SECTION **01 73 00** - **EXECUTION**

**Content Requests:**

Revise this Section by deleting and inserting text to meet Project-specific requirements.

1. GENERAL
   * + 1. SUMMARY

Section includes general administrative and procedural requirements governing execution of the Work, including the following:

Correction of the Work.

Preconstruction photographs.

Construction layout.

**[Field engineering.]**

Installation.

Cutting and patching.

Coordination of Government's portion of the Work.

Progress cleaning.

Starting and adjusting.

Protection of installed construction.

Retain subparagraphs below to cross-reference requirements Contractor might expect to find in this Section but are specified in other Sections.

Revise first subparagraph below to suit Project.

* + - 1. DEFINITIONS

Retain terms that remain after this Section has been edited for a project.

Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.

* + - * 1. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

Retain "Cutting and Patching Conference" Paragraph below only if cutting and patching Work is extensive or complex enough to justify a conference.

Retain "Layout Conference" Paragraph below and revise to suit Project when scope or complexity of layout work justifies conference.

Retain option in first subparagraph below that applies to Project. For modest projects, an experienced member of the Contractor's staff may practically perform layout operations. See the Evaluations.

* + - 1. INFORMATIONAL SUBMITTALS

Coordinate "Qualification Data" Paragraph below with qualification requirements in Section 01 40 00 "Quality Requirements" and as may be supplemented in "Quality Assurance" Article. Contractor's professional engineer or other experienced staff may be capable of performing certain field-engineering tasks; however, for more complex tasks and for certified surveys, qualified land surveyors are more frequently required.

Verify local practices when selecting type of entity to provide surveying services for Project. See the Evaluations.

Retain "Cutting and Patching Plan" Paragraph below only if required by Government or by special Project requirements; review of a contractor's cutting and patching plan may be beyond scope of architectural services due to Contractor responsibility for means and methods of construction. Revise to include other submittal requirements.

Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed. Include the following information:

Extent: Describe reason for and extent of each occurrence of cutting and patching.

Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.

Products: List products to be used for patching and firms or entities that will perform patching work.

Dates: Indicate when cutting and patching will be performed.

Retain "Utilities and Mechanical and Electrical Systems" Subparagraph below for occupied projects if utilities or mechanical and electrical systems are affected by cutting and patching.

Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.

Retain subparagraph below when Contractor must provide temporary services and systems during permanent power interruptions.

Include description of provisions for temporary services and systems during interruption of permanent services and systems.

* + - * 1. Preconstruction photographs.
        2. Overhead Mounting Delegated Design: For mounting items suspended from roof structure weighing 30 lbs. or more.

Submit design calculations and details signed and sealed by the qualified professional engineer responsible for their preparation.

Include design calculations for seismic restraints including analysis data.

Retain "Final Property Survey" Paragraph below if final property survey is required as part of this Contract. Verify number of copies with Government.

* + - 1. QUALITY ASSURANCE

Revise this article to comply with local requirements. Retain references to either land surveyor or professional engineer, based on entity charged with performing surveying. See the Evaluations.

* + - * 1. Professional Engineer Qualifications: Refer to Section 01 40 00 "Quality Requirements."

Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

* + - * 1. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of specified products and equipment.

1. PRODUCTS
   * + 1. MATERIALS

Comply with requirements specified in other Sections.

Retain subparagraph below for projects with specific sustainable design requirements that may affect Contractor selection of materials used in patching.

For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with sustainable design requirements.

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

If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Government for the visual and functional performance of in-place materials.

"Cleaning Agents" Paragraph below contains basic requirements. Revise this paragraph to suit Project or to accommodate unusual situations.

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

Retain or revise subparagraph below if required by Government. Requirements are from the USGBC's "LEED 2009 for Existing Buildings: Operation & Maintenance."

1. EXECUTION
   * + 1. EXAMINATION

Revise "Existing Conditions" Paragraph below to suit Project. Verify with authorities having jurisdiction and utility companies. Coordinate with Section 33 05 00 "Common Work Results for Utilities."

Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.

Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, gas service piping, and water-service piping; underground electrical services; and other utilities.

Furnish location data for work related to Project that must be performed by public utilities serving Project site.

Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.

Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.

Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

Retain "Written Report" Paragraph below if required.

Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

Description of the Work, including Specification Section number and paragraph, and Drawing sheet number and detail, where applicable.

List of detrimental conditions, including substrates.

List of unacceptable installation tolerances.

Recommended corrections.

Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

* + - 1. PREPARATION

Revise "Existing Utility Information" Paragraph below to suit Project.

Existing Utility Information: Furnish information to Government that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

* + - * 1. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
        2. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

Revise "Review of Contract Documents and Field Conditions" Paragraph below to suit Project and Government's special requirements.

* + - * 1. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Government in accordance with requirements in Section 01 31 00 "Project Management and Coordination."
      1. PRECONSTRUCTION PHOTOGRAPHS

Prior to starting construction, coordinate with and accompany Government Authorized Technical Representative to Project site and take photographs of existing site conditions as directed.

Take photographs documenting all surfaces, finished, equipment, and furniture that will be effaced by Work.

Photographs shall be minimum size of 5 megapixels.

Take photographs with maximum depth of field and in focus.

Provide adequate lighting to produce clear images.

Provide a key plan showing location and direction of each photograph.

Upload digital files of photographs and key plan to web-based Project management website with files named in compliance with Government requirements.

* + - * 1. Video Options: High resolution 30 fps digital video or 360/VR video meeting the requirements of this Article may be submitted in lieu of photographs.
      1. CONSTRUCTION LAYOUT

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

* + - * 1. Use the following accepted surveying practices:

Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.

Establish limits on use of Project site.

Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.

Inform installers of lines and levels to which they must comply.

Check the location, level and plumb, of every major element as the Work progresses.

Notify Government when deviations from required lines and levels exceed allowable tolerances.

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

* + - * 1. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
        2. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Government.

Insert special requirements for laying out the Work to suit Project.

* + - 1. **[FIELD ENGINEERING**

**Revise "Identification" Paragraph below to suit Project which only requires Government to furnish a survey.**

**Identification: Government will identify existing benchmarks, control points, and property corners.**

* + - * 1. **Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.**

**Do not change or relocate existing benchmarks or control points without prior written approval of Government. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Government before proceeding.**

**Protect benchmarks from damage or disturbance.**

**Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.**

**Insert additional requirements for preserving permanent benchmarks and control points.**

**Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.**

**Record benchmark locations, with horizontal and vertical data, on Project Record Documents.**

**Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.**

**Remove temporary reference points when no longer needed. Restore marked construction to its original condition.]**

Retain "Certified Survey" Paragraph below if required by Government or authorities having jurisdiction.

Retain "Final Property Survey" Paragraph below if Contractor is required to provide final property survey.

Delete "Recording" Subparagraph below if Government will record survey.

Insert other special field-engineering requirements, such as damage surveys, settlement surveys and reports, environmental impact surveys, and similar requirements, as needed.

* + - 1. INSTALLATION

Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

Make vertical work plumb and make horizontal work level.

Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.

Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.

Maintain minimum headroom clearance of 96 inches (2440 mm) in occupied spaces and 90 inches (2300 mm) in unoccupied spaces, unless otherwise indicated on Drawings.

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

* + - * 1. Install products at the time and under conditions that will ensure satisfactory results as judged by Government. Maintain conditions required for product performance until Substantial Completion.
        2. Conduct construction operations, so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy of type expected for Project.
        3. Sequence the Work and allow adequate clearances to accommodate movement of construction items on-site and placement in permanent locations.
        4. Tools and Equipment: Select tools or equipment that minimize production of excessive noise levels.
        5. Templates: Obtain and distribute to the parties’ involved templates for Work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
        6. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work.

Where details for suspending overhead items are not indicated, engage a qualified professional engineer to design and detail attachments, hangers, and seismic bracing.

Where size and type of attachments are not indicated, verify size and type required for load conditions with manufacturer.

Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Government.

Allow for building movement, including thermal expansion and contraction.

Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

Joints: Make joints of uniform width. Where joint locations in exposed Work are not indicated, arrange joints for the best visual effect, as judged by Government. Fit exposed connections together to form hairline joints.

Insert additional installation requirements to suit Project. See the Evaluations.

* + - 1. CUTTING AND PATCHING

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

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

Structural Elements: When cutting and patching structural elements, or when encountering the need for cutting and patching of elements whose structural function is not known, notify Government of locations and details of cutting and await directions from Government before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.

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

Fire separation assemblies.

Air or smoke barriers.

Fire-suppression systems.

Plumbing piping systems.

Mechanical systems piping and ducts.

Control systems.

Communication systems.

Fire-detection and -alarm systems.

Electrical wiring systems.

Operating systems of special construction.

Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.

Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Government's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

* + - * 1. Temporary Support: Provide temporary support of Work to be cut.
        2. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

Retain "Adjacent Occupied Areas" and "Existing Utility Services and Mechanical/Electrical Systems" paragraphs below where Government continues to occupy other portions of an existing facility.

* + - * 1. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching in accordance with requirements in Section 01 10 00 "Summary."
        2. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.
        3. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

In general, use hand or small power tools designed for sawing and grinding, not hammering, and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.

Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.

Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.

Revise "Mechanical and Electrical Services" Subparagraph below to suit Project.

Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.

Retain subparagraph below if required to prevent multiple cutting and patching in the same area. Insert specific requirements for multiple contracts and special conditions requiring coordination.

Proceed with patching after construction operations requiring cutting are complete.

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

Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.

Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

Clean piping, conduit, and similar features before applying paint or other finishing materials.

Restore damaged pipe covering to its original condition.

Insert specific refinishing requirements for floors, walls, and ceilings. Revise "Floors and Walls" Subparagraph below to suit Project.

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

Where patching occurs in a painted surface, prepare substrate, and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch, corner to corner of wall and edge to edge of ceiling. Provide additional coats until patch blends with adjacent surfaces.

Revise "Ceilings" Subparagraph below to suit Project or delete.

Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.

Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures air, thermal, and moisture integrity of enclosure.

Fire Separation Assemblies and Smoke and Air Barriers: Patch components in a manner that restores intended performance and ensures integrity of assemblies and barriers.

Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

Insert specific installation requirements if not specified elsewhere. Specific installation requirements are better specified in individual Sections.

* + - 1. COORDINATION OF GOVERNMENT'S PORTION OF THE WORK

Site Access: Provide access to Project site for Government's construction personnel and Government's separate contractors.

Provide temporary facilities required for Government-furnished, Contractor-installed, and Government-furnished, Government-installed products.

Refer to Section 01 10 00 "Summary" for other requirements for Government-furnished, Contractor-installed, and Government-furnished, Government-installed products.

Coordination: Coordinate construction and operations of the Work with work performed by Government's construction personnel and Government's separate contractors.

Construction Schedule: Inform Government of Contractor's preferred construction schedule for Government's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Government if changes to schedule are required due to differences in actual construction progress.

* + - 1. PROGRESS CLEANING

This article refers to regular cleaning operations conducted while construction is in progress. Requirements for final cleaning before Substantial Completion are included in Section 01 77 00 "Closeout Procedures."

Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.

Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F (27 deg C).

Containerize unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, in accordance with regulations.

Use containers intended for holding waste materials of type to be stored.

Retain subparagraph below for projects involving multiple contracts.

Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

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

* + - * 1. Work Areas: Clean areas where Work is in progress to the level of cleanliness necessary for proper execution of the Work.

Remove liquid spills promptly.

Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

* + - * 1. Installed Work: Keep installed work clean and protected.

Clean installed surfaces in accordance with written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not to health or property and that will not damage exposed surfaces.

Adjust and lubricate operable components to comply with manufacturer's recommendations to prevent damage or wear.

* + - * 1. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
        2. Exposed Surfaces: Clean and maintain exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
        3. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 01 74 19 "Construction Waste Management and Disposal."

Three paragraphs below reduce or eliminate the need for similar provisions in other Sections. Insert other provisions needed because of unusual Project conditions. Specify unusual provisions for specific work in the individual Section.

* + - * 1. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
        2. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

If necessary, revise "Limiting Exposures" Paragraph below by inserting a list of exposures. See the Evaluations.

* + - * 1. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

Special cleaning provisions are often required on projects that include alterations to existing buildings. See the Evaluations.

* + - 1. STARTING AND ADJUSTING

Coordinate startup and adjusting of equipment and operating components with requirements in Section 01 91 13 "General Commissioning Requirements."

* + - * 1. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
        2. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
        3. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
        4. Manufacturer's Field Service: Comply with qualification requirements in Section 01 40 00 "Quality Requirements."
      1. PROTECTION OF INSTALLED CONSTRUCTION

Revise first paragraph below to suit Project conditions and special Government requirements.

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

Retain "Protection of Existing Items" Paragraph below when applicable for renovation work.

* + - * 1. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.
        2. Comply with manufacturer's written instructions for temperature and relative humidity.
      1. CORRECTION OF THE WORK

Repair or remove and replace damaged, defective, or nonconforming Work. Restore damaged substrates and finishes.

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

Repair Work previously completed and subsequently damaged during construction period. Repair to like-new condition.

* + - * 1. Restore permanent facilities used during construction to their specified condition.
        2. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
        3. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
        4. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

Insert additional requirements to suit Project.

END OF SECTION