C. Condition replacement wood members and replacement units to prevailing conditions at installation areas before installing.

3.3 HISTORIC TREATMENT OF WOOD WINDOWS, GENERAL

A. Historic Treatment Appearance Standard: Completed work is to have a uniform appearance as viewed by Architect from the window interior at 5 feet away and from the window exterior at 20 feet away.

B. General: In treating historic items, disturb them as minimally as possible and as follows:
1. Stabilize and repair wood windows to reestablish structural integrity and weather resistance while maintaining the existing form of each item.
2. Remove coatings and apply borate preservative treatment before repair. Remove coatings according to Section 090391 "Historic Treatment of Plain Painting" unless otherwise indicated.
3. Repair items in place where possible.
4. Install temporary protective measures to protect wood window work that is indicated to be completed later.
5. Refinish historic wood windows according to Section 090391 "Historic Treatment of Plain Painting" unless otherwise indicated.

C. Mechanical Abrasion: Where mechanical abrasion is needed for the work, use only the gentlest mechanical methods, such as scraping and natural-fiber bristle brushing, that will not abrade wood substrate, reducing clarity of detail. Do not use abrasive methods such as sanding, wire brushing, or power tools except as indicated as part of the historic treatment program and as approved by Architect.

D. Repair and Refinish Existing Hardware: Dismantle window hardware; strip paint, repair, and refinish it to match finish samples; and lubricate moving parts just enough to function smoothly.

E. Repair Wood Windows: Match existing materials and features, retaining as much original material as possible to perform repairs.
1. Unless otherwise indicated, repair wood windows by consolidating, patching, splicing, or otherwise reinforcing wood with new wood matching existing wood or with salvaged, sound, original wood.
2. Where indicated, repair wood windows by limited replacement matching existing material.

3. Sash Balance: Repair sash balances to function according to type as specified in "Hardware" Article" above. Provide missing sash balances.

F. Replace Wood Units: Where indicated, duplicate and replace units with units made from salvaged, sound, original wood or with new wood matching existing wood. Use surviving prototypes to create patterns for duplicate replacements.
1. Do not use substitute materials unless otherwise indicated.
2. Compatible substitute materials may be used.

G. Protection of Openings: Where sash or windows are indicated for removal, cover resultant openings with temporary enclosures so that openings are weathertight during repair period.

H. Identify removed windows, frames, sash, and members with numbering system corresponding to window locations to ensure reinstallation in same location. Key windows, sash, and members to Drawings showing location of each removed unit. Permanently label units in a location that will be concealed after reinstallation.

3.4 WOOD WINDOW PATCH-TYPE REPAIR

A. General: Patch wood members that exhibit depressions, holes, or similar voids, and that have limited amounts of rotted or decayed wood.
1. Remove [**sash**] [**storm windows**] [**and**] [**screens**] from windows before performing patch-type repairs at meeting or sliding surfaces unless otherwise indicated. Reglaze units before reinstallation.
2. Verify that surfaces are sufficiently clean and free of paint residue before patching.
3. Treat wood members with wood consolidant before applying patching compound. Coat wood surfaces by brushing, applying multiple coats until wood is saturated and unable to absorb more. Allow treatment to harden before filling void with patching compound.
4. Remove rotted or decayed wood down to sound wood.

B. Apply borate preservative treatment to accessible surfaces either before applying wood consolidant or after removing rotted or decayed wood. Apply treatment liberally by brush to joints, edges, and ends; top, sides, and bottom. Allow treatment to dry.

C. Apply wood-patching compound to fill depressions, nicks, cracks, and other voids created by removed or missing wood.
1. Prime patch area with application of wood consolidant or manufacturer's recommended primer.
2. Mix only as much patching compound as can be applied according to manufacturer's written instructions.
3. Apply patching compound in layers as recommended in writing by manufacturer until the void is completely filled.
4. Sand patch surface smooth and flush with adjacent wood, without voids in patch material, and matching contour of wood member.
5. Clean spilled compound from adjacent materials immediately.

3.5 WOOD WINDOW MEMBER-REPLACEMENT REPAIR

A. General: Replace parts of or entire wood window members at locations indicated on Drawings .
1. Verify that surfaces are sufficiently clean and free of paint residue before repair.
2. Remove broken, rotted, and decayed wood down to sound wood.
3. Custom fabricate new wood to replace missing wood; either replace entire wood member or splice new wood part into existing member.
4. Secure new wood using finger joints, multiple dowels, or splines with adhesive and nailing to ensure maximum structural integrity at each splice. Use only concealed fasteners. Fill nail holes and patch surface to match surrounding sound wood.

B. Apply borate preservative treatment to accessible surfaces after replacements are made. Apply treatment liberally by brush to joints, edges, and ends; top, sides, and bottom.

C. Repair remaining depressions, holes, or similar voids with patch-type repairs.

D. Clean spilled materials from adjacent surfaces immediately.

3.6 FIELD QUALITY CONTROL

A. Manufacturers Field Service: Engage wood-repair-material manufacturers' factory-authorized service representatives for consultation and Project-site inspection and to provide on-site assistance when requested by Architect.

3.7 ADJUSTING

A. Adjust existing and replacement operating sash, screens, hardware, weather stripping, and accessories for a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts.

3.8 CLEANING AND PROTECTION

A. Protect window surfaces from contact with contaminating substances resulting from construction operations. Monitor window surfaces adjacent to and below exterior concrete and masonry during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances contact window surfaces, remove contaminants immediately.

B. Clean exposed surfaces immediately after historic treatment of wood windows. Avoid damage to coatings and finishes. Remove excess sealants, glazing and patching materials, dirt, and other substances.

C. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction.

END OF SECTION

SECTION 085113 - ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes aluminum windows for exterior locations.

B. Definitions:
1. Blast Consultant: Blast Engineer for the design-build team.
2. Blast Engineer: Blast Engineer for the specialty Subcontractor.
3. Capacity Controlled Element: A member designed to experience inelastic deformations and reliably sustain deformation above the yield load level under blast loading. Connections to supporting elements are designed to preclude non-ductile failure and allow inelastic behavior of the member.
4. Conventional Requirements: All performance requirements defined by other disciplines for architectural and structural components that are not related to blast requirements. These may include, but are not limited to, gravity, wind, seismic, thermal, and air and water infiltration performance requirements.
5. Ductility Ratio (μ): The ratio of the maximum deflection of an element to its maximum elastic deflection.
6. Dynamic Increase Factor (DIF): A factor accounting for high strain rate effects applied to the material Static Expected Actual Strength to obtain the Dynamic Strength.
7. Dynamic Strength: The dynamic expected strength of a material. This strength is used for dynamic design of capacity-controlled elements such as window mullions or precast panels.
8. Nominal Material Strength: The published minimum strength of a component. For example, the Nominal Material Strength of A36 steel is 36,000psi.
9. Static Expected Actual Strength: The average strength of a material. For example, the Static Expected Actual Strength of A36 steel is 39,600psi if the Strength Increase Factor is 1.1.
10. Strength Increase Factor (SIF): A factor applied to the Nominal Material Strength to account for the difference between the specified minimum and Static Expected Actual Strength value.
11. Support Rotation (θ): The angle through which a flexural element has rotated at its supports due to deflection under loading. When a flexural element is modeled for analysis as an equivalent single-degree-of-freedom dynamic system, the support rotation shall be calculated using the ratio of the maximum deflection to the distance between hinge or yield line locations.
12. Ultimate Resistance: The capacity of the element; defined as the uniform pressure load that causes the element to form all plastic hinges necessary to create an instability mechanism.

C. Design Procedures
1. All systems identified herein shall be designed, fabricated, and installed to resist the blast loads specified in this section within the performance limits specified in this section. Blast loading conditions shall be considered independent of conventional design loads, except unfactored dead loads. Designing to meet the blast requirements does not relieve the need to design for all other applicable Conventional Requirements.
2. All blast designs and analyses shall be conducted in accordance with accepted industry standards for dynamic, inelastic systems. The following procedures and requirements shall be met:

D. Tributary Area-Single Degree of Freedom (SDOF) Analysis: Analysis whereby the specified linearly decaying blast load function is applied to the member based on the member's tributary width. Unless the failure of supported elements can be demonstrated through analysis, the blast load must be applied to the entire tributary area of the designed element.

E. Dynamic Edge Reaction-SDOF Analysis: Single Degree of Freedom analysis whereby the dynamic glazing edge reaction time history loading function is applied to the frame member. Dynamic glazing edge reactions shall be computed using a Pre-approved Glass Hazard Code.
1. This approach is recommended for simple spanning window mullions with only one or two lights of glass tributary to the mullion without any ancillary mullions framing into it and is discouraged for complex loading conditions such as ancillary mullions that frame into the main mullions and where the natural period of the glass is similar to that of the mullion.
2. Additional consideration shall be given to the appropriate mass used in this type of analysis.

F. Multi-Degree of Freedom (MDOF) Analysis: Non-linear dynamic analysis that explicitly considers interactions between connected members. Finite element analysis is considered an MDOF analysis.
1. Include in the model appropriate response modes, e.g., axial, shear, and bending interaction, of the structural element, including local and lateral buckling where applicable.
2. If connections are not explicitly included in the model, rotations for connections and supports in the advanced model are to be limited to the Support Rotations provided below.
3. For glass supporting elements, calculations must be provided to demonstrate that for the specified blast load, connections, frames, and mullions do not achieve rotations and deflection levels that result in a premature disengagement of the glass pane from its support for the design pressure and impulse load or the dynamic edge reaction predicted by the Pre-approved Glass Hazard Code. Use rotation limits for window frame/glass pocket included below or provide justification for other limits.
4. Calculations must be provided to demonstrate that the connection between mullions, frames, and supporting structure do not disengage under the Glass Maximum Capacity of the largest glazed pane tributary to the element being designed.

G. Anchorage and Connection Design:
1. Anchorages and connections may utilize the ultimate strength of the materials as dictated in the specification sections below. Designs based upon manufacturer supplied data may use the published "Ultimate Capacity" values with an applied factor of 0.65 for brittle failure modes (e.g. shear and tensile rupture).
2. SIFs and DIFs do not apply to anchorage and connection designs.

H. Blast Loads
1. The blast load shall be a linearly decaying dynamic load function with peak pressure and impulse as shown in the table below. Negative phase effects shall not be considered.

Floor	Window Types (3.4.24)	Balanced Load Controlling Window	Pressure (psi)	Time (msec)	Impulse (psi-msec)
Basement	A,B,D	A	8.44	14.00	59.08
First Floor	A,C,D,F,H,I,K,L,M	K	5.94	14.00	41.58
Second Floor	B,D,G,J	J	6.75	14.00	47.25
Third Floor	D,F	F	6.56	14.00	45.92
Fourth Floor	E	E	7.25	14.00	50.75

I. Materials
1. For each respective material, the SIF and DIF in the following table shall both be applied to the nominal material strengths when performing dynamic design. These factors may only be used for the design of Capacity Controlled Elements in a ductile response mode (usually flexure). The material increase factors shall not be used for connection design.

J. SIF and DIF for materials not listed in the table below shall be taken from published sources and are subject to approval of the authorized representative of the Government.

Material	ASTM Designation	SIF	DIF
Aluminum	6063-T5	1.16	1.02
Aluminum	6063-T6	1.12	1.02
Structural Steel	A36	1.10	1.29

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

2. Review and discuss the finishing of aluminum windows that is required to be coordinated with the finishing of other aluminum work for color and finish matching.
3. Review, discuss, and coordinate the interrelationship of aluminum windows with other exterior wall components. Include provisions for anchoring, flashing, weeping, sealing perimeters, and protecting finishes.
4. Review and discuss the sequence of work required to construct a watertight and weathertight exterior building envelope.
5. Inspect and discuss the condition of substrate and other preparatory work performed by other trades.

1.3 ACTION SUBMITTALS

A. Submittal Compliance Form: If Basis-of-Design products are provided, Submittal Compliance Form may be submitted in lieu of required . Ensure compliance with requirements included in Product Data: For each type of product.
1. Include construction details, material descriptions, glazing and fabrication methods, dimensions of individual components and profiles, hardware, and finishes for aluminum windows.

B. Shop Drawings: For aluminum windows.
1. Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.

C. Samples: For each exposed product and for each color specified, [2 by 4 inches] <Insert dimensions> in size.

D. Samples for Initial Selection: For units with factory-applied finishes.
1. Include Samples of hardware and accessories involving color selection.

E. Samples for Verification: For aluminum windows and components required, showing full range of color variations for finishes, and prepared on Samples of size indicated below:
1. Exposed Finishes: 2 by 4 inches.
2. Exposed Hardware: Full-size units.

F. Product Schedule: For aluminum windows. Use same designations indicated on Drawings.

G. Pre-Submittal: Subcontractor shall submit proposed blast analysis methodology and Blast Engineer qualifications at the onset of the project, for review by the Blast Consultant prior to beginning design/analysis. The Blast Engineer shall identify the intended analysis approach (SDOF, MDOF or other advanced analysis approach) and as a minimum include:
1. A detailed description of the analytic methodology including material properties, applied load, boundary conditions, mass, and damping considered, etc.

H. Blast Reports: Submit blast calculations in the form of a report that includes a summary narrative, structural design sketches, and structural design calculations for the work required to resist blast loads for each window system showing compliance with blast performance requirements. Blast calculations, sketches and shop drawings shall each be numbered and coordinated such that cases can be easily linked. Blast calculation reports shall be prepared and submitted by qualified Blast Engineer experienced in blast resistant design of these systems and shall be signed and sealed by a registered Professional Engineer. Revisions to calculation packages during resubmissions shall be clouded or tracked.
1. Window framing calculations shall as a minimum include:

I. Calculations or output identifying the mullion/framing section properties.

J. SDOF or MDOF input and output of each unique window mullion/framing member demonstrating that the specified support rotations and ductility ratios are met.

K. Calculations for all internal mullion-to-mullion and mullion-to-frame connections as well as all connections between the frame and supporting structure. These calculations shall account for all relevant failure mechanisms.

L. Elevations showing connection reaction forces for each window system shall be provided clearly for the SER to verify the loads imposed on the structure or other façade components.

M. A labeling scheme shall be developed such that it is possible to relate each calculation to a specific window type on the building. Calculation package should address every window unit type number.

N. Shop Drawings: Submit shop drawings signed and sealed by a Registered Professional Engineer, showing the proposed facade profiles and anchorages that demonstrate compliance with the design intent.

O. Qualification Data: Submit qualifications for Subcontractors and Subcontractor's Blast Engineers verifying years of experience; include list of completed projects having similar Scope of Work identified by name, location, date, reference names and phone numbers.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A manufacturer capable of fabricating aluminum windows that meet or exceed performance requirements indicated and of documenting this performance by test reports and calculations.

B. Installer Qualifications: An installer acceptable to aluminum window manufacturer for installation of units required for this Project.

C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic and performance effects, and to set quality standards for materials and execution.
1. Build one mockup of typical window area as shown on Drawings for each of the following:
   a. Window Type D
   b. Window Type H
   c. Window Type J
   d. Coordinate locations with the Owner and the Architect Prior to the start of work.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

D. Provide the following upon request:
1. Qualification Data: For manufacturer and Installer.
2. Product Test Reports: For each type of aluminum window, for tests performed by a qualified testing agency.
3. Field quality-control reports.

E. Blast Subcontractor Qualifications: A firm with documented, successful experience with work comparable to that specified in applicable component of the above section "PERFORMANCE REQUIREMENTS."

F. Blast Engineer Qualifications: Blast Engineers performing designs of elements governed by this specification shall be Professional Engineers who are acceptable to the authorized representative of the Government and have a minimum of 5 years of experience in providing blast engineering services of the kind indicated for projects of similar size and scope.

G. References: Design and analysis approaches shall be consistent with those in the following standards, manuals:
1. "The Risk Management Process for Federal Facilities", An Interagency Security Committee Standard, 2021 Edition; and Appendix A: The Design-Basis Threat Report, 2021; and Appendix B: Countermeasures, 2021.
2. "General Services Administration Facility Requirements for Explosive Devices Applicable to Facility Security Levels III and IV; GSA's Interpretation of the Interagency Security Committee (ISC) Risk Management Process for Federal Facilities: An Interagency Security Committee Standard - Appendix B: Countermeasures", 2nd Edition dated December 21, 2018.
3. ASCE 59-11 Blast Protection of Buildings
4. ASTM F1642-12 Standard Test Method for Glazing and Glazing Systems Subject to Airblast Loadings

5. U.S. General Services Administration. Window Glazing Analysis Response & Design WINGARD Technical Manual. Applied Research Associates, Inc, Vicksburg, MS.

1.5 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace aluminum windows that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Failure to meet performance requirements.

B. Structural failures including excessive deflection, water leakage, condensation, and air infiltration.

C. Faulty operation of movable sash and hardware.

D. Deterioration of materials and finishes beyond normal weathering.

E. Failure of insulating glass.
   1. Warranty Period:
      a. Window: 10 years from date of Substantial Completion.

F. Glazing Units: 10 years from date of Substantial Completion.

G. Aluminum Finish: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain aluminum windows from single source from single manufacturer.

2.2 WINDOW PERFORMANCE REQUIREMENTS

A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.
   1. Window Certification: AAMA certified with label attached to each window.

B. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:
   1. Minimum Performance Class: AW.
   2. Minimum Performance Grade: 45 .

C. Thermal Transmittance: NFRC 100 maximum whole-window U-factor of 0.35 Btu/sq. ft. x h x deg F.

D. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of 0.30 .

E. Thermal Performance:
   1. Design wall and its components to not develop any visible interior condensation on framing members or glazing when the exterior air dry bulb temperature is 0 deg F (17.8 deg C) and the interior air dry bulb temperature is 2 deg F (2.2 deg C) with a 30 % relative humidity.
   2. Thermal performance will be verified during mockup testing.
   3. Provide independent laboratory test reports based on AAMA 1503.1, confirming wall system performance to at least the above criteria.
   4. If independent laboratory test reports are unavailable to verify thermal performance, provide computer analysis using THERM 5 and Windows 5 software as developed by Lawrence Berkeley National Laboratory. Include in the analysis at least all principle mullions for sill, jamb, and head conditions for vision lites and spandrel areas.

F. Thermal Movements: Provide aluminum windows, including anchorage, that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. Temperature Change: 120 deg F ambient; 180 deg F material surfaces.

G. Blast Design Performance:
1. Design Procedures: Tributary Area-SDOF, Dynamic Edge Reaction-SDOF, and MDOF blast design procedures described above are acceptable.
2. Design Scope: The window Subcontractor shall be responsible for determining all performance, reaction forces and connection designs based on the actual geometry and make-up for all conditions. Analysis shall be provided for all typical and atypical conditions.
3. Performance Criteria: Design, fabricate, and install glazed window assemblies to comply with the following:

H. Support Rotation: Support rotation of window mullion ends shall not exceed the following limits:
1. 3 degrees **(**L/40**)** over the full span of all mullions in response to the Specified Blast Loads. Second order effects such as local buckling shall be evaluated if rotation exceeds 2 degrees.
2. 6 degrees **(**L/20**)** over the full span of all mullions in response to the Glass Maximum Capacity.

I. Ductility Ratio: Ductility ratio of window mullions shall not exceed the following limits:
1. Ductility of 5 over the full span of all mullions in response to the Specified Blast Loads.
2. Ductility of 7 over the full span of all mullions in response to the Glass Maximum Capacity.
3. Framing Members:

J. Aluminum and steel material strengths used for design shall be taken as the Dynamic Strength. Refer to the Materials section, above.

K. Snap on elements or other aluminum extrusions that are not structurally connected together to act as a single composite member shall not be considered in determining the structural capacity of the mullion, unless adequate load transfer can be demonstrated between combined sections. Combined section properties of mullion components may be used if calculations demonstrate deformation compatibility between all components.

L. Steel bars/shapes used to reinforce aluminum extrusions shall be structurally connected or in tight bearing to transfer the blast loads across the interface between the members. Combined section properties of mullions and reinforcement components may be used if calculations demonstrate deformation compatibility between the aluminum and steel components.

M. Composite section properties of mullion components may only be used if calculations demonstrate strain compatibility across the interface.
1. This requirement applies to the inner and outer components of thermally broken systems.

N. All window framing members shall be positively fastened or in tight bearing to adequately transfer the blast end reaction forces across the connection between adjacent structural framing members.
1. Anchorages and Connections:

O. Design responsibility: Design of window anchorages to the supporting structure is the responsibility of the Subcontractor. Connection details shown on the architectural and structural drawings are schematic only.

P. Coordination: It is the D-B Contractor's responsibility to coordinate blast reaction forces and connection design information between different trades and subcontractors. For example, coordination of connection forces to supporting structural elements.

Q. Blast Reaction Forces: Internal connections and anchorages between windows, and supporting structure shall be engineered to develop the calculated direct and rebound reaction forces as follows:
1. The window frame member reaction forces shall be 1.0 times the reaction forces calculated using the Ultimate Resistance of the supported member.

2. The Ultimate Resistance of each framing member shall be calculated to account for the actual member's plastic section properties and Dynamic Strength.
3. 3) Rebound: Design connections and anchorages for each member for the actual computed rebound forces.

R. Anchorage/Connection Design: Design anchorages and connections per the project applicable versions of AISC manuals for steel connections, Aluminum Design Manual for aluminum connections, ACI-318 or PCI manual for anchorage to concrete, or documented design methodologies approved by the authorized representative of the Government.
1. Load factor for blast reactions shall be 1.0.
2. Resistance (phi) factors shall be as specified in the noted material specific design manuals.
3. When using proprietary anchors embeds or fasteners, a resistance factor of 0.65 shall be applied to any manufacturers published ultimate load capacities.

S. Ballistic Design Performance:
1. Ballistic performance of window framing and mullions shall be UL Level IV for all windows designated in the drawings as ballistic resistant.

2.3 ALUMINUM WINDOWS

A. Manufacturers: Subject to compliance with requirements, [provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
1. Graham Architectural Products Corporation.
2. TRACO.
3. Wausau Window and Wall Systems; Apogee Wausau Group, Inc.

B. Types: Provide the following types in locations indicated on Drawings:
1. Double hung.
2. Fixed.

C. Frames and Sashes: Aluminum extrusions complying with AAMA/WDMA/CSA 101/I.S.2/A440.
1. Thermally Improved Construction:
   a. For thermally improved windows, provide frames and ventilators of split construction with exterior component separated from interior component by a non-metallic material providing a complete separation and joined to both components without the use of, or by minimizing, metal fasteners through the thermal break.

D. Provide one of the following types of thermal break insulation:
   1) Insulbar: A glass-reinforced polyamide 6/6 nylon, with glass fibers oriented in three directions, mechanically crimped into dual dovetail-shaped slots in the aluminum extrusions.
   2) Struct-Link or similar construction as approved: A poured and interrupted debridged polyurethane construction that periodically leaves a measured length of aluminum web to provide structural integrity, with the debridged sections continuously sealed using an elastomeric sealant.
   3) Azon or similar construction as approved: A poured and debridged polyurethane construction with mechanically abraded surfaces that lock in the polyurethane minimizing dry shrinkage and fracturing of the polyurethane.
2. Pressure Bar: A continuous extruded aluminum member anchored to the window framing system with mechanical fasteners and separated from the framing by an insulating non-metallic spacer.

E. Glass: Clear annealed glass, ASTM C1036, Type 1, Class 1, q3.

F. Insulating-Glass Units: ASTM E2190.
1. Glass: ASTM C1036, Type 1, Class 1, q3.
   a. Tint: Clear.
2. Lites: Two.
3. Filling: Fill space between glass lites with air.
4. Low-E Coating: Sputtered on second surface.

G. Hardware, General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with adjacent materials; designed to smoothly operate, tightly close, and securely lock windows, and sized to accommodate sash weight and dimensions.
1. Exposed Hardware Color and Finish: As selected by Architect from manufacturer's full range.

H. Hung Window Hardware:
1. Counterbalancing Mechanism: Complying with AAMA 902, concealed, of size and capacity to hold sash stationary at any open position.
2. Locks and Latches: Allow unobstructed movement of the sash across adjacent sash in direction indicated and operated from the inside only. Provide key-operated custodial locks.
3. Tilt Latch: Releasing latch allows sash to pivot about horizontal axis to facilitate cleaning exterior surfaces from the interior.

I. Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.

2.4 ACCESSORIES

A. Subsills: Thermally broken, extruded-aluminum subsills in configurations indicated on Drawings.

B. Panning Trim: Extruded-aluminum profiles in sizes and configurations indicated on Drawings.

C. Receptor System: Two-piece, snap-together, thermally broken, extruded-aluminum receptor system that anchors windows in place.

2.5 FABRICATION

A. Fabricate aluminum windows in sizes indicated. Include a complete system for assembling components and anchoring windows.

B. Glaze aluminum windows in the factory.

C. Weather strip each operable sash to provide weathertight installation.

D. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.

E. Provide water-shed members above side-hinged sashes and similar lines of natural water penetration.

F. Mullions: Provide mullions and cover plates, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections. Provide mullions and cover plates capable of withstanding design wind loads of window units.

G. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation.

2.6 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.7 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. Class I, Color Anodic Finish: AA-M12C22A42/A44 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker) complying with AAMA 611.
1. Color: Dark bronze.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Verify rough opening dimensions, levelness of sill plate, and operational clearances.

C. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure weathertight window installation.

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

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E2112.

B. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.

C. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.

D. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

3.3 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.

B. Testing Services: Testing and inspecting of installed windows shall take place as follows:
1. Testing Methodology: Testing of windows for air infiltration and water resistance shall be performed according to AAMA 502.
2. Air-Infiltration Testing:
   a. Test Pressure: That required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance class indicated.

C. Allowable Air-Leakage Rate: 1.5 times the applicable AAMA/WDMA/CSA 101/I.S.2/A440 rate for product type and performance class rounded down to one decimal place.
1. Water-Resistance Testing:
   a. Test Pressure: Two-thirds times test pressure required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance grade indicated.

D. Allowable Water Infiltration: No water penetration.
   1. Testing Extent: Three windows of each type as selected by Architect and a qualified independent testing and inspecting agency. Windows shall be tested after perimeter sealants have cured.
   2. Test Reports: Prepared according to AAMA 502.

E. Windows will be considered defective if they do not pass tests and inspections.

F. Prepare test and inspection reports.

3.4 ADJUSTING, CLEANING, AND PROTECTION

A. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.

B. Clean exposed surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
   1. Keep protective films and coverings in place until final cleaning.

C. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

D. Protect window surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written instructions.

END OF SECTION

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:

1. Windows.
2. Doors.
3. Glazed entrances.
4. Glazing sealants and accessories.

1.2 DEFINITIONS

A. Blast Consultant: Blast engineer for the design-build team.

B. Blast Engineer: Blast engineer for the specialty Subcontractor.

C. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

D. Glass Fabrication: Using primary glass in the production of single pane glass products such as coated, laminated and heat treated glass. Can be done by either the Glass Manufacturer or the Glazing Product Manufacturer.

E. Glass Maximum Capacity: The highest dynamic load at which the glass cracks but is retained by the frame. The glass maximum capacity is usually associated with the rupture strength of the laminated glass interlayer. The dynamic Glass Maximum Capacity load shall utilize the same time duration as the specified blast load, based on probability of failure of 750 breaks per 1,000.

F. Glazing Product Manufacturer: Firm that uses fabricated glass in the production of insulating glass (multiple panes of glass).

G. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C1036.

H. IBC: International Building Code.

I. Interspace: Space between lites of an insulating-glass unit.

J. Large Glass Lites and Insulating Glass Units: Over 55 SF.

K. Performance Condition: Per the GSA Standard Test Method for Glazing and Window Systems Subject to Dynamic Overpressure Loadings.

L. Pre-approved Glass Hazard Codes: WinGard v5.5.1 or approved equivalent.

M. Structural Glazing Product Manufacturer: Firm that produces insulating glass for use in a structural glazing system.

N. Structurally Glazed Unit: A window unit where the glazing is adhered to the surrounding mullion/frame with a structural silicone bead.

1.3 Blast Design Procedures

A. All glazing systems identified herein shall be designed, fabricated, and installed to resist the blast loads specified in this section within the performance limits specified in this section. Blast loading conditions shall be considered independent of conventional design loads, except unfactored dead loads. Designing to meet the blast requirements does not relieve the need to design for all other applicable Conventional Requirements.

1.4 Blast Loads

A. The blast load shall be a linearly decaying dynamic load function with peak pressure and impulse as shown in the table below. Negative phase effects shall not be considered.

1.5 Blast Design Submittals

A. Pre-Submittal: Subcontractor shall submit proposed blast analysis methodology and Blast Engineer qualifications at the onset of the project, for review by the Blast Consultant prior to beginning design/analysis. The Blast Engineer shall identify the intended analysis approach (SDOF, MDOF or other advanced analysis approach) and as a minimum include:

1. A detailed description of the analytic methodology including material properties, applied load, boundary conditions, mass, and damping considered, etc.

B. Blast Reports: Submit blast calculations in the form of a report that includes a summary narrative, applicable sketches, and design calculations for the work required to resist blast loads for each window system showing compliance with blast performance requirements. Blast calculations, sketches and shop drawings shall each be numbered and coordinated such that cases can be easily linked. Blast calculation reports shall be prepared and submitted by qualified Blast Engineer experienced in blast resistant design of these systems and shall be signed and sealed by a registered Professional Engineer. Revisions to calculation packages during resubmissions shall be clouded or tracked.

1. Window calculations shall as a minimum include:
   a. Glazing calculations demonstrating that all the specified glazing performance conditions are met.
   b. Structural silicone analysis demonstrating capacity to achieve the required performance.
   c. A labeling scheme shall be developed such that it is possible to relate each calculation to a specific window type on the building. Calculation package should address every window unit type number.

C. Shop Drawings: Submit shop drawings signed and sealed by a Registered Professional Engineer, that demonstrate compliance with the design intent.

D. Blast Qualification Data: Submit qualifications for Subcontractors and Subcontractor’s Blast Engineers verifying years of experience; include list of completed projects having similar Scope of Work identified by name, location, date, reference names and phone numbers.

1.6 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.7 DELIVERY, STORAGE, AND HANDLING

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

B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F. Do not install sealants to wet or frost covered surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS AND FABRICATORS

A. Glazing and Coating Manufacturers: The Contractor must comply with requirements for LEC glazing materials found in this Contract. The Government notes that its market research found IRA-Eligible Materials (glazing and coating) products that potentially adhere to the global warming potential (GWP) IRA Limits established in this Contract from the following manufacturers. The Government provides this list of manufacturers only as an example of options available in the market; the Contractor is free to source the IRA-Eligible Materials (glazing) products that adhere to the GWP IRA Limits established in this Contract from any manufacturer that adheres to all other requirements about sourcing materials in this Contract:
1. Cardinal Glass Industries.
2. Guardian Glass.
3. Vitro Architectural Glass.

B. Glazing Unit Fabricators: The Contractor must comply with requirements for LEC glazing materials found in this Contract. The Government notes that its market research found IRA-Eligible Materials (glazing units) products that potentially adhere to the global warming potential (GWP) IRA Limits established in this Contract from the following manufacturers. The Government provides this list of manufacturers only as an example of options available in the market; the Contractor is free to source the IRA-Eligible Materials (glazing units) products that adhere to the GWP IRA Limits established in this Contract from any manufacturer that adheres to all other requirements about sourcing materials in this Contract:
1. Cardinal Glass Industries.
2. Oldcastle BuildingEnvelope.
3. Viracon, Inc.

C. Solar Control Coating, provide Low-E coating on surface #4 (air space facing face on laminated exterior pane) Guardian Glass SunGuard SNX 69/27 or equal.

D. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.

E. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

2.2 PERFORMANCE REQUIREMENTS

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

B. Low Embodied Carbon: Glazing shall meet the requirements for low embodied carbon as defined in the Inflation Reduction Act of 2023 and the U.S. General services Administration Inflation Reduction Act Low Embodied Carbon Glass Requirements, Dated December 12, 2023.
1. Acquire and install IRA-Eligible Materials that adhere to the global warming potential IRA Limits established in the Contract. IRA-Eligible Materials shall be purchased and properly installed per the Agreement, Scope of Work, Drawings and Specifications. Unless otherwise specified, all work requiring use of materials with a contractually-established IRA Limit shall utilize materials compliant with those Limits.

2. For each type of IRA-Eligible Material, the Contractor shall provide submittals of Environmental Product Declarations (EPD) and product information -- see Division One Specification, Submittal Procedures, 013300.
3. IRA-Eligible Material scope item(s) shall be integrated into the project's phasing, scheduling, reporting, and scope, to support overall project goals
4. Limit area of disturbance or work area for IRA-Eligible Material scope item(s) to the minimum practical area. Work area or area of disturbance shall be restored to pre-project or new condition.

C. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the IBC and ASTM E1300.
1. Design Wind Pressures:
   a. As indicated on Drawings.
   b. Design Wind Pressures: Determine design wind pressures applicable to Project according to ASCE/SEI 7, based on heights above grade indicated on Drawings.
      1) Wind Design Data: As indicated on Drawings.
      2) Basic Wind Speed: 110 mph.
      3) Importance Factor: 1.0.
      4) Exposure Category: B.
2. Thickness of Patterned Glass: Base design of patterned glass on thickness at thinnest part of the glass.
3. "Probability of Breakage for Sloped Glazing" Subparagraph below is an example only and is more conservative than ASTM E1300 and the IBC, which are based on a probability of breakage of 0.008.
4. Probability of Breakage for Sloped Glazing: For glass surfaces sloped more than 15 degrees from vertical, design glass for a probability of breakage not greater than 0.001.
5. Deflection requirements in "Maximum Lateral Deflection" Subparagraph below are examples only and apply only to glass supported on all four edges. The IBC does not contain any deflection limits for glass. ASTM E1300 only requires that the deflection not result in loss of edge support. Revise to suit Project.
6. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.
7. "Differential Shading" Subparagraph below applies primarily to tinted glass because of its heat-absorbing property. ASTM E1300 and the IBC do not address this concern.
8. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

D. Blast Performance
1. General
   a. The glazing and the glazing bite shall be designed, fabricated, and installed to resist the specified blast loads within the performance criteria indicated.
   b. The blast analysis of glass shall be performed using a Pre-approved Glass Hazard Code.
2. Performance Criteria: Design, fabricate, and install glass units to comply with the following:
   a. Balanced design load associated with the capacity of the glass shall be the blast load that causes the largest glazing pane in the glazing system to exceed LOP III glazing behavior (see ASCE 59-11, Section 3.3.3). The balanced design load is to be taken as an equivalent triangular blast load with a duration of 14 ms.
   b. Glazing Strength shall be based on probability of failure of 750 breaks per 1,000.
3. Bite:
   a. Glazing bite: The glass unit connections to the glazed unit framing shall be designed, fabricated, and installed to resist the blast loads specified in this section within the limits and under the conditions indicated.
      1) Glazing Bite Requirements:
         a) Provide glazing bite at least equal to the thickness designation of the glass, ½" minimum.
         b) Provide a continuous structural silicone bead along all four sides of each glazed opening. The width of the structural silicone sealant bead must be at least equal to the thickness designation of the glass to which it adheres, but not larger than two times the thickness designation of the glass to which it adheres.

E. Ballistic Performance

1. Ballistic performance of window glazing shall be UL Level IV for all windows designated in the drawings as ballistic resistant.

F. Safety Glazing:
1. CPSC 16 CFR part 1201, testing requirements of ANSI Z97.1, and listed in the SGCC Certified Products Directory with appropriate SGCC certification mark or label permanently affixed.
2. Furnish safety glass for glass occurring in doors and sidelights, and where indicated and further required by authorities having jurisdiction.

G. Sound Control Glazing: Products with air borne sound transmission loss as measured by ASTM E90 and STC rating as classified by ASTM E413.

H. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
1. For monolithic-glass lites, properties are based on units with lites of thickness indicated.
2. For laminated-glass lites, properties are based on products of construction indicated.
3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
4. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F (W/sq. m x K).
5. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
6. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.3 GLAZING GASKETS

A. Dense Compression Gaskets: Molded or extruded gaskets of profile and hardness required to maintain watertight seal, made from one of the following:
1. Neoprene complying with ASTM C 864.
2. EPDM complying with ASTM C 864.
3. Silicone complying with ASTM C 1115.
4. Thermoplastic polyolefin rubber complying with ASTM C 1115.
5. SG NOTE: Compression wedge: Recommend 70 plus/minus 5 Shore "A" durometer.
6. Compression wedge for dry glazing system: of shape and size to compress the exterior compression gasket a minimum of 25 percent, and as recommended by glazing and sealing systems manufacturer.
7. Provide gaskets that are compatible with glazing sealants and will provide for silicone adhesion.

B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned neoprene EPDM silicone or thermoplastic polyolefin rubber gaskets complying with ASTM C 509, Type II, black; of profile and hardness required to maintain watertight seal.
1. Bed gasket for wet glazing system: continuous with pressure sensitive adhesive 1 side, designed to be compressed 25-40 percent in the opening.
2. Compression gasket for dry glazing system: shape as required to be compressed in place a minimum of 25 percent and of one-piece construction with factory-assembled frames with injection-molded, vulcanized corners; produced oversize in opening dimension, as determined by measurements, to insure compression at corners but within limits so that compression does not create a "pucker".
3. Channel gasket: continuous channel of shape and dimensions for application in the opening with specified glazing.
4. Provide gaskets that are compatible with glazing sealants and will provide for silicone adhesion.

2.4 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.

C. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep systems.
3. Minimum required face and edge clearances.
4. Effective sealing between joints of glass-framing members.

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

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
1. Ensure approved Quality Assurance Program is implemented.

B. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances

C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
1. Locate one quarter of glass width from each corner, but with block edge nearest corner no closer than 6 inches from corner, unless otherwise specified or required by glass manufacturer.
2. Insulating glass used in sloped glazing shall have both panes supported by setting blocks.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

G. Provide spacers for glass lites where length plus width is larger than 50 inches.
1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.

2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

J. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

K. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

L. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

M. Where butted glass without mullions is indicated, seal open joints with silicone sealant in accordance with sealant and glass manufacturer's written instructions. Set glass so that joint is plumb and glass edges are aligned to provide for a uniform joint width of 3/8 inch maximum. Mask edges of glass to confine sealant to joints and to avoid contact with either face of glass. Use primer where required. Neatly tool joints to slightly concave surface using recommended tooling agent. Remove masking from glass and clean glass surfaces completely free of sealant material.

3.4 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

E. Install gaskets so they protrude past face of glazing stops.

3.5 STRUCTURAL SEALANT GLAZING

A. Install continuous spacers between glass lites and glazing channels to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Perform no structural sealant glazing prior to written certification of adhesion and compatibility test results, review and written approval of glazing details by glass and sealant manufacturers, and acceptance of written quality assurance program.

C. Install glass in metal windows or framing with continuous spacer installed between glass and window or frame, setting blocks properly sized and located and structural sealant installed in properly sized and located cavity formed by glass, spacer and window or frame.

D. Provide installation that maintains glass face clearances and prevents sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or backings in place and in position to control location and depth of installed sealant for required sealant performance.

E. Perform installation procedures per written sealant and glass manufacturers' requirements and written quality assurance program.

F. Force sealants into glazing channels to eliminate voids and to ensure complete wetting and bond of sealant to glass and channel surfaces.

G. Tool exposed surfaces of sealants to provide a smooth surface and on exterior applications provide a wash away from glass.

H. Do not allow sealant to bleed into the interface between the glass and glazing spacer.

I. Structural sealant work shall be shop-glazed.

3.6 CLEANING AND PROTECTION

A. Immediately after installation remove nonpermanent labels and clean surfaces.

B. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and clean surfaces.

C. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.

D. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.

E. Remove and replace glass that is damaged during construction period.

F. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.7 QUALITY ASSURANCE

A. Blast Subcontractor Qualifications: A firm with documented, successful experience with work comparable to that specified in applicable component of the above section “PERFORMANCE REQUIREMENTS.”

B. Blast Engineer Qualifications: Blast Engineers performing designs of elements governed by this specification shall be Professional Engineers who are acceptable to the authorized representative of the Government and have a minimum of 5 years of experience in providing blast engineering services of the kind indicated for projects of similar size and scope.

C. References: Design and analysis approaches shall be consistent with those in the following standards, manuals:

1. "The Risk Management Process for Federal Facilities", An Interagency Security Committee Standard, 2021 Edition; and Appendix A: The Design-Basis Threat Report, 2021; and Appendix B: Countermeasures, 2021.
2. "General Services Administration Facility Requirements for Explosive Devices Applicable to Facility Security Levels III and IV; GSA's Interpretation of the Interagency Security Committee (ISC) Risk Management Process for Federal Facilities: An Interagency Security Committee Standard - Appendix B: Countermeasures", 2nd Edition dated December 21, 2018.
3. ASCE 59-11 Blast Protection of Buildings
4. ASTM F1642-12 Standard Test Method for Glazing and Glazing Systems Subject to Airblast Loadings
5. U.S. General Services Administration. Window Glazing Analysis Response & Design WINGARD Technical Manual. Applied Research Associates, Inc, Vicksburg, MS.

END OF SECTION