

**DOCUMENT 000101 - PROJECT TITLE PAGE**

**PROJECT MANUAL**

Issued: February 1, 2023 – 100% DD Phase

Project Name: **Indiana University Health Medical Center Campus, Indianapolis, IN**

Project Location: **Central Utility Plant**

Owner's Name: **Indiana University Health System**

Owner's Address: 340 W. 10<sup>th</sup> St. Indianapolis, Indiana, 46202

Owner Project No. E1

Engineer's Name: Applied Engineering Services, Inc.

Engineers' Address: 5975 Castle Creek Pkwy. N. Dr., Indianapolis, IN 46250.

Phone: 317-810-4141

Engineer's Project No. 21-154

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## **SECTION 011000 - SUMMARY**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Provide the work of this Section in accordance with requirements of the Contract Documents.
- B. This Section includes but is not limited to:
  - 1. Project information.
  - 2. Work covered by Contract Documents.
  - 3. Phased construction.
  - 4. Work by Owner.
  - 5. Future work.
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- C. Related Requirements:
  - 1. Division 00 Requirements associated with procurement requirements specific to the packaging of bidding proposal, and work scopes as prepared by the Contractor at the direction of the Owner.
  - 2. Division 01 Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.2 PROJECT INFORMATION

A. Project Identification: Central Utility Plant (CUP).

1. Project Location: Southeast corner of W. 13<sup>th</sup> St. and Senate Ave, Indianapolis, IN.

B. Owner: **Indiana University Health System**, 340 W. 10<sup>th</sup> Street, Indianapolis, Indiana 46202.

1. Owner's Representative: Bryan McHugh.

C. Engineer: Applied Engineering Services.

1. Engineer's Representative: John Yoder.

D. Other Owner Consultants: Owner has retained the following design professionals who have prepared designated portions of the contract Documents: Work by the Owner's consultants will be paid for by the Owner. The contractor shall provide support and interface as indicated in other sections of Division 01.

1. The Project Commissioning Specialists (CxA) and (BECxA) will be separate process leaders for their scope of Work, providing analysis and reports independent of one another and associated costs of their services will be included in their scope of the Work.

2. Building Systems Commissioning Agent (CxA) Smith Seckman Reid, Inc., has prepared the following portions of the Contract Documents:

a. Building Systems: Representative:

- 1) Laura Ludwig, PE, QCxP, Principal, 312-656-3609, lludwig@ssr-inc.com.

b. Scope of Service: Refer to the following sections for the scope and description of the work and responsibilities of this Owner's Consultant:

- 1) Section 019100 - "Building Systems Commissioning"
- 2) Section 019114 - "Monitoring-Based Commissioning."

3. Building Enclosure Commissioning Agent (BECxA) Klein & Hoffman has prepared the following portions of the Contract Documents:

a. Architectural / Structural; Representative:

- 1) Glenn Johnson, AIA, NCARB, QCxP, Principal, 150 S. Wacker Dr., Suite 1900, Chicago, IL 60606.

b. Scope of Service: Refer to the following sections for the scope and description of the work and responsibilities of this Owner's Consultant.

- 1) Section 019119 - "General Enclosure Commissioning."

2) Section 019119.43 – “Exterior Enclosure Commissioning.”

- E. Construction Manager (CM) as Constructor: Weddle Bros. Building Group, LLC has been engaged as CMc for this Project.
  - 1. Contractor Representative: Kim Norton ([knorton@weddlebros.com](mailto:knorton@weddlebros.com))
  - 2. Construction Manager for this Project is Project's constructor. The terms "Construction Manager" and "Contractor" are synonymous as “Constructor”.
- F. Project Web Site: A project Web site, administered the Owner, will be used for purposes of managing communication and documents during the construction stage.
  - 1. See Division 01 Section "Project Management and Coordination." for requirements for establishing, administering, and using the Project Web site.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and consists of the following:
  - 1. Project consists of a new multi-story hospital in proximity to a new academic medical center (designed and constructed as a separate Project, under separate contract) with associated site improvements located on an Owner parcel of property in Indianapolis, Indiana.
  - 2. The Project is designed to comply with a Certification Level of Silver according to the U.S. Green Building Council's Leadership in Energy & Environmental Design (LEED) V4 Rating System, as specified in Division 01 Section "Sustainable Design Requirements - LEED."
  - 3. Energy Star Program Requirements and Owner's intent to be established.
- B. Type of Contract:
  - 1. Project will be constructed under a single prime contract with a **Construction Manager** as Constructor.
  - 2. Owner has elected to contract for Work on the Project utilizing a ‘fast-track’ delivery method with multiple design and technical document releases.
    - a. Contractor shall coordinate and integrate the multiple Releases of Contract Documents into one, complete, coordinated document which constitute one singular document set of Drawings and Specifications.
    - b. All design and technical Contract Documents prepare by the Architect are cumulative. Contractor shall utilize all references of both early release and final Contract Documents overlapping issuances as one.
  - 3. Contractor shall reference and coordinate the communication of each earlier Contract Document release, subsequent sequential issuance to all subsequent

contractors, installers, subcontractors, manufacturers and affected trades of each multiple issuance.

- a. Architect will not further reference all earlier releases of Contract Documents except as prepared in the Contractor's procurement and bid packaging and project management information.

#### 1.4 PHASED CONSTRUCTION

- A. Before commencing Work of each phase, submit an updated copy of Contractor's construction schedule showing the sequence, commencement and completion dates, and move-out and -in dates of Owner's personnel for all phases of the Work.

#### 1.5 WORK BY OWNER

- A. General: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner, or under separate contracts for the Owner.
- B. Concurrent Work: Owner will perform the following construction operations at Project site. Those operations will be conducted simultaneously with work under this Contract.
  1. Planning and installation of selected medical systems to be determined.
  2. Planning and installation of IT, furniture, medical devices, medical furniture and diagnostic equipment.
  3. Planning, and installation of accessories which may be Owner installed (OFOI) or contractor installed (OFCl) into facility for medical or academic use.
  4. Owner purchased and installed prior to Substantial Completion:
    - a. Data network closet equipment.

#### 1.6 OWNER-FURNISHED PRODUCTS

- A. Owner will furnish products to be indicated. The Work includes receiving, unloading, handling, storing, protecting, and installing Owner-furnished products and making building services connections.
- B. Owner-Furnished Products:
  1. The Owner will furnish a listing of products and equipment with designations for contractor installation, including final utility connections and coordinate with supply-chain vendors for timing.
  2. Contractor shall coordinate and assist Owner in the timing and scheduling of availability, submittal review, coordination, and placement of these pieces into the facility as it is constructed.

1.7 ACCESS TO SITE

- A. General: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project. Refer to "Site Logistics Plan, for limits.
- B. Use of Site: Limit use of Project site to areas within the Contract limits indicated on the Drawings. Do not disturb portions of Project site beyond areas in which the Work is indicated.
  - 1. Limits: Confine construction operations to areas indicated for improvements on the Drawings.
  - 2. Limits: As indicated on the Drawings.
  - 3. Contractor Parking: Limit vehicle parking for construction personnel to locations indicated on the Drawings, or as designated by the Owner.
  - 4. Contractor and its Subordinate Parties shall be subject to such rules and regulations for the conduct of the Work as the Owner may establish - and shall fully cooperate with and participate in the implementation of the Interim Life Safety Measures (ILSM) established for the project. All employees shall be properly and completely clothed while working. Bare torsos, legs and feet will not be allowed. Possession or consumption of alcoholic beverages or drugs, or other noxious behavior on the site is strictly prohibited. Violators shall be promptly removed from the site.
  - 5. Before starting the Work, Contractor shall ascertain from the Owner what entrances, routes or roadways shall be used for access to the Work, and use only those designated for movement of personnel, materials and vehicles to and from the Project site. Close coordination will be required of Contractor with the Owner, other Contractors, the City and others having an interest in the Project to assure that Work on the site, access to and from the site and the general conduct of operations is maintained in a safe and efficient manner, and that disruption and inconvenience to existing streets and property is minimized. Contractor is responsible to review the site and be familiar with all existing conditions within and around the Owner's property including local conditions.
  - 6. Contractor shall maintain free access to all buildings and areas of the site for designated vehicles, service vehicles and firefighting equipment and at no time shall block off or close roadways or fire lanes without providing auxiliary roadways and means of entrance acceptable to the Owner. Fire hydrants must remain accessible at all times. Subcontractors shall give the Owner and the local fire department at least forty-eight (48) hours' notice of any such changes of routes.

- 1.8 There limited on-site parking for Contractors and their employees. If required, off-site parking for construction employees shall be arranged by the Contractor. Each Contractor is responsible for providing transportation to and from the site, if required.



Any additional arrangement is the responsibility of Contractor. Contractors and their personnel will not be allowed to park in the Owner's parking areas.

## 1.9 COORDINATION WITH OCCUPANTS

- A. Owner Limited Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed portions of the Work, prior to Substantial Completion of the Work, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and limited occupancy shall not constitute acceptance of the total Work.
1. Owner will retain the right to provide medical and other primary equipment for installation into the facility as a part of its preparations and Owner Furnished Contractor Installed (OFCI) coordination without the areas to be designated as a portion of the limit occupancy. Owner provision of such equipment shall not be construed as limited occupancy or beneficial use of the areas of the building defined in this article.
  2. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied prior to Owner acceptance of the completed Work.
  3. Obtain a Certificate of Occupancy from authorities having jurisdiction before limited Owner occupancy.
  4. Before limited Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will operate and maintain mechanical and electrical systems serving occupied portions of Work.
  5. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of Work.
  6. For each limited occupancy, Owner agrees to obtain written consent of Contractor, secure endorsement from insurance carriers, and consent of Surety.
  7. Prior to occupying a specific portion of the Work, Owner and Contractor shall make mutually acceptable arrangements for security, protection and insurance for people and property; warranties; and operation, maintenance and payment for each complete area to be occupied.
  8. Owner reserves the right to use and occupy in whole or any part of the improvements that have been substantially completed. Use and occupancy by Owner shall not be construed as an acceptance of Work or any part, and any claim which Owner may have against Contractor shall not be deemed to have been waived by occupancy. If limited occupancy increases cost of Work or imposes delay in completion, Contractor shall be entitled to extra compensation, or extension of time, or both, but claims for extra compensation shall be in writing and shall be substantiated with receipted vouchers and other supporting data.

9. Execute Certificate of Substantial Completion for each specific portion of Work prior to Owner occupancy. After Owner occupancy Contractor shall allow access for Owner personnel, access for the public, operation of HVAC, plumbing, and electrical systems for occupied areas, Owner's security and protection of occupied areas, Owner's maintenance of occupied areas, and Owner's insurance for occupied areas.

#### 1.10 NO DISRUPTION OF OCCUPANCY/SEQUENCING

- A. Contractor is responsible to plan, coordinate and execute its Work in such a manner that there will be no disruption of the Owner's operations. If an interruption of operations is unavoidable, then this Work will be scheduled with the Owner prior to beginning such Work.
- B. The sequence of Work shall be scheduled and coordinated with the Owner's ongoing operations to minimize disruptions and/or disturbances to the Owner's Work and at all times remain as secondary to the Owner's operations. Each segment of the Work shall be coordinated with the Owner prior to proceeding.
- C. Work that interrupts the Owner's services will be accomplished during the time periods when it is least inconvenient to the Owner and completed in the shortest possible time frame. Contractor may be requested to work split shifts, weekends, off peak Owner loading periods, etc., to accommodate Owner's utility and service requirements, such as, but not limited to, medical gas systems, electrical power, HVAC systems, storm and sanitary lines.
- D. Contractor is responsible to provide any temporary alternate supply and/or return conditions to maintain services to the facility while Work is being performed. Place safety stages or markers to indicate location of disconnected services.
- E. No interruptions to Owner's power, lighting, signal, or alarm circuits will be permitted without the express written permission of the Owner. Arrangements for interruptions shall be made with the Owner at least forty-eight (48) hours prior to the interruption and shall be made at such time and duration as authorized by them. Temporary feeders, transformer jumpers, connections, circuits, etc., shall be used as required to accomplish the above at no additional cost to the Owner.
- F. Contractor shall construct the Work in stages to provide for public convenience. Contractor shall not close off public use of facilities until completion of one stage of construction will provide alternative usage, or until other means have been provided.

#### 1.11 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations on all IU Health property.
  1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

2. Contractor shall confine its Work to 7:00 am to 3:30 p.m., Monday through Friday.
  3. Whenever Contractor intends to depart from normal work hours, it shall notify the Owner in writing at least forty-eight (48) hours in advance. Special arrangements can be made for emergency work or shutdowns as may be required.
  4. Use of explosives is not permitted.
  5. Contractor shall be responsible for all damage to the Project including the existing buildings and grounds arising or resulting from its operations under the Agreement. Repair or replacement of damaged items shall be to the satisfaction of the Owner.
  6. Contractor shall at all times maintain a clean and safe passageway for the Owner's operations and personnel in existing areas and maintain clearances adjacent to and in connection with the Work performed.
  7. Contractor shall effectively confine dust, dirt and noise to the actual construction area and in compliance with all applicable laws, rules and regulations and provisions indicated in other Section of the Division 01 requirements associated with infection control provisions.
  8. Contractor shall restrict all work activities associated with an area undergoing renovation to within the boundaries indicated by the Contract Documents. Any means of access or egress from the stipulated boundaries shall be coordinated with the Owner.
  9. Work shall, if required, be constructed in phases to accommodate the Owner's use of the premises during construction and to accommodate installation of equipment.
  10. Contractor shall limit use of the premises for Work and for storage, to allow for:
    - a. Work by other Contractors engaged by the Owner.
    - b. Owner full or partial occupancy of designated areas.
    - c. Public use and safety.
    - d. Free use of corridors at all times.
- B. Contractors and their Subordinate Parties shall exercise common sense and good judgment, and to conduct themselves in a manner which would be a credit to the Owner. Without limiting other applicable provisions of the Contract Documents, Contractor shall not engage in the following. Willful disregard will be grounds for requiring the offending person(s) to be removed from the Project, and may subject the Contractor to termination under the Agreement
1. Conduct that interferes with Work or work of others.
  2. Conduct that interferes with, or is detrimental to good safety and well-being.

3. Unauthorized use of confidential information.
  4. Discourtesy toward Owner's staff, visitors and the general public (including abusive, vulgar or other language).
  5. Soliciting.
  6. Disregard of safety, sanitation, or security laws, rules and regulations.
  7. Conduct detrimental to the Owner's operations and good reputation.
  8. Stealing.
  9. Gambling.
  10. Possession and/or use of narcotics or intoxicants.
  11. Threats or abuse of others.
  12. Disorderly conduct or fighting.
  13. Playing of loud music.
  14. Falsification of information.
  15. Unauthorized travel of Contractor's employees outside the designated project Work areas.
  16. Discriminating Behavior.
  17. Sexual or Ethnic harassment.
- C. Tobacco use of any kind, smoking, including "vaping" is forbidden anywhere on IU Health property.
- D. Employee Identification: Follow Owner and requirements for hard hat stickers or other personnel identification requirements as may be established based on elements of construction and Project construction stage.
- E. Employee Screening: Comply with Owner's requirements for drug, virus and background screening of Contractor personnel working on Project site.
- F. Contractor shall:
1. Not unreasonably encumber site with materials and equipment.
  2. Not load structure with weight that will endanger structure.
  3. Assume full responsibility for protection and safekeeping of stored products.

4. Move stored products that interfere with operations of Owner and other contractors.
  5. Cooperate with other contractors and coordinate Work with work under separate contracts, including access to the Work.
- G. Contractor shall notify the Construction Manager 48 hours in advance of all crane mobilizations and movements of cranes on the Project site.
- H. No equipment and/or trucks will be allowed to block access to the jobsite. Coordinate all site access with the Owner
1. Because of limited site storage space, the Contractor is required to have his Subcontractors and material suppliers schedule “just-in-time” shipments of materials to the job site.
  2. Storage on-site is limited to five (5) working day supply. Storage of materials in the building and on the site is limited to the areas under immediate construction. Contractor shall make accommodations to stock the project with sufficient materials to maintain progress and schedule.
  3. Contractor assumes full responsibility for the protection and safekeeping of the products under their control. If the Contractor fails to adhere to this requirement, Owner shall have the right to employ an outside service or utilize its own personnel to remove material from the Project at the expense of the Contractor.
  4. This Contractor is advised that all areas where the Contractor is working are temporary and shall not be considered for the exclusive use of this Contractor.
  5. Contractor shall submit a receipt of shipment for all equipment stored on site or off-site to the Owner’s designated representative. No materials or equipment shall be removed from the site without the permission of the Owner.
  6. Storage of combustible materials within or adjacent to the building is prohibited.

#### 1.12 SPECIAL SECURITY REQUIREMENTS

- A. General: Comply with Owner’s special security requirements at the Project Site.
- B. Security Requirements:
1. Access to Project Site: Access to the project site will be granted only after preliminary verification of the accuracy and completeness of submitted information shows no disqualifying factors.
    - a. If for any reason, a contract individual is denied access to the project site, the Owner will not disclose to the Contractor the reason for denial, nor will the Owner be liable for any expense in the replacement of the individual, or any costs incurred by the Contractor, as a result of such denial.

- b. Decisions concerning granting of access to the project site are made on a case-by-case basis. The Contractor is cautioned that individuals with criminal histories such as arrest records, felony convictions, misdemeanor convictions, or those addicted to, or abusive of, alcohol or chemicals, are likely to be denied access to the project site. The exact nature, extent, and time passed since these incidents occurred, will influence all access decisions.
  - c. Illegal or undocumented aliens may be referred to other law enforcement agencies for appropriate action.
- 2. Escorts: At the discretion of the Owner, Contractor and Subcontractor personnel may have to be escorted by the Owner's representatives when accessing an Owner-occupied area of the new building.
- 3. Access Badges: All Contractor and Subcontractor personnel working within Owner occupied areas, or within the security perimeter, shall wear a current identification badge with name, photo, and other information as shall be reasonably determined by the Owner. The badge shall be worn on the upper part of the body so as to be clearly visible at all times. Badges shall be provided by the Contractor. All Contractor and Subcontractor personnel shall also have a valid and current recognizable photo identification, such as a driver's license, on their person at all times.
- 4. Contractor and Subcontractor personnel authorized by the Owner to work within secure areas are subject to physical checks of all equipment, tools, and supplies, by the Owner prior to entering or exiting the secure areas. All items deemed by the Owner to pose a security risk may be required to be removed from the secure area at the end of each work day.
- 5. The Contractor shall maintain the security and integrity of the required site enclosure fences and gates. All gates shall be locked at the end of each working day, and the Contractor shall verify that the site is clear of personnel and secure before departing.
- 6. If the Contractor schedules work outside of normal hours, the Owner shall be given at least 72 hours advance notice so that access can be arranged. The Owner reserves the right to refuse entry to the site if the required notice is not provided, or if operational considerations preclude entry at the requested time.
- 7. When the Contractor schedules work in Owner occupied areas of the existing building or Owner-occupied areas of the new building, the Owner shall be given at least 72 hours advance notice so that access can be arranged. The Owner reserves the right to refuse entry to Owner occupied areas if the required notice is not provided, or if operational considerations preclude entry at the requested time.
- C. Coordination: The Owner will cooperate with the Contractor to allow work to proceed. The Contractor shall coordinate and schedule work so that the security of the project site is not compromised. Prior to the start of construction, the Owner will schedule a

security coordination meeting with the Contractor to facilitate compliance with the security requirements, if requested by the Contractor.

### 1.13 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
  - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
  - 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
  - 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
  - 2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
  - 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

### 1.14 MISCELLANEOUS PROVISIONS

- A. The Owner shall have the option to curtail or delay any activity that affects its operations. Should the Contractor directed to stop its Work, Subcontractors shall also do so immediately and proceed with other activities with no additional cost to the Owner. For existing facility construction projects, and for new facilities which are partially occupied by the Owner, the Owner may occupy the premises during the entire period of construction for the conduct of its normal operations.
  - 1. Contractor shall cooperate with the Owner in all construction operations to minimize conflict, and to facilitate Owner usage.
- B. Contractor and their Subordinate Parties are prohibited from canvassing, soliciting, posting, or distributing literature or materials for any purpose while on the job site.
- C. Refer to the Owner's "Site Logistics Plan" Section 011000, for technical requirements associated with construction and security perimeter fencing, site security and access controls, construction site temporary lighting and on-site traffic control provisions.

- D. Traffic Control: Posted speed limits and driving regulations will be strictly enforced by the Owner. The Owner reserves the right to take any action deemed appropriate regarding violations including, but not limited to, refusal to permit violators to enter upon or remain on the premises.
1. Escort appropriately to and from the site all large crawler or mobile cranes operating on site and take all precautions necessary to prevent damage to Owner's property during operation both on and off site.
  2. Obtain advance written authorization from the Owner and from authorities having jurisdiction for all road blocks, detours and other interruptions of normal traffic flow that may be needed to facilitate construction operations.
  3. Contractor and construction delivery access to the worksite shall be as designated by the Owner.
    - a. Selected entrances to the Project site will remain open during normal working hours for the use of all Contractors. Contractor shall utilize specific entrances for material deliveries, equipment deliveries and worker access to the Project site as directed by the Owner.

At no time are ANY vehicles to be parked, whether attended or not, in the Owner's entrances or drives. Any material delivery which will tie up the Owner's entrances or drives in excess of one (1) hour shall be pre-scheduled with the Owner. In scheduling construction deliveries, the Contractor agrees that the Owner's deliveries and operations will take precedence.

#### 1.15 MECHANICAL AND ELECTRICAL REQUIREMENTS OF GENERAL WORK

- A. General: Except as otherwise indicated, comply with applicable requirements of sections in Divisions 21, 22, and 23 for mechanical provisions for general construction work specified in Divisions 02 through 14. Except as otherwise indicated, comply with applicable requirements of sections in Divisions 25, 26, 27, and 28 for electrical and electronic provisions for general construction work specified in Divisions 02 through 14.
1. Service Connections: Refer to Divisions 21, 22, 23, 25, 26, 27, and 28 for the characteristics of the mechanical, electrical, and electronic services to be connected to units of general work. Provide units manufactured or fabricated for proper connection to and utilization of available services, as indicated. Completion and final connection of mechanical services to general construction work is defined as being mechanical work and completion and final connection of electrical services to general construction work is defined as electrical work.
- B. Electrical Requirements: Except as otherwise indicated, comply with applicable provisions of the National Electrical Code (NEC) and standards by National Electrical Manufacturer's Association (NEMA), for electrical components of general work. Provide Underwriters Laboratories listed and labeled products where applicable.

#### 1.16 PERMITS AND RESPONSIBILITIES

- A. Permits: The Contractor shall, without additional expense to the Owner, be responsible for obtaining any necessary licenses, fees, inspections, and permits, and



for complying with any federal, and municipal laws, codes, and regulations applicable to the performance of the work.

1. The Contractor shall also be responsible for all damages to persons or property that occur as a result of the Contractor's fault or negligence, and shall take proper safety and health precautions to protect the work, the workers, the public, and the property of others.
  2. The Contractor shall also be responsible for all materials delivered and work performed until completion and acceptance of the entire work, except for any completed unit of work which may have been accepted under the contract.
- B. The Contractor shall not load or permit any part of the construction or site to be loaded so as to endanger its safety.
- C. The Contractor shall, without additional expense to the Owner, provide monetary deposits for the prosecution of the work, if required.

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

END OF SECTION 011000

## **SECTION 012100 - ALLOWANCES**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Provide the work of this Section in accordance with requirements of the Contract Documents.
- B. This Section includes but is not limited to administrative and procedural requirements governing allowances.
  - 1. Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.
- C. Types of allowances include the following:
  - 1. Lump-sum allowances.
  - 2. Unit-cost allowances.
  - 3. Quantity allowances.
  - 4. Contingency allowances.
  - 5. Testing and inspecting allowances.
- D. Related Requirements:
  - 1. Division 0 – Requirements for Allowances to be included with the bid.
  - 2. Division 01 Section 012200 "Unit Prices" for procedures for using unit prices.
  - 3. Division 01 Section 014000 "Quality Requirements" for procedures governing the use of allowances for testing and inspecting.

#### **1.2 SELECTION AND PURCHASE**

- A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.
- B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by Architect from the designated supplier.

### 1.3 ACTION SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

### 1.4 INFORMATIONAL SUBMITTALS

- A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.
- C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

### 1.5 COORDINATION

- A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

### 1.6 LUMP-SUM, UNIT-COST, AND QUANTITY ALLOWANCES

- A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.
- B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner and selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.
- C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.
  - 1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

### 1.7 CONTINGENCY ALLOWANCES

- A. Use the contingency allowance only as directed by Architect for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.

- B. Contractor's overhead, profit, and related costs for products and equipment ordered by Owner under the contingency allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs.
- C. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit margins.
- D. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

#### 1.8 TESTING AND INSPECTING ALLOWANCES

- A. Testing and inspecting allowances include the cost of engaging testing agencies, actual tests and inspections, and reporting results.
- B. The allowance does not include incidental labor required to assist the testing agency or costs for retesting if previous tests and inspections result in failure. The cost for incidental labor to assist the testing agency shall be included in the Contract Sum.
- C. Costs of services not required by the Contract Documents are not included in the allowance.
- D. At Project closeout, credit unused amounts remaining in the testing and inspecting allowance to Owner by Change Order.

#### 1.9 ADJUSTMENT OF ALLOWANCES

- A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
  - 1. Include installation costs in purchase amount only where indicated as part of the allowance.
  - 2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.
  - 3. Submit substantiation of a change in scope of work, if any, claimed in Change Orders related to unit-cost allowances.
  - 4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.
- B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.

1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.
2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

## **PART 2 - PRODUCTS (Not Used)**

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

### **3.2 PREPARATION**

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

### **3.3 SCHEDULE OF ALLOWANCES**

- A. See Allowances information provided in Division 0.

END OF SECTION 012100

## **SECTION 012200 - UNIT PRICES**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Provide the work of this Section in accordance with requirements of the Contract Documents.
- B. This Section includes but is not limited to administrative and procedural requirements for unit prices.
- C. Scope of Work: The Scope of this Project includes Work that may be performed on a Unit Price basis. Work items designated in this Section may be added to or deleted from the Work at any time during the duration of the Agreement, when authorized by written Change Order.
- D. Related Requirements:
  - 1. Division 0 - Requirements for Unit Prices to be included with the bid.
  - 2. Division 01 Section 012600 "Contract Modification Procedures" for procedures for submitting and handling Change Orders and Contractor-initiated Change Order Proposals.
  - 3. Division 01 Section 013100 "Project Management and Coordination" for requirements for coordination of submittals and installation of various portions of the Work
  - 4. Division 01 Section 01400 "Quality Requirements" for general testing and inspecting requirements.

#### **1.2 DEFINITIONS**

- A. Unit price is an amount incorporated in the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

#### **1.3 PROCEDURES**

- A. Unit Prices: Each unit price shall include the following costs:

1. Net cost of product and material to Contractor, considering trade discounts.
  2. Delivery to Project Site.
  3. Job site unloading and handling, including uncrating and storage, clean-up, and disposal of waste.
  4. Protection from elements and from damage.
  5. Installation labor, finishing and cleaning.
  6. Other expenses required to complete installation.
  7. Applicable taxes, bonds, warranties and insurance.
  8. Overhead and profit.
- B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
- C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.
- D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

## **PART 2 - PRODUCTS (Not Used)**

## **PART 3 - EXECUTION**

### **3.1 SCHEDULE OF UNIT PRICES**

- A. See Unit Prices schedule and information provided in Division 0.

END OF SECTION 012200

## **SECTION 012300 - ALTERNATES**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Provide the work of this Section in accordance with requirements of the Contract Documents.
- B. This Section includes but is not limited to administrative and procedural requirements for alternates.

#### **1.2 DEFINITIONS**

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

#### **1.3 PROCEDURES**

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



**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION**

3.1 SCHEDULE OF ALTERNATES

- A. See Alternate schedule and information provided in Division 0.

END OF SECTION 012300

## **SECTION 012500 - SUBSTITUTION PROCEDURES**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Provide the work of this Section in accordance with requirements of the Contract Documents.
- B. This Section includes but is not limited to administrative and procedural requirements for submitting and processing substitutions for after execution of the Agreement.
  - 1. For administrative and procedural requirements for product substitutions during the procurement process and prior to execution of the Agreement, refer to Division 00 Document "Procurement Substitution Procedures".
- C. Related Requirements:
  - 1. Division 01 Section 012100 "Allowances" for products selected under an allowance.
  - 2. Division 01 Section 012300 "Alternates" for products selected under an alternate.
  - 3. Division 01 Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

#### **1.2 DEFINITIONS**

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
  - 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.

#### **1.3 ADMINISTRATIVE REQUIREMENTS**

- A. Construction Manager's Process: The Construction Manager (CM) will use web-based Procore software system for tracking and responding to communications from the Contractor and for submitting requests, responses, and information to the Contractor.
  - 1. Prepare Requests for Substitution on electronic form via Procore software as directed by the CM, provided the data included is consistent with the Request for Substitution information included in this Section.

## 1.4 ACTION SUBMITTALS

- A. Requests for Substitution: Submit electronic requests for consideration. Identify product, fabrication, or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles which reference the specified item.
1. Substitution Request Form: Use form provided as Section 012501 – “Substitution Request Form,” or other equivalent form as directed by the CM. Failure to use the designated Substitution Request form, or failure to fully execute form as required, will result in rejection of proposed substitution request without review.
  2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
    - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
    - b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors, which will be necessary to accommodate proposed substitution.
    - c. 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, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
    - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
    - e. Samples, where applicable or requested.
    - f. Certificates and qualification data, where applicable or requested.
    - g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
    - h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
    - i. Research/evaluation reports evidencing compliance with building code in effect for Project, from model code organizations acceptable to authorities having jurisdiction.
    - j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. 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.

- k. Cost information, including a proposal of change, if any, in the Contract Sum.
  - l. Contractor's certification that 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.
  - m. 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. Construction Manager's Action: If necessary, CM will request additional information or documentation for evaluation within fifteen (15) working days of receipt of a request for substitution. CM will notify Contractor of acceptance or rejection of proposed substitution within twenty (20) working days of receipt of request, or seven (7) working days of receipt of additional information or documentation, whichever is later.
- a. Response: CM will use electronic Request for Substitution form included as Section 012501 – "Substitution Request Form," or other form designated by the CM.
  - b. Use product specified if CM does not issue a decision on use of a proposed substitution within time allocated.
- B. Source and Quantity of Substitution Requests: Only one request for substitution submitted directly from Contractor will be considered for an item; repetitive submittals of the same item will not be considered. Substitution requests from others, or that contain unrelated material, or that contain incomplete information will be returned without review. Refer to Division 01 Section "Submittal Procedures" for additional requirements.

## 1.5 QUALITY ASSURANCE

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

## 1.6 PROCEDURES

- A. Coordination: Revise or adjust affected work of all trades as necessary to integrate work of the approved substitutions.

## **PART 2 - PRODUCTS**

### **2.1 SUBSTITUTIONS**

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than thirty (30) working days prior to time required for preparation and review of related submittals.
1. Conditions: CM will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, CM 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. Requested substitution provides sustainable design characteristics that specified product provided for achieving LEED & SITES prerequisites and credits, as well as compliance with ASHRAE 189.3.
  - c. Substitution request is fully documented and properly submitted.
  - d. Requested substitution will not adversely affect Contractor's construction schedule.
  - e. Requested substitution has received necessary approvals of authorities having jurisdiction.
  - f. Requested substitution is compatible with other portions of the Work.
  - g. Requested substitution has been coordinated with other portions of the Work.
  - h. Requested substitution provides specified warranty.
  - i. 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: Not allowed.

## **PART 3 - EXECUTION (Not Used)**

END OF SECTION 012500

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## SECTION 012501 - Substitution Request Form

<b>Project Name:</b>		<b>Issued by:</b>	
<b>Address:</b>		<b>Address:</b>	
<b>Const. Mgr. Project No:</b>		<b>Copies To:</b>	
<b>Subst. Request #:</b>		<b>Date Issued:</b>	

## Specified Product, Material, System or Equipment in the Contract Documents:

<b>Specification Number:</b>		<b>Article/Paragraph/Page#:</b>	
<b>Drawing No./Detail:</b>		<b>Drawing Issue Date:</b>	
<b>Item Specified:</b>			

## Proposed Substitution:

<b>Description:</b>				
<b>Manufacturer:</b>				
<b>Address:</b>			<b>Tel:</b>	
<b>Trade Name:</b>			<b>Model #:</b>	
<b>Installer:</b>				
<b>Address:</b>			<b>Tel:</b>	
<b>History</b>	<input type="checkbox"/> New Product	<input type="checkbox"/> 2-5 years old	<input type="checkbox"/> 5-10 years old	<input type="checkbox"/> more than 10 years old
<b>Attachments Included:</b>	<input type="checkbox"/> Drawings	<input type="checkbox"/> Product Data	<input type="checkbox"/> Samples	
	<input type="checkbox"/> Test Reports	<input type="checkbox"/> Comparative Data	<input type="checkbox"/> Research & Evaluation Reports	
<b>Reason for Substitution:</b>				
<b>SPECIFIED PRODUCT:</b>		<b>PROPOSED PRODUCT:</b>		
<input type="checkbox"/> Is no longer available.		<input type="checkbox"/> Will reduce construction time by ____ days to Project.		
<input type="checkbox"/> Is unable to meet project schedule.		<input type="checkbox"/> Will result in cost savings of \$_____.		
<input type="checkbox"/> Is unsuitable for the designated application.		<input type="checkbox"/> Is for Supplier's Convenience		
<input type="checkbox"/> Cannot interface with adjacent materials		<input type="checkbox"/> Owner Initiated Substitution		
<input type="checkbox"/> Is not compatible with adjacent materials.		<input type="checkbox"/> Other:		
<input type="checkbox"/> Is not compatible with adjacent materials.				
<input type="checkbox"/> Cannot provide the specified warranty				
<input type="checkbox"/> Cannot be constructed as indicated.				
<input type="checkbox"/> Other:				
<input type="checkbox"/> Cannot be obtained due to one or more of the following:				
<input type="checkbox"/> Strike <input type="checkbox"/> Bankruptcy of manufacturer or supplier				
<input type="checkbox"/> Lockout <input type="checkbox"/> Similar occurrence				
<b>Explanation of each item marked above (Attach Documentation):</b>				

<b>COMPARISONS OF THE SPECIFIED ITEM AND THE PROPOSED SUBSTITUTION:</b>			
1. Compare proposed substitution with specified quality, size, weight, visual appearance, durability, and performance using the fields below:			
<b>QUALITY:</b>	<b>SPECIFIED PRODUCT:</b>	<b>PROPOSED PRODUCT:</b>	
<b>Manufacturer:</b>			
<b>Name/Brand/No:</b>			
<b>Supplier/ Distributor:</b>			
<b>Mfr/Rep:</b>			
<b>Size:</b>			
<b>Weight:</b>			
<b>Appearance:</b>			
<b>DURABILITY:</b> Identify at least three (3) similar local projects on which proposed substitution was used:			
1	Project:		Date Installed: <input type="text"/>
	Address:		
	Owner/Contact:	Tel: <input type="text"/>	<input type="text"/>
2	Project:		Date Installed: <input type="text"/>
	Address:		
	Owner/Contact:	Tel: <input type="text"/>	<input type="text"/>
3	Project:		Date Installed: <input type="text"/>
	Address:		
	Owner/Contact:	Tel: <input type="text"/>	<input type="text"/>
<b>PERFORMANCE CRITERIA:</b>		<b>SPECIFIED PRODUCT:</b>	<b>PROPOSED PRODUCT:</b>
<b>Features/Attributes</b>	<b>Test Protocol</b>		
2. Verify specified warranties, maintenance service, parts, code (including relevant ASTMs) and accessibility compliance, sustainability, and other requirements are met:			
a. <b>WARRANTY:</b> Proposed product offers the same warranty? <input type="checkbox"/> Yes <input type="checkbox"/> No; explain			
	<b>SPECIFIED PRODUCT:</b>	<b>PROPOSED PRODUCT:</b>	

Item:			
Item:			
Item:			
Item:			
<b>b. MAINTENANCE SERVICE:</b> Same day service available? <input type="checkbox"/> Yes <input type="checkbox"/> No; explain:			
Item:			
Item:			
Item:			
Item:			
<b>c. SPARE PARTS:</b> Source/Location:			
Item:			
Item:			
Item:			
Item:			
<b>CODE REQUIREMENTS:</b>		<b>SPECIFIED PRODUCT:</b>	<b>PROPOSED PRODUCT:</b>
ASTM:			
ASTM:			
ASTM:			
ASTM:			
<b>ADA Compliance:</b>			
<b>SUSTAINABLE DESIGN</b>			
<b>FEATURES/ATTRIBUTES:</b>		<b>SPECIFIED PRODUCT:</b>	<b>PROPOSED PRODUCT:</b>
3. Describe changes required in other elements of the Work to accommodate the proposed substitution, including work performed by the Owner and separate contractors:			
4. Describe changes of the Work required by the Owner, separate Contractors, or Consultants:			



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5. Describe the impact the proposed substitution will have on the work schedule, licensing or royalty fees in comparison to the work schedule without approval of the proposed substitution:
6. Define detailed cost impact of the proposed substitution in relation to the originally specified item, including related modifications required to other Work:
7. Proposed Substitution Summary:
Savings to the Owner for accepting substitution \$ _____ (\$ _____)
Proposed Change in Contract Time: <input type="checkbox"/> Yes <input type="checkbox"/> No [Add] [Deduct] _____ Days.

**Contractor's Certification and Waiver:** Permission to make a substitution after Award of Contract shall be effected by Change Order. Change Order shall not relieve the Contractor, a subcontractor, manufacturer, fabricator, or supplier from responsibility for deficiencies that may exist in the substituted product, nor for departure or deviation from the Contract Documents. The Undersigned certifies:

1. Except as otherwise expressly defined by the Contractor in this Request for Substitution (RFS) and approved by Change Order, the Contractor warrants, that the proposed substitution:
  - a. Has been fully investigated and determined to be equal or superior in all respects to the specified product
  - b. Will satisfy all requirements of the original product, material or equipment specified, including but not limited to appearance, quality, performance, code compliance, sustainability (LEED, SITES, ASHRAE 189.3), and warranty.
  - c. Will have the same maintenance service and source of replacement parts as the original
  - d. Will not have an adverse effect on other trades nor affect or delay progress schedule.
  - e. Will not affect dimensions and functional clearances.
2. Cost data and change in contract time stated are complete. Claims for additional costs or additional time related to accepted substitution which may subsequently become apparent are waived.

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3. If substitution affects a correlated function, adjacent construction, or the work of other trades or contractors, the necessary changes and modifications to the affected work shall be considered as an essential part of the proposed substitution, to be accomplished by the Contractor without additional expense to the Owner.
4. Payment will be made for changes to building design, including A/E design, detailing and construction costs caused by the substitution.
5. Coordination, installation and changes in the Work necessary for accepted substitution will be complete in all respects.

<b>Contractor's Signature:</b>		<b>Date:</b>	
--------------------------------	--	--------------	--

**Conditions of Acceptance:** The Construction Manager's approval, if granted, relies on data submitted and the opinion, knowledge, information, and belief of the CM at the time decision is rendered. The approval is conditional in nature and subject to re-evaluation and reconsideration if additional data or materials are submitted, or coordination with other work is observed to invalidate claims that substitution is equal to items originally specified

<b>Construction Manager's Response:</b>					
<input type="checkbox"/> Substitution Approved					
<input type="checkbox"/> Substitution Approved as Noted					
<input type="checkbox"/> Substitution Rejected -- Use specified materials.					
<input type="checkbox"/> Substitution Received too late -- Use specified materials.					
<input type="checkbox"/> More Information Required					
<b>RFS Response by:</b>				<b>Date:</b>	
		Construction Manager's Name			
<b>Construction Manager:</b>		<b>Contractor:</b>		<b>Owner:</b>	
<b>Accepted By:</b>		<b>Accepted By:</b>		<b>Accepted By:</b>	
<b>Date:</b>		<b>Date:</b>		<b>Date:</b>	

END OF SECTION 012501

## **SECTION 012600 - CONTRACT MODIFICATION PROCEDURES**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Provide the work of this Section in accordance with requirements of the Contract Documents.
- B. This Section includes but is not limited to administrative and procedural requirements for handling and processing Contract modifications.
- C. Related Requirements:
  - 1. Division 01 Section 012500 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.
  - 2. Division 01 Section 013300 "Submittal Procedures" for electronic submittal requirements.

#### **1.2 MINOR CHANGES IN THE WORK**

- A. Construction Manager (CM) will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on electronic facsimile of CM's form.

#### **1.3 ADMINISTRATIVE REQUIREMENTS**

- A. Construction Manager's Process: The CM will use web-based Procore software system for tracking and responding to communications from the Contractor and for submitting requests and information to the Contractor. Forms included in the Project Manual are printed facsimiles of the response forms which may be utilized by the CM.
  - 1. Contractor shall prepare requests and submittals on electronic forms acceptable to CM provided the data included is consistent with the forms included at the end of this Section.

#### **1.4 PROPOSAL REQUESTS**

- A. Owner-Initiated Proposal Requests: CM will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract

Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Work Change Proposal Requests issued by CM are not instructions either to stop work in progress or to execute the proposed change.
    - a. Work Change Proposal Requests will be issued on form typical to the electronic facsimile of Bulletin Form included at the end of this Section.
  2. Within twenty (20) working days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
    - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    - c. Include costs of labor and supervision directly attributable to the change.
    - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
    - e. Contractor's Quotation Form: Use Contractor's Change Order Proposal (COP) Form included at the end of this Section, or similar form as directed by the CM.
- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change.
1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
  2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
  3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
  4. Include costs of labor and supervision directly attributable to the change.
  5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

6. Comply with requirements in Division 01 Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Proposal Request Form: Use Contractor's Change Order Proposal (COP) Form included at the end of this Section, or similar form as directed by the CM.

#### 1.5 ADMINISTRATIVE CHANGE ORDERS

- A. Allowance Adjustment: See Division 01 Section 012100 "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.
- B. Unit-Price Adjustment: See Division 01 Section 012200 "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

#### 1.6 CHANGE ORDER PROCEDURES

- A. On CM's approval of a Change Order, Contractor will issue a Change Order for signatures of CM, Owner, and Contractor on electronic facsimile of Change Order Form included at the end of this Section, or similar form as directed by the CM.

#### 1.7 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: CM will issue a Construction Change Directive on electronic facsimile of the Bulletin Form. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
  1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
  1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

END OF SECTION 012600

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**SECTION 012600.03 – BULLETIN FORM****Bulletin**

<b>Project:</b>	_____	<b>Bulletin No:</b>	_____
<b>To Contractor:</b>	_____	<b>Date Issued:</b>	_____
<b>Office Address:</b>	_____	<b>Date Completed:</b>	_____
<b>CM Project #</b>	_____	<b>Copies:</b>	_____
<b>Contract For:</b>	_____		_____

**This Bulletin directs you to proceed as indicated:**☐ **ASI – Architect’s Supplemental Information**

Execute promptly the instructions given herein, which interpret the Contract Documents or order minor changes in the Work without change in the Contract Sum or Contract Time. Indicate your acceptance of these instructions for minor changes to the work as consistent with the Contract Documents and return a signed copy to the Construction Manager.

If you consider that a change in Contract Sum or Contract Time is required, submit a Change Order Proposal to the CM immediately and before proceeding with this work. If your proposal is found to be satisfactory and in proper order, this Bulletin will be superseded by a Change Order.

☐ **CCD – Construction Change Directive**

In order to expedite the Work and avoid or minimize delays in the Work, the Contract Documents are hereby amended as described below. This amendment may affect Contract Sum or Contract Time,

Proceed with this Work promptly and submit a Change Order Proposal for adjustments to Contract Sum, Contract Time, or both.

☐ **RFP - Request for Pricing**

Changes described herein are being considered for incorporation into the Work. Within \_\_\_\_ working days, submit an itemized proposal for changes to the Contract Sum or Contract Time for proposed modifications to the Contract Documents.

Do not proceed with the changes to the Work described herein until further written instructions are issued by the CM.

**Description:** \_\_\_\_\_**Drawings:** \_\_\_\_\_**Specifications:** \_\_\_\_\_**Bulletin Issued By:** \_\_\_\_\_ **Date:** \_\_\_\_\_**Const. Mgr.:** \_\_\_\_\_ **Contractor:** \_\_\_\_\_ **Owner:** \_\_\_\_\_**Accepted By:** \_\_\_\_\_ **Accepted By:** \_\_\_\_\_ **Accepted By:** \_\_\_\_\_**Date:** \_\_\_\_\_ **Date:** \_\_\_\_\_ **Date:** \_\_\_\_\_

## SECTION 012600.04 – CHANGE ORDER FORM

**Change Order**

PROJECT:

CHANGE ORDER NUMBER:

DATE:

TO CONTRACTOR:

CONSTRUCTION MANAGER'S PROJECT NUMBER:

**THE CONTRACT IS CHANGED AS FOLLOWS:***(Include, where applicable, any undisputed amount attributable to previously executed Construction Change Directives)*The original Contract Price was \$ 0.00The net change by previously authorized Change Orders \$ 0.00The Contract Price prior to this Change Order was \$ 0.00The Contract Prices will be **decreased/increased** (mark one) by this Change Order in the amount of \$ 0.00The new Contract Price including this Change Order will be \$ 0.00

The Contract Time will be increased by \_ days. (Zero if none are identified.)

The date of Substantial Completion as of the date of this Change Order therefore is

**NOTE:** This Change Order does not include changes in the Contract Time or Contract Price which have been authorized by Construction Change Directive until the cost and time have been agreed upon by both the CM and Contractor, in which case a Change Order is executed to supersede the Construction Change Directive.

**The Contract Price adjustment and/or time extension provided by this Change Order constitutes full and complete satisfaction for all direct and indirect costs, and interest related thereto, which has been or may be incurred in connection with this change to the work.**

By executing this Change Order, Construction Manager and Contractor agree to modify the Agreement's Scope of Work, Contract Price, and/or Contract Time as stated above. Upon execution, this Change Order becomes a Contract Document.

**NOT VALID UNTIL SIGNED BY THE CONSTRUCTION MANAGER, CONTRACTOR AND OWNER.**CONSTR. MANAGER (Firm name)CONTRACTOR (Firm name)OWNERBY (Signature)BY (Signature)BY (Signature)(Written name)(Written name)(Written name)DATEDATEDATE



## **SECTION 012900 - PAYMENT PROCEDURES**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
  - 1. Division 01 Section 012100 "Allowances" for procedural requirements governing the handling and processing of allowances.
  - 2. Division 01 Section 012200 "Unit Prices" for administrative requirements governing the use of unit prices.
  - 3. Division 01 Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
  - 4. Division 01 Section 013200 "Construction Schedule and Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.
  - 5. Division 01 Section 018114 "Sustainable Design Requirements - LEED" for administrative requirements governing submittal of cost breakdown information required for LEED documentation.

#### **1.2 DEFINITIONS**

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

#### **1.3 SCHEDULE OF VALUES**

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
  - 1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
    - a. Application for Payment forms with continuation sheets.

- b. Items required to be indicated as separate activities in Contractor's construction schedule.
  2. Submit the schedule of values to Construction Manager (CM) at earliest possible date, but no later than seven working days before the date scheduled for submittal of initial Applications for Payment.
  3. Subschedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values coordinated with each phase of payment.
  4. Subschedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work, provide subschedules showing values coordinated with each element.
  5. Subschedules for Separate Design Contracts: Where the Owner has retained design professionals under separate contracts who will each provide certification of payment requests, provide subschedules showing values coordinated with the scope of each design services contract as described in Division 01 Section 011000 "Summary."
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
  1. Identification: Include the following Project identification on the schedule of values:
    - a. Project name and location.
    - b. Name of Construction manager.
    - c. CM's project number.
    - d. Contractor's name and address.
    - e. Date of submittal.
  2. Applications for Payment shall be submitted on the AIA G702 and G703 Application for Payment Forms.
  3. AIA G702 and G703 Forms shall be submitted with the appropriate detailed Schedule of Values for approval by the Owner or their designated representative.
    - a. The Schedule of Values shall be itemized such that no line item shall exceed \$100,000 or 5% of the subcontracted value and an accurate account can be made of the work installed.
    - b. Changes shall either be listed separately or combined into the original Schedule of Values as determined by the Owner or their designated representative.

4. Contractor shall submit his proposed Schedule of Values to the Owner or their designated representative, for approval prior to submission of the first Application for Payment and no later than ten (10) calendar days after the award of a Contract Agreement or Purchase Order Agreement.
5. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
  - a. Related Specification Section or Division.
  - b. Description of the Work.
  - c. Name of subcontractor.
  - d. Name of manufacturer or fabricator.
  - e. Name of supplier.
  - f. Change Orders (numbers) that affect value.
  - g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
    - 1) Labor.
    - 2) Materials.
    - 3) Equipment.
6. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
  - a. Include separate line items under Contractor and principal subcontracts for LEED documentation and other Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
7. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
8. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
  - a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.
9. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
10. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.

11. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
  - a. 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 Contractor's option.
12. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

#### 1.4 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by CM and paid for by Owner.
  1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
  2. "Pencil Copy" of the Application for Payment shall be submitted to the Owner or their designated representative, office on or before the 20th of each month.
  3. Applications for Payment shall include costs projected to the last day of the month.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Construction Manager and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
- C. Payment Application Times: Submit Application for Payment to Owner or their designated representative by the 5th of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.
  1. Submit draft copy of Application for Payment seven days prior to due date for review by CM.
- D. Application Preparation: Complete every entry on form. Notarize and executed by a person authorized to sign legal documents on behalf of Contractor. CM will return incomplete applications without action.
  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 previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
  3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
  4. Indicate separate amounts for work being carried out under CM-requested project acceleration.
- E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
1. Provide certificate of insurance, evidence of transfer of title to CM, 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; do not include overhead and profit on stored materials.
  3. Provide summary documentation for stored materials indicating the following:
    - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    - c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
- F. Transmittal: Submit three signed and notarized original copies of each Application for Payment to the CM by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
1. The Contractor shall submit with each Application for Payment a Conditional Waiver of Lien on the form provided by the Owner or their designated representative.
    - a. An Unconditional Waiver of Lien shall be submitted prior to or at the time of payment.

- b. Payment for subsequent Applications will not be made until the Unconditional Waiver of Lien has been received by the Owner or their designated representative, for the prior Application payment.
  2. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
  3. When an application shows completion of an item, submit conditional final or full waivers.
  4. Owner or their designated representative reserves the right to designate which entities involved in the Work must submit waivers.
  5. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
  - 6.
- H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
  1. List of subcontractors.
  2. Schedule of values.
  3. LEED submittal for project materials cost data.
  4. Contractor's construction schedule (preliminary if not final).
  5. Combined Contractor's construction schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor.
  6. Products list (preliminary if not final).
  7. LEED action plans.
  8. Schedule of unit prices.
  9. Submittal schedule (preliminary if not final).
  10. List of Contractor's staff assignments.
  11. List of Contractor's principal consultants.
  12. Copies of building permits.

13. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
  14. Initial progress report.
  15. Report of preconstruction conference.
  16. Certificates of insurance and insurance policies.
  17. Performance and payment bonds.
  18. Data needed to acquire Owner's insurance.
- I. Application for Payment at Substantial Completion: After CM issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion 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 application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- J. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
  2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
  3. Updated final statement, accounting for final changes to the Contract Sum.
  4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
  5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
  6. AIA Document G707, "Consent of Surety to Final Payment."
  7. Evidence that claims have been settled.
  8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took

possession of and assumed responsibility for corresponding elements of the Work.

9. Final liquidated damages settlement statement, if applicable based on conditions of the Contract.

- K. Failure to meet any of the above requirements shall delay processing of an Application for Payment until the next cycle determined by item

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

END OF SECTION 012900



SECTION 012900 - CONTRACTOR'S LIEN WAIVER

**PRIME CONTRACTOR'S WAIVER OF LIEN RIGHTS, CERTIFICATION OF AMOUNTS PAID,  
AND ACKNOWLEDGMENT OF PARTIAL PAYMENT**

TO ALL WHOM IT MAY CONCERN:

In consideration for payment in the amount of \_\_\_\_\_ received \_\_\_\_\_  
the receipt of which is hereby acknowledged, the undersigned Prime Contractor does hereby waive and  
relinquish all rights of lien or claim that it may have either in law or equity with respect to the construction project  
known as \_\_\_\_\_ ("the Project"), for all labor, equipment, and/or  
materials provided to or on behalf of the Project through \_\_\_\_\_, 20\_\_\_\_, except for claims made  
pursuant to the agreement in place between Prime Contractor and Owner, and any lien previously perfected and  
remaining unreleased.

The undersigned Prime Contractor acknowledges and agrees that such payment represents payment in full for  
all such labor, equipment and/or materials (subject to any previously agreed to retainage) and that the Prime  
Contractor anticipates providing or may have already provided additional labor, equipment, and/or materials,  
subsequent to the above date, which are not covered by this Waiver of Lien Rights and Acknowledgment of  
Partial Payment. The undersigned Prime Contractor certifies that all amounts have been paid by the Prime  
Contractor for all work or materials furnished by others to the Prime Contractor for which the Prime Contractor  
has received previous payments from Owner, and Prime Contractor acknowledges that Owner is now making  
payment to the Prime Contractor in reliance upon such certification.

IN WITNESS WHEREOF, the undersigned has caused this Waiver of Lien Rights, Acknowledgment of Partial  
Payment, and Certification of Amounts Paid to be executed by its authorized representative as of the date  
indicated below.

**THE INDIVIDUAL SIGNING THIS LIEN WAIVER REPRESENTS THAT HE OR SHE IS AUTHORIZED TO DO  
SO.**

PRIME CONTRACTOR:

\_\_\_\_\_

By: \_\_\_\_\_  
(Printed name)

\_\_\_\_\_  
(Signature)

Its: \_\_\_\_\_  
(Title)

State of Indiana :  
County of \_\_\_\_\_ : ss,

Sworn to and subscribed before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
NOTARY PUBLIC  
My Commission Expires: \_\_\_\_\_

SECTION 012900.03 - CONTRACTOR'S LIEN WAIVER - FINAL

**PRIME CONTRACTOR'S WAIVER OF LIEN RIGHTS, CERTIFICATION OF AMOUNTS PAID,  
AND ACKNOWLEDGMENT OF FINAL PAYMENT INCLUDING ANY RETAINAGE**

TO ALL WHOM IT MAY CONCERN:

In consideration for payment in the amount of \_\_\_\_\_ received from \_\_\_\_\_ the receipt of which is hereby acknowledged, the undersigned Prime Contractor does hereby waive and relinquish all rights of lien or claim that it may have either in law or equity with respect to the construction project known as \_\_\_\_\_ ("the Project"), for all labor, all equipment, and/or materials provided to or on behalf of the Project throughout its entirety, except for claims previously made pursuant to the agreement in place between Prime Contractor and Owner, and any lien previously perfected and remaining unreleased.

The undersigned Prime Contractor acknowledges and agrees that such payment represents final payment in full for all such labor, equipment and/or materials including retainage, if any, and that the Prime Contractor has completed its work on the Project. The undersigned Prime Contractor certifies that all amounts have been paid by the Prime Contractor for all work or materials furnished by others to the Prime Contractor for which the Prime Contractor has received previous payments from Owner, and Prime Contractor acknowledges that Owner is now making payment to the Prime Contractor in reliance upon such certification. The undersigned Prime Contractor further certifies that it will pay all amounts lawfully owing for all work or materials furnished by others to the Prime Contractor with the payment received from Owner referenced herein.

IN WITNESS WHEREOF, the undersigned has caused this Waiver of Lien Rights, Acknowledgment of Final Payment, and Certification of Amounts Paid to be executed by its authorized representative as of the date indicated below.

**THE INDIVIDUAL SIGNING THIS LIEN WAIVER REPRESENTS THAT HE OR SHE IS AUTHORIZED TO DO SO.**

PRIME CONTRACTOR:

\_\_\_\_\_

By: \_\_\_\_\_  
(Printed name)

\_\_\_\_\_  
(Signature)

Its: \_\_\_\_\_  
(Title)

State of Indiana :  
County of \_\_\_\_\_ : ss,

2023-02-01 – 100% DD Issue

Applied Engineering Project 21-154

Sworn to and subscribed before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
NOTARY PUBLIC

My Commission Expires: \_\_\_\_\_

SECTION 012900.05 - SUBCONTRACTOR'S LIEN WAIVER

**SUBCONTRACTOR / SUPPLIER WAIVER OF LIEN RIGHTS, CERTIFICATION OF AMOUNTS PAID, AND ACKNOWLEDGMENT OF PARTIAL PAYMENT (Exhibit L)**

TO ALL WHOM IT MAY CONCERN:

In consideration for payment in the amount of \_\_\_\_\_ received from \_\_\_\_\_ ("Prime Contractor") the receipt of which is hereby acknowledged, the undersigned Subcontractor or Supplier does hereby waive and relinquish all rights of lien or claim that it may have either in law or equity with respect to the construction project known as \_\_\_\_\_ ("the Project"), for all labor, equipment, and/or materials provided to or on behalf of the Project through \_\_\_\_\_, 20\_\_, except for claims made pursuant to the agreement in place between Subcontractor or Supplier and Prime Contractor, and any lien previously perfected and remaining unreleased.

The undersigned Subcontractor or Supplier acknowledges and agrees that such payment represents payment in full for all such labor, equipment and/or materials (subject to any previously agreed to retainage) and that the Subcontractor or Supplier anticipates providing or may have already provided additional labor, equipment, and/or materials, subsequent to the above date, which are not covered by this Waiver of Lien Rights and Acknowledgment of Partial Payment. The undersigned Subcontractor or Supplier certifies that all amounts have been paid by the Subcontractor or Supplier for all work or materials furnished by others to the Subcontractor or Supplier for which the Subcontractor or Supplier has received previous payments from Prime Contractor, and Subcontractor or Supplier acknowledges that Prime Contractor is now making payment to the Subcontractor or Supplier in reliance upon such certification.

IN WITNESS WHEREOF, the undersigned has caused this Waiver of Lien Rights, Acknowledgment of Partial Payment, and Certification of Amounts Paid to be executed by its authorized representative as of the date indicated below.

**THE INDIVIDUAL SIGNING THIS LIEN WAIVER REPRESENTS THAT HE OR SHE IS AUTHORIZED TO DO SO.**

SUBCONTRACTOR OR SUPPLIER:

(Print name of Subcontractor or supplier)

By: \_\_\_\_\_  
(Printed name)

\_\_\_\_\_  
(Signature)

Its: \_\_\_\_\_  
(Title)

2023-02-01 – 100% DD Issue

Applied Engineering Project 21-154

State of Indiana :  
County of \_\_\_\_\_ : ss,

Sworn to and subscribed before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
NOTARY PUBLIC  
My Commission Expires: \_\_\_\_\_

SECTION 012900.07 - SUBCONTRACTOR'S LIEN WAIVER - FINAL

**SUBCONTRACTOR / SUPPLIER WAIVER OF LIEN RIGHTS, CERTIFICATION OF AMOUNTS PAID, AND ACKNOWLEDGMENT OF FINAL PAYMENT INCLUDING ANY RETAINAGE (Exhibit L)**

TO ALL WHOM IT MAY CONCERN:

In consideration for payment in the amount of \_\_\_\_\_ received from \_\_\_\_\_ ("Prime Contractor") the receipt of which is hereby acknowledged, the undersigned Subcontractor or Supplier does hereby waive and relinquish all rights of lien or claim that it may have either in law or equity with respect to the construction project known as \_\_\_\_\_ ("the Project"), for all labor, all equipment, and/or materials provided to or on behalf of the Project throughout its entirety, except for claims previously made pursuant to the agreement in place between Subcontractor or Supplier and Prime Contractor, and any lien previously perfected and remaining unreleased.

The undersigned Subcontractor or Supplier acknowledges and agrees that such payment represents final payment in full for all such labor, equipment and/or materials including retainage, if any, and that the Subcontractor or Supplier has completed its work on the Project. The undersigned Subcontractor or Supplier certifies that all amounts have been paid by the Subcontractor or Supplier for all work or materials furnished by others to the Subcontractor or Supplier for which the Subcontractor or Supplier has received previous payments from Prime Contractor, and Subcontractor or Supplier acknowledges that Prime Contractor is now making payment to the Subcontractor or Supplier in reliance upon such certification. The undersigned Subcontractor or Supplier further certifies that it will pay all amounts lawfully owing for all work or materials furnished by others to the Subcontractor or Supplier with the payment received from Contractor referenced herein.

IN WITNESS WHEREOF, the undersigned has caused this Waiver of Lien Rights, Acknowledgment of Final Payment, and Certification of Amounts Paid to be executed by its authorized representative as of the date indicated below.

**THE INDIVIDUAL SIGNING THIS LIEN WAIVER REPRESENTS THAT HE OR SHE IS AUTHORIZED TO DO SO.**

SUBCONTRACTOR OR SUPPLIER:

(Print name of Subcontractor or supplier)

By: \_\_\_\_\_  
(Printed name)

\_\_\_\_\_  
(Signature)

Its: \_\_\_\_\_  
(Title)

State of Indiana :  
County of \_\_\_\_\_ :

2023-02-01 – 100% DD Issue

Applied Engineering Project 21-154

Sworn to and subscribed before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
NOTARY PUBLIC  
My Commission Expires: \_\_\_\_\_



2023-02-01 – 100% DD Issue

Applied Engineering Project 21-154

SECTION 012900.09 - FORM OF CERTIFICATE FOR PAYMENT

**Certificate for Payment** (*Exhibit M*)

PROJECT:

PAYMENT APPLICATION NUMBER: \_  
DATE:

FOR CONTRACTOR:

CONST. MGR'S PROJECT NUMBER:

Owner and Construction Manager certify that based on the Payment Application Number identified above and the representations made by Contractor therein, Contractor is due payment in the amount identified below:

\$ \_\_\_\_\_

CONSTRUCTION MANAGER

OWNER

BY (*Signature*)

BY (*Signature*)

(*Written name*)

(*Written name*)

DATE

DATE

## **SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Provide the work of this Section in accordance with requirements of the Contract Documents.
- B. This Section includes but is not limited to administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
  - 1. General coordination procedures.
  - 2. Coordination drawings.
  - 3. Requests for Information (RFI's).
  - 4. Web-based project communication and documentation.
  - 5. Project meetings.
- C. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.
- D. Related Requirements:
  - 1. Division 01 Section 013200 "Construction Schedule and Progress Documentation" for preparing and submitting Contractor's construction schedule.
  - 2. Division 01 Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
  - 3. Division 01 Section 017419v "Construction Waste Management and Disposal" for additional waste salvage requirements.
  - 4. Division 01 Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.
  - 5. Division 01 Section 018114 "Sustainable Design Requirements – LEED" for indoor environmental air quality.

6. Division 01 Section 018115 "Sustainable Design Requirements – SITES v2" for site related sustainability requirements.
7. Division 01 Section 019100 "Building Systems Commissioning Requirements" for coordinating the Work with Owner's Commissioning Authority.

## 1.2 DEFINITIONS

- A. RFI: "Request for Information:" Request from CM, or Contractor seeking information required by, or clarifications of the Contract Documents.

## 1.3 ADMINISTRATIVE REQUIREMENTS

- A. Construction Manager's Process: The CM will use web-based Procore software system for tracking and responding to communications from the Contractor and for submitting requests, responses, and information to the Contractor. Forms included in the Project Manual are printed facsimiles of the typical response forms that will be generated by the Procore software.
  1. Contractor shall prepare requests and submittals on electronic forms acceptable to CM and Owner provided the data included is consistent with the forms included at the end of this Section.

## 1.4 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Use electronic facsimile of CSI Form 1.5A. Include the following information in tabular form:
  1. Name, address, and telephone number of entity 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.
- B. Digital Coordination Drawings: Two-dimensional documents, such as schedules, shop drawings, product data, and general information, shall be submitted electronically in portable document format (PDF) file.
- C. Key Personnel Names: Within 15 working days of Contract award, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and e-mail addresses. Provide names,

addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

1. Post copies of list in project meeting room, in temporary field office, on Project Web site, and by each temporary telephone. Keep list current at all times.
2. No changes in key personnel will be permitted until after Substantial Completion without the written consent of the Owner, except in the event of employee termination.

## 1.5 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.
1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
  2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
  3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with operations included in different Sections that depend on each other for proper installation, connection, and operation.
1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
  2. Coordinate installation of different components with other contractors to ensure maximum performance and accessibility for required maintenance, service, and repair.
  3. Make adequate provisions to accommodate items scheduled for later installation.
- C. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for CM and separate contractors if coordination of their Work is required.
- D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's construction schedule.
  2. Preparation of the Schedule of Values.
  3. Installation and removal of temporary facilities and controls.
  4. Delivery and processing of submittals.
  5. Progress meetings.
  6. Preinstallation conferences.
  7. Project closeout activities.
  8. Startup and adjustment of systems.
  9. Executed Contract or Work Authorization.
  10. Executed Performance and Payment Bonds if required by the Contract.
  11. Insurance Certificates.
  12. Permits
  13. Submittal Register.
  14. Listing of all Subcontractors, manufacturers and materials vendors.
  15. Project execution schedule of the Work.
  16. Quality control Plan.
  17. BIM Execution Plan.
  18. XBE Plan with Certification.
  19. OCIP Documentation.
  20. LEED/SITES Documentation listing.

- E. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
  - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

## 1.6 COORDINATION DRAWINGS AND PROCEDURES

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, consistent with the Project BIM Guidelines and Standards applicable to the Project, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity. Update information according to BIM Guidelines at regular intervals.
  - 1. In the event of a conflict between the requirements listed in this Section, and the Project BIM Guidelines and Standards (Appendix A), the more stringent requirements shall apply.
  - 2. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
    - a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
    - b. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
    - c. Provide coordinated composite drawings, drawn at a scale not less than 1/4 inch per foot in both plan and elevation, including, but not limited to, equipment, ducts, pipe sleeves, piping including plumbing and sprinkler systems, lighting, special supports and other items contained within the space and finished ceiling. Show mechanical and electrical services and architectural and structural features drawn to scale. Provide composite drawings for corridors, specialty spaces, mechanical rooms, shafts, tunnels, and other areas of limited space with complex systems. Distribute copies of composite drawings to all trades to assure a complete, coordinated installation of work within the space available. Include elevation drawings indicating finish ceiling heights, and heights above finished floor to bottom of ductwork, piping, conduit and other overhead fixtures and equipment.

- 1) Sheet Size: At least 8-1/2 by 11 inches but no larger than 30 by 42 inches.
    - 2) Draw required details at a scale not less than 3/4 inch per foot.
  - d. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
  - e. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
  - f. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
  - g. Indicate required installation sequences.
    - 1) Scheduling, sequencing movement, and positioning of large equipment into the building during construction.
  - h. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
3. Submit certificate guaranteeing that coordination drawings have been done and are being utilized at the project site.
  4. Call attention in advance to Design Professional of any dimensional or detail information needed to complete the coordination drawings.
    - a. Refer to Project BIM Guidelines for specific requirements associated with coordination of materials and systems information, specific to the various disciplines.
    - b. Refer to Sections of Division 23 and Division 26 for specific Coordination Drawing requirements for mechanical and electrical installations.
    - c. Indicate relationship of components shown on separate Shop Drawings.
    - d. Electronic Data: Electronic digital data files of the Contract Drawings will be provided by the Owner for Contractor's use in preparing submittals upon execution of an "Electronic Data Transfer Agreement" and "BIM Data Transfer Agreement".
- B. Coordination Drawing Organization: Organize coordination drawings as follows, consistent with the Project BIM Guidelines applicable to the Project. Details of equipment information to be captured through COBie including O&M Manuals.

1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work. Designate fire-rated walls, partitions and floors.
  - a. Where indicated, include supports, components and plenum space clearances for raised access flooring.
2. Plenum Space: Indicate sub-framing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Highlight black iron ceiling system supports required. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
3. Mechanical and Electrical Rooms: Provide coordination drawings for mechanical and electrical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
4. Structural and Through Penetrations: Indicate fire-rated and non-fire-rated penetrations and openings required for all disciplines through interior and exterior walls, interior partitions, foundation walls, and floor slabs.
5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, curtain wall anchorage, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping and equipment pads, and similar items.
6. Mechanical and Plumbing Work: Show the following:
  - a. Sizes and bottom elevations of ductwork, supply piping, sanitary, floor and roof drain piping, heat tracing, and conduit runs, including insulation, bracing, flanges, and support systems. Indicate access points and required maintenance areas.
  - b. Dimensions of major components, such as control boxes, dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
  - c. Fire-rated enclosures around ductwork.
  - d. Sleeves and capped utilities for future work.
7. Electrical Work: Show the following:
  - a. Runs of vertical and horizontal conduit 2 inches in diameter and larger.



- b. Light fixture, exit light, electrified door hardware, access controls, emergency battery pack, smoke detector, and other fire-alarm locations.
  - c. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
  - d. Location of pull boxes and junction boxes, dimensioned from column center lines.
- 8. Fire-Protection System: Show the following:
  - a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
- 9. Site Work: Show the following:
  - a. Civil and electrical underground utilities, both new and existing.
  - b. Location of all building and site ground connections and rods.
- 10. Review: CM will review coordination drawings to confirm that the Work is being coordinated according to the Project BIM Guidelines. CM will review Coordination Submittals for assessment of completion and aesthetic considerations such as finishes and layouts; not for accuracy or content, but for the details of the coordination, which are Contractor's responsibility.
  - a. If it is determined that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, the Contractor will be informed and requested to make changes as directed and resubmit for review.
- C. Coordination Drawing Prints: Prints will not be accepted.
- D. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:
  - 1. File Preparation Format: Same digital data software program, version, and operating system as original Drawings.
  - 2. File Submittal Format: Submit or post coordination drawing files using Portable Data File (PDF) format.
  - 3. BIM File Incorporation: Develop and incorporate coordination drawing files into Building Information Model established for Project.
    - a. Perform three-dimensional component conflict analysis as part of preparation of coordination drawings. Resolve component conflicts prior to submittal. Indicate where conflict resolution requires modification of design requirements by project Design Team..

4. CM will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.
  - a. CM makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
  - b. Digital Data Software Program: Drawings are available in accordance with use and release agreement executed by the recipient and the CM.
  - c. Contractor shall execute an electronic data licensing agreement in the form of Electronic Data Transfer Agreement included at the end of Division 01 Section 017839 "Project Record Documents".

#### 1.7 REQUESTS FOR INFORMATION(RFI's)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, the Contractor shall prepare and submit an electronic RFI in the form specified, coordinate and submit RFI's in a prompt manner so as to avoid delays in the Contractor's work or work of subcontractors.
  1. RFIs shall originate with Contractor, reviewed by the CM and returned to the Contractor. The CM will return RFI's submitted to the CM by other entities controlled by Contractor with no response.
  2. Rejection: The following Contractor-generated RFI's will be deemed frivolous and returned without action:
    - a. Requests for approval of submittals.
    - b. Requests for approval of substitutions.
    - c. Requests for approval of Contractor's means and methods.
    - d. Requests for resolution of construction deficiencies or failed inspections.
    - e. Requests for coordination information already indicated in the Contract Documents.
    - f. Requests for adjustments in the Contract Time or the Contract Sum.
    - g. Requests for Information of CM's actions on submittals.
    - h. Incomplete RFI's or inaccurately prepared RFI's.
    - i. Solicit clarification of comments that have been communicated to the Contractor by the CM in the course of shop drawing review or the review of other required submittals.
    - j. RFI's are not to be used to document meetings or conversations.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
  1. Project name.
  2. Project number.

3. Date.
  4. Name of Contractor.
  5. Name of Construction Manager.
  6. RFI number, numbered sequentially.
  7. RFI subject.
  8. Specification Section number and title and related paragraphs, as appropriate.
  9. Drawing number and detail references, as appropriate.
  10. Field dimensions and conditions, as appropriate.
  11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
  12. Contractor's signature.
  13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing information or interpretation.
    - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: Use electronic facsimile of RFI Form included as a part of the Procore software system.
1. Attachments shall be electronic files in Adobe Acrobat PDF format.
- D. CM's Action: CM will review each RFI, determine action required, and respond. Allow twelve (12) working days for CM's response for each RFI.
1. CM's action may include a request for additional information, in which case CM's time for response will date from time of receipt of additional information.
  2. CM will provide responses for up to 5 RFIs per day. If more than 5 RFIs are submitted per day (more than 25 RFIs per week), the Contractor shall prioritize RFIs responses needed based on most to least critical. Due dates based on 12-day duration will be adjusted accordingly.

3. Multiple question RFIs will be considered as individual RFIs.
  4. CM's action on RFI's that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 01 Section 012600 "Contract Modification Procedures."
    - a. Request for Information Response Form: CM will use electronic facsimile of form, or similar document, included at the end of this Section.
    - b. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify CM in writing within 10 working days of receipt of the RFI response.
  - E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly with not less than the following:
    1. Project name.
    2. Name and address of Contractor.
    3. Name and address of Construction Manager.
    4. RFI number including RFI's that were returned without action or withdrawn.
    5. RFI description.
    6. Date the RFI was submitted.
    7. Date CM's response was received.
  - F. On receipt of CM's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify CM within seven (7) working days if Contractor disagrees with response.
    1. Identification of related Minor Change in the Work, Construction Change Authorization, and Proposal Request, as appropriate.
    2. Identification of related Field Order, Work Change Authorization, and Proposal Request, as appropriate.
- 1.8 PROJECT COMMUNICATION AND DOCUMENTATION – WEB-BASED (***confirm whether Owner provided, for each project***)
- A. The Construction Manager will use Procore, an Internet enabled electronic software application for purposes of managing project communication and documentation until Final Completion. The application is specifically not intended to provide promotional, or general public information about the

project; rather for the use of construction, design, and Owner team members with user access password enabled. Project software shall include the following functions:

1. Project directory.
  2. Project correspondence.
  3. Meeting minutes.
  4. Contract modifications forms and logs.
  5. RFI forms and logs.
  6. Task and issue management.
  7. Photo documentation.
  8. Schedule and calendar management.
  9. Submittals forms and logs.
  10. Payment application forms.
  11. Drawing and specification document hosting, viewing, and updating.
  12. Online document collaboration.
  13. Reminder and tracking functions.
  14. Archiving functions.
- B. On completion of Project, provide complete electronic, data correlated, searchable record of software site files to Owner and to CM in a digital storage format acceptable to CM.
- C. Users granted access shall execute an electronic data electronic data use agreement.

#### 1.9 PROJECT MEETINGS

- A. General: Attend meetings and conferences at Project site as directed by the CM.
1. Attendees: Contractor shall inform their key personnel, subcontractors, others involved, and individuals whose presence is required, of date and time of each meeting.

2. Agenda: CM will prepare the meeting agenda, unless the meeting is requested by the Contractor. In which case the Contractor will distribute the agenda to all invited attendees a minimum of 24 hours prior to the meeting.
  3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three working days of the meeting.
- B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to CM and Owner, but no later than 15 working days after execution of the Agreement.
1. Conduct the conference to review responsibilities and personnel assignments.
  2. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Construction Manager, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  3. Agenda: Discuss items of significance that could affect progress, including the following:
    - a. Tentative construction schedule
    - b. Phasing.
    - c. Critical work sequencing and long-lead items.
    - d. Designation of key personnel and their duties.
    - e. Lines of communications.
    - f. Procedures for processing field decisions and Change Orders.
    - g. Procedures for RFIs.
    - h. Procedures for testing and inspecting.
    - i. Procedures for processing Applications for Payment.
    - j. Distribution of the Contract Documents.
    - k. Submittal procedures.
    - l. Preparation of record documents.
    - m. Use of the premises.
    - n. Work restrictions.
    - o. Working hours.
    - p. Owner's occupancy requirements.
    - q. Responsibility for temporary facilities and controls.
    - r. Procedures for moisture and mold control.
    - s. Procedures for disruptions and shutdowns.
    - t. Construction waste management and recycling.
    - u. Parking availability.
    - v. Office, work, and storage areas.

- w. Equipment deliveries and priorities.
    - x. First aid.
    - y. Security.
    - z. Progress cleaning.
  - 4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. LEED & SITES Coordination Conferences: Schedule and conduct a LEED & SITES coordination conference before starting construction, at a time convenient to CM, Owner, Architect, and Contractor.
- 1. Attendees: Authorized representatives of CM, Owner, Owner's Commissioning Authority, Architect, and their consultants; Contractor and its superintendent and LEED & SITES coordinator; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  - 2. Agenda: Discuss items of significance that could affect meeting requirements for LEED & SITES certifications, including the following:
    - a. LEED & SITES Project Checklist.
    - b. General requirements for LEED & SITES related procurement and documentation.
    - c. Project closeout requirements and LEED & SITES certification procedures.
    - d. Role of LEED & SITES coordinator.
    - e. Construction waste management.
    - f. Construction operations and LEED & SITES requirements and restrictions.
  - 3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- D. Preconstruction Indoor Air Quality (IAQ) Conference: Schedule a preconstruction IAQ conference separately from other preconstruction conferences, at a time convenient to CM, Owner, CxA and Architect, but no later than 15 working days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.
- 1. Attendees: Authorized representatives of CM, Owner, CxA, Architect, Contractor and its superintendent; major subcontractors; manufacturers; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.

2. Agenda: Discuss items of significance that could affect progress, including the following:
  - a. Indoor air quality procedures: Discuss the IAQ and environmental impact compliance procedures specified in Division 01 Section 018114 "Sustainable Design Requirements – LEED".
    - 1) The purpose of this agenda item is to develop a mutual understanding of the IAQ and environmental impact program requirements, and coordination of the Contractor's management of the program with the CM, Owner, CxA and Architect.
  - b. Product Emission Testing Coordination.
- E. Pre-installation Conferences: Conduct a pre-installation conference at Project site before each construction activity is a definable feature of Work. See section 014000 - "Quality Requirements" for requirements.
- F. Project Closeout Conference: Contractor shall schedule and conduct a project closeout conference, at a time convenient to CM and Owner, but no later than 90 days prior to the scheduled date of Substantial Completion.
  1. Conduct the conference to review requirements and responsibilities related to Project closeout.
  2. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, , Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
  3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
    - a. Preparation of record documents.
    - b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
    - c. Submittal of written warranties.
    - d. Requirements for completing LEED & SITES documentation.
    - e. Requirements for preparing operations and maintenance data.
    - f. Requirements for delivery of material samples, attic stock, and spare parts.
    - g. Requirements for demonstration and training.
    - h. Preparation of Contractor's punch list.
    - i. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
    - j. Submittal procedures.



- k. Coordination of separate contracts.
    - l. Owner's partial occupancy requirements.
    - m. Installation of Owner's furniture, fixtures, and equipment.
    - n. Responsibility for removing temporary facilities and controls.
  - 4. Minutes: Entity conducting meeting will record and distribute meeting minutes.
- G. Progress Meetings: The CM will conduct progress meetings at regular intervals.
  - 1. Attendees: In addition to representatives of Owner, Owner's Commissioning Authority, Construction Manager, and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
  - 2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction 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.
      - 1) Review schedule for next period.
    - b. Review present and future needs of each entity present, including the following:
      - 1) Interface requirements.
      - 2) Sequence of operations.
      - 3) Resolution of BIM component conflicts.
      - 4) Status of submittals.
      - 5) Status of LEED & SITES documentation.
      - 6) Deliveries.
      - 7) Off-site fabrication.
      - 8) Access.
      - 9) Site utilization.
      - 10) Temporary facilities and controls.
      - 11) Progress cleaning.
      - 12) Quality and work standards.
      - 13) Status of correction of deficient items.

- 14) Field observations.
  - 15) Status of RFI's.
  - 16) Status of proposal requests.
  - 17) Pending changes.
  - 18) Status of Change Orders.
  - 19) Pending claims and disputes.
  - 20) Documentation of information for payment requests.
3. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
    - a. Schedule Updating: Contractor will revise construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.
- H. Coordination Meetings: CM shall conduct Project coordination meetings at regular intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and pre-installation conferences.
1. Attendees: In addition to representatives of CM, Owner, Owner's Commissioning Authority, Contractor, and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.
  2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    - a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined Contractor's construction 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.
    - b. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.

- c. Review present and future needs of each contractor present, including the following:
  - 1) Interface requirements.
  - 2) Sequence of operations.
  - 3) Resolution of BIM component conflicts.
  - 4) Status of submittals.
  - 5) Construction waste management and recycling.
  - 6) Sequence of finish installation and indoor air quality procedures.
  - 7) Deliveries.
  - 8) Off-site fabrication.
  - 9) Access.
  - 10) Site utilization.
  - 11) Temporary facilities and controls.
  - 12) Work hours.
  - 13) Hazards and risks.
  - 14) Progress cleaning.
  - 15) Quality and work standards.
  - 16) Status of correction of deficient items.
  - 17) Field observations.
  - 18) Requests for Information (RFI's).
  - 19) Status of Proposal Requests (PR's).
  - 20) Pending changes.
  - 21) Status of Change Orders.
  - 22) Pending claims and disputes.
  - 23) Documentation of information for payment requests.
- 3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

**PART 2 - PRODUCTS (Not Used)****PART 3 - EXECUTION (Not Used)**

END OF SECTION 013100

## **SECTION 013200 - CONSTRUCTION SCHEDULE AND PROGRESS DOCUMENTATION**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Provide the work of this Section in accordance with requirements of the Contract Documents.
- B. The Contractor is required to submit, maintain, and update a complete schedule for their project/scope. The schedule is to be the product of the Contractor's Construction Management personnel input as well as the subcontractors, consultants, equipment vendors, suppliers, and the Owner's input to achieve an active and accurately maintained schedule. The schedule will be used as a quantitative basis for:
  - 1. Monitoring and evaluating the Contractor's progress
  - 2. Evaluating requests for additional contract time
- C. This Section includes but is not limited to administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
  - 1. Contractor's construction schedule.
    - a. Preliminary Construction Schedule
    - b. Contractor's Construction Schedule (CPM / Detailed Baseline)
  - 2. Schedule updating reports.
  - 3. Daily construction reports.
  - 4. Material location reports.
  - 5. Site condition reports.
  - 6. Special reports.
- D. All schedules required by this Section shall be developed according to the critical path method (CPM) scheduling technique, utilizing the Precedence Diagramming Method with Oracle's Primavera (P6) or an approved equivalent program.
- E. Related Requirements:
  - 1. Division 01 Section 013300 "Submittal Procedures" for submitting schedules and reports and for electronic submittal requirements.
  - 2. Division 01 Section 014000 "Quality Requirements" for submitting a schedule of tests and inspections.

## 1.2 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
  - 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
  - 2. Predecessor Activity: An activity that precedes another activity in the network.
  - 3. Successor Activity: An activity that follows another activity in the network.
  - 4. Construction activity descriptions shall clearly describe the work and the location where the work will be performed. The description shall encompass the activity's definitive geographical boundaries in order to facilitate progress reporting.
  - 5. Procurement or administrative activity descriptions, such as activities tracking the submittal processes, shall describe a single package or element that cannot be further subdivided and identify single steps in the process and the responsible party. The use of "percentages" as well as "start," "continue," and "complete" shall not be used in the activity's description.
- B. Cost Loading: The allocation of the schedule of values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum unless otherwise approved by Architect.
- C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
- D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- E. Event: The starting or ending point of an activity.
- F. Float: The measure of leeway in starting and completing an activity.
  - 1. Float time belongs to Owner.
  - 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
  - 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- G. Level of Detail: The CPM Schedule shall be sufficiently detailed to accurately depict all the work required by the Contract and shall demonstrate the order, sequence and duration of all work activities in accordance with the requirements

set forth in this Contract. Maximum duration of a singular activity shall not exceed 30 days

- H. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

### 1.3 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
  - 1. Working electronic copy of schedule file, where indicated. Provide in format .XER initially and at monthly intervals.
  - 2. PDF electronic file(s).
- B. Preliminary Schedule: Of size required to display entire network for entire construction period.
- C. Contractor's Construction Schedule: Of size required to display entire schedule for entire construction period.
- D. CPM Schedule Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar and working days.
  - 1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
    - a. List activities added or deleted since previous report.
    - b. Descriptions of activities shall not be modified without approval by the Owner to maintain continuity of activity understanding.
  - 2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
  - 3. Total Float Report: List of all activities sorted in ascending order of total float.
  - 4. Earnings Report: Compilation of Contractor's total earnings from the Notice to Proceed until most recent Application for Payment.
- E. Construction Schedule Updating Reports: Submit with Applications for Payment.
- F. Daily Construction Reports: Submit at monthly intervals.
- G. Material Location Reports: Submit at monthly intervals.
- H. Site Condition Reports: Submit at time of discovery of differing conditions.

- I. Special Reports: Submit at time of unusual event.
- J. Qualification Data: For scheduling consultant.

#### 1.4 QUALITY ASSURANCE

- A. Scheduling Consultant or Skilled in-house personnel Qualifications: An experienced specialist in CPM scheduling and reporting, with capability of producing CPM reports and diagrams within 24 hours of Construction Manager's request.
- B. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Division 01 Section 013100 "Project Management and Coordination." Review methods and procedures related to the preliminary construction schedule and Contractor's construction schedule, including, but not limited to, the following:
  - 1. Review software limitations and content and format for reports.
  - 2. Verify availability of qualified personnel needed to develop and update schedule.
  - 3. Discuss constraints, including phasing work stages area separations interim milestones and partial Owner occupancy.
  - 4. Review delivery dates for Owner-furnished products.
  - 5. Review schedule for work of Owner's separate contracts.
  - 6. Review schedule of Owner provided equipment and furnishings.
  - 7. Review submittal requirements and procedures.
  - 8. Review time required for review of submittals and resubmittals.
  - 9. Review requirements for tests and inspections by independent testing and inspecting agencies.
  - 10. Review time required for Project closeout and Owner startup procedures related to equipment testing, validation or certification, including commissioning activities.
  - 11. Review and finalize list of construction activities to be included in schedule.
  - 12. Review procedures for updating schedule.
- C. Schedule Composition Requirements
  - 1. Use Primavera P6 Scheduling Software (or an approved equivalent)
  - 2. Use the Critical Path Method (CPM) of network calculation for the schedule
  - 3. Each Activity shall be a part of the logic driven network (have a predecessor & successor)
  - 4. Each Activity name shall include a verb and a noun and represent the work function
  - 5. Each Activity name must include the location of work
  - 6. Activity Durations:

- a. Constructions Activities: Less than or equal to **15** working days.
  - b. Preconstruction & Procurement Activities: no restrictions, use the appropriate durations
- 7. Activities need to be coded by "Responsibility", who is performing the work
  - 8. Constraints shall only be used on Contractual Milestones
  - 9. Negative Lags shall not be used
  - 10. WBS shall be the default structure of the schedule
  - 11. Schedules should account for the historical average number of weather days using the NOAA data of the 5-year average for the calculated days
  - 12. If requested by the Owner, the Contractor shall provide adequate information on crew sizes, production rates, and similar data used to arrive at the durations and sequences
  - 13. Integrate Project key submittals as designated by the Owner. Integrate and coordinate submittal log information.

## 1.5 COORDINATION

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

## PART 2 - PRODUCTS

### 2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Substantial Completion. Complete development of the network diagram in sufficient time to submit the CPM schedule no later than 60 working days after commencement of the Work.
  - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- B. Activities: Treat each story or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
  - 1. Activity Duration: Define activities so no activity is longer than 15 working days, unless specifically allowed by CM.



2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
  3. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
  4. Startup and Testing Time: Include no fewer than 15 working days for startup and testing.
  5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion and allow time for CM's and Owner's administrative procedures necessary for certification of Substantial Completion.
  6. Punch List and Final Completion: Include not more than 30 working days for completion of punch list items and final completion.
- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and show how the sequence of the Work is affected.
1. Phasing: Arrange list of activities on schedule by phase.
  2. Work under More Than One Contract: Include a separate activity for each contract.
  3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
  4. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Division 01 Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
  5. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Division 01 Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
    - a. Coordinate with the CM to integrate dates for the equipment which provide adequate procurement and optimize construction sequence flow of the Work.
  6. Work Restrictions: Show the effect of the following items on the schedule:
    - a. Coordination with existing construction.
    - b. Limitations of continued occupancies.
    - c. Uninterruptible services.
    - d. Partial occupancy before Substantial Completion.
    - e. Use of premises restrictions.
    - f. Provisions for future construction.
    - g. Seasonal variations.
    - h. Environmental control.

7. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
    - a. Subcontract awards.
    - b. Submittals.
    - c. Purchases.
    - d. Mockups.
    - e. Fabrication.
    - f. Sample testing.
    - g. Deliveries.
    - h. Installation.
    - i. Tests and inspections.
    - j. Adjusting.
    - k. Curing.
    - l. Building flush-out.
    - m. Startup and placement into final use and operation.
    - n. Commissioning.
  8. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
    - a. Structural completion.
    - b. Temporary enclosure and space conditioning.
    - c. Permanent space enclosure.
    - d. Completion of mechanical installation.
    - e. Completion of electrical installation.
    - f. Substantial Completion.
  9. Other Constraints: Materials delivery, dock and elevator access and scheduling with the Owner use of existing facilities. Major equipment shall be identified and coordinated with the CM.
- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion, and the following interim milestones:
1. Temporary enclosure and space conditioning.
  2. Partial completion and occupancy of spaces if applicable based on provisions of the Contract for Construction.
    - a. Specific milestone date(s) of Substantial Completion and Final Project Completion.
  3. Start-up of key equipment and systems.
- E. Cost Correlation: Superimpose a cost correlation timeline, indicating planned and actual costs. On the line, show planned and actual dollar volume of the

Work performed as of planned and actual dates used for preparation of payment requests.

1. See Division 01 Section 012900 "Payment Procedures" for cost reporting and payment procedures.
- F. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
1. Unresolved issues.
  2. Unanswered Requests for Information.
  3. Rejected or unreturned submittals.
  4. Notations on returned submittals.
  5. Pending modifications affecting the Work and Contract Time.
  6. Status of materials availability, shipment and delivery.
- G. Recovery Schedule: When periodic update indicates the Work and its activities in progress is fourteen (14) or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, equipment required to achieve compliance, and date by which recovery will be accomplished.
- H. Computer Scheduling Software: Prepare schedules using the current version of Oracle's Primavera (P6) or an approved compatible equivalent, it must be a program that has been developed specifically to manage construction schedules.

## 2.2 PRELIMINARY CONSTRUCTION SCHEDULE

- A. Schedule: Submit a preliminary construction schedule within 10 working days of date established for the Notice to Proceed.
- B. Preparation: Indicate each significant construction activity separately. Outline significant construction activities for first 60 working days of construction. Include skeleton diagram for the remainder of the Work and a cost requirement prediction based on indicated activities to demonstrate that the Contractor understands the scope and schedule requirements.
1. Preliminary Schedule must include:
    - a. Meets schedule quality requirements
    - b. Alignment with the Master Program Schedule
    - c. Contract Milestones
    - d. Procurement and Lead Times for Long Lead Items
    - e. Summary of the realistic durations with the current Turnover/Activation Plan for the project

2. Preliminary Schedule is to be submitted & presented to the Program Team for review and comment
  3. Preliminary Schedule is to be modified per agreed upon comments and reviews
- C. Preliminary Schedule is to be Maintained and Updated per the contract Schedule Update Requirements till the complete Contractor's Construction Schedule (CPM) is done

### 2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE / DETAILED BASELINE)

- A. CPM Schedule: Prepare Contractor's construction schedule using a cost- and resource-loaded, time-scaled CPM network analysis diagram for the Work in Oracle Primavera (P6).
1. Develop network diagram in enough time to submit CPM schedule so it can be accepted for use no later than 30 working days after date established for the Notice to Proceed.
    - a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of CM's approval of the schedule.
  2. Schedule must include:
    - a. Meets schedule quality requirements
    - b. Detailed Construction Plan to execute the work
    - c. All Phases of Work
    - d. All Subcontractor's Work
    - e. Planned Utility Interfaces
    - f. Milestones
    - g. Punchlist and lists of uncompleted items
    - h. Commissioning activities and milestones
    - i. Turnovers of spaces based on finalization of partial or complete Substantial Completion of designated areas of the building or portions of the Project.
    - j. Full Procurement Schedule (Submittals Schedule)
      - 1) Complete list per specifications with submittals/shop drawings with reviews and approvals and lead times
  3. Develop and Submit a Schedule Area Key Graphic (depicting the areas/phases labeled in the schedule)
  4. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data

- and using CPM schedule information. Provide schedule consistent with requirements in Section 017900 – “Demonstration and Training”.
5. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
  6. Use "one workday" as the smallest unit of time for individual activities.
  7. Indicate nonworking days and holidays incorporated into the schedule in order to coordinate with the Contract Time.
- B. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Prepare a skeleton network to identify probable critical paths.
1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
    - a. Preparation and processing of submittals.
    - b. Mobilization and demobilization.
    - c. Purchase of materials.
    - d. Delivery.
    - e. Fabrication.
    - f. Utility interruptions.
    - g. Installation.
    - h. Work by CM that may affect or be affected by Contractor's activities.
    - i. Testing.
    - j. Commissioning.
    - k. Punch list preparation and completion of designated work activity associated therewith.
    - l. Final completion assembly of documentation indicated.
    - m. Activities occurring following final completion.
  2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
  3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
  4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
    - a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.
  5. Cost- and Resource-Loading of CPM Schedule: Assign cost to construction activities on the CPM schedule. Do not assign costs to submittal activities. Obtain Architect's approval prior to assigning costs to fabrication and delivery activities. Assign costs under main subcontracts

- for testing and commissioning activities, operation and maintenance manuals, punch list activities, Project record documents, LEED/SITES documentation, and demonstration and training, in the amount of 5 percent of the Contract Sum.
- a. Each activity cost shall reflect an appropriate value subject to approval by CM.
  - b. Total cost assigned to activities shall equal the total Contract Sum.
- C. Contract Modifications/Change Orders: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall project schedule.
- D. Initial CPM Schedule/Detailed Baseline Issuance of Schedule:
1. Prepare/Submit schedule & pdfs
    - a. Electronic copy of the entire schedule (.xer file).
    - b. Pdf's: Summary 1 pager, Full Detail schedule with Float, Critical Path(s)
  2. Prepare a Narrative
    - a. WBS (Work Breakdown Structure) – layout and explanation
    - b. Description of workflow with phasing and area by area plan written out in a narrative
    - c. Critical Path/Longest Path description
    - d. Major Milestones required from Utilities/Owner/etc.
    - e. Report of any Potential Time Impacts/Delay's
  3. Prepare tabulated reports showing the following:
    - a. Contractor or subcontractor and the Work or activity.
    - b. Description of activity.
    - c. Main events of activity.
    - d. Immediate preceding and succeeding activities.
    - e. Early and late start dates.
    - f. Early and late finish dates.
    - g. Activity duration in workdays.
    - h. Total float or slack time.
    - i. Average size of workforce.
    - j. Dollar value of activity (coordinated with the schedule of values).
- E. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.
1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.

2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.
3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.
4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.
  - a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.
  - b. Submit value summary printouts one week before each regularly scheduled progress meeting.

## 2.4 DAILY/MATERIAL LOCATION/SITE CONDITION REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
  1. Activities (referenced to the CPM Schedule/Baseline number) performed that day.
  2. List of subcontractors at Project site.
  3. List of separate contractors at Project site.
  4. Approximate count of personnel at Project site.
  5. Equipment at Project site.
  6. Material deliveries.
  7. High and low temperatures and general weather conditions, including presence of rain or snow. Designate days identified as affected by the weather in the Project schedule reporting.
  8. Accidents, including near misses, environmental events and property damage.
  9. Meetings and significant decisions.
  10. Unusual events (see special reports).
  11. Stoppages, delays, shortages, and losses. If the Contractor believes he is delayed for which he/she may be entitled to a time extension, Contractor must submit Notice in strict accordance with the Contract requirements.
  12. Meter readings and similar recordings.
  13. Emergency procedures.
  14. Orders, inspections, re-inspections and requests of authorities having jurisdiction.
  15. Change Orders received and implemented.
  16. Construction Change Authorizations received and implemented.
  17. Services connected and disconnected.
  18. Equipment or system tests and startups.
  19. Partial completions and occupancies.
  20. Substantial Completion(s) authorized.
- B. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall

be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:

1. Material stored prior to previous report and remaining in storage.
  2. Material stored prior to previous report and since removed from storage and installed.
  3. Material stored following previous report and remaining in storage.
- C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

## 2.5 SPECIAL REPORTS

- A. General: Submit special reports directly to CM within two working day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise CM in advance when these events are known or predictable.

## PART 3 - EXECUTION

### 3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Scheduling Consultant: Engage a consultant to provide planning, evaluation, and reporting using CPM scheduling.
  1. In-House Option: Owner may waive the requirement to retain a consultant if Contractor employs skilled personnel with experience in CPM scheduling and reporting techniques. Submit qualifications for the CM's review and approval. Upon approval, the scheduler shall be assigned for the project duration, unless otherwise approved for replacement by the CM upon the Contractor's request.
    - a. In the event of the CM's approval of the scheduler replacement, Contractor shall make available and assign on the same terms an equally or better qualified candidate as primary project scheduler.



- b. The replacement shall be assigned to duties and execute project responsibilities within 5 working days the removal of the initial scheduler.
  2. Meetings: Scheduling consultant shall attend all meetings related to Project progress, alleged delays, and time impact.
- B. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
  1. The Schedule is updated and calculated to the agreed upon data date (typically the 1st day of the month)
  2. Change Orders are to be added in each update following their approval
  3. As the Work progresses, indicate final physical completion percentage for each activity.
  4. Delays & work impacted Weather Days are to be recorded in the schedule
  5. Weather Days that impact work on site are to be recorded in the schedule
  6. Submit with each update:
    - a. Electronic copy of the entire schedule (.xer file).
    - b. Pdf's: Summary 1 pager, Full Detail schedule with Float, Critical Path(s)
    - c. Comparison Schedule to baseline and the last update
    - d. Schedule Narrative – reviewing and stating the below:
    - e. Milestone Summary Table – Baseline vs. Current with Comments section
    - f. Summary of Work Complete since last update
    - g. Longest Path last update compared to the current longest path – Summary of differences/similarities plus a Description / Summary of the current Longest Path
    - h. Description of Schedule Logic Changes made in this update and why they were made
    - i. Description of any activities added to the schedule and why they were added
    - j. Report any Delay's / Time Impacts to the current schedule
    - k. Report of any Potential Time Impacts/Delay's to the current schedule
    - l. Activity Report
    - m. Logic Report
    - n. Total Float Report
    - o. Earnings Report
  7. If the Contractor fails to timely submit the Schedule Update, Owner may withhold approval of progress payments until the required Schedule Update is submitted

- C. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
  - 1. Include a report with the revised updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
- D. Distribution: Distribute copies of approved schedule to Architect, and Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
  - 1. Post copies in Project meeting rooms and temporary field offices.
  - 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 013200

## **SECTION 013233 - PHOTOGRAPHIC DOCUMENTATION**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Provide the work of this Section in accordance with requirements of the Contract Documents.
- B. Photography in the Section will be provided by the Construction Manager, using the services of a professional photographer. The Contractor's role shall be to facilitate and coordinate access for the photographer as requested, coordinating with contractors engaged with the Work.
- C. Section includes administrative and procedural requirements for the following:
  - 1. Preconstruction photographs.
  - 2. Periodic construction photographs.
  - 3. Final completion construction photographs.
  - 4. Periodic construction video recordings.
  - 5. Web-based construction photographic documentation.

#### **1.2 INFORMATION RELATED TO THE PHOTOGRAPHER**

- A. Qualification Data: Construction Manager will provide for a photographer and also for a Web-based photographic documentation service provider.
- B. Key Plan: Photographer will submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph and video recording. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.
- C. Digital Photographs: Photographer will submit image files within three working days of taking photographs.
  - 1. Digital Camera: Minimum sensor resolution of 8 megapixels.
  - 2. Format: Minimum 3200 by 2400 pixels, in unaltered original files, with same aspect ratio as the sensor, uncropped, date and time stamped, in folder named by date of photograph, accompanied by key plan file.

3. Identification: Photographer will provide the following information with each image description in file metadata tag:
  - a. Name of Project.
  - b. Name and contact information for photographer.
  - c. Date photograph was taken.
  - d. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
  - e. Unique sequential identifier keyed to accompanying key plan.
- D. Video Recordings: Photographer will submit video recordings within five working days of recording.
  1. Submit video recordings in digital video format acceptable to CM.
  2. Identification: With each submittal, provide the following information:
    - a. Name of Project.
    - b. Name and address of photographer.
    - c. Name of Construction Manager.
    - d. Name of Contractor.
    - e. Date video recording was recorded.
    - f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
    - g. Weather conditions at time of recording.
- E. Web-Based Photographic Documentation (If authorized by the CM and Owner) : Submit time-lapse sequence video recordings simultaneously with recording.
  1. Submit time-lapse sequence video recordings by posting to Project Web site.
  2. Identification: For each recording, provide the following information:
    - a. Name of Project.
    - b. Name and contact information for photographer.
    - c. Name of Architect.
    - d. Name of Contractor.
    - e. Date(s) and time(s) video recording was recorded.
    - f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
    - g. Weather conditions at time of recording.

### 1.3 QUALITY ASSURANCE FOR PHOTOGRAPHER

- A. Photographer Qualifications: An individual who has been regularly engaged as a professional photographer of construction projects for not less than three years.
- B. Web-Based Photographic Documentation Service Provider: A firm specializing in providing photographic equipment, Web-based software, and related services for construction projects, with record of providing satisfactory services similar to those required for Project.

### 1.4 USAGE RIGHTS FOR PHOTOS AND DIGITAL IMAGES

- A. Photographer agrees to transfer copyright usage rights from photographer to Owner for unlimited reproduction of photographic documentation.

## PART 2 - PRODUCTS

### 2.1 PHOTOGRAPHIC MEDIA

- A. Digital Images: Provide images in JPG format, produced by a digital camera with minimum sensor size of 8 megapixels, and at an image resolution of not less than 3200 by 2400 pixels.
- B. Digital Video Recordings: Provide high-resolution, digital in format acceptable to the Owner.

### 2.2 WEB-BASED PHOTOGRAPHIC DOCUMENTATION

- A. Project Camera (If authorized by the CM): Provide fixed exterior camera installation, mounted to provide unobstructed view of construction site from location approved by Architect.
  - 1. Provide one fixed-location camera(s), with the following characteristics:
    - a. Remotely controllable view with mouse-click user navigation for horizontal pan, vertical tilt, and optical zoom of 500 percent minimum.
    - b. Capable of producing minimum 3.0 megapixel pictures.
    - c. Provide power supply, active high-speed data connection to service provider's network, and static public IP address for each camera.
- B. Wireless Hand-Held Camera (If authorized by the CM): Provide portable camera system capable of producing images complying with requirements in

this Section, with wireless transmission to service provider's network enabling a live image stream viewable by multiple parties.

1. Provide battery charger, spare battery pack, base station hub, and base station connections in a number and distribution adequate to enable wireless camera operation throughout Project site.
  2. Provide power supply, active high-speed data connection to service provider's network, and static public IP address at base station hub. Provide power supply, conduit, and data wiring between base station hub and base station connections.
- C. Web-Based Image Access: Password-protected access for Project team administered by the Owner may be authorized, providing current image access and archival image access by date and time, with images downloadable to viewer's device.
1. Owner may elect to make available and provide public viewer open access to most recent project camera image.

## **PART 3 - EXECUTION**

### **3.1 CONTRACTOR'S SUPPORT ACTIVITY**

- A. Contractor shall provide the CM's Photographer(s) full access to the Project and provide necessary and request assistance guidance and support to conduct activity in this Section.

### **3.2 CONSTRUCTION PHOTOGRAPHS BY THE CONSTRUCTION MANAGER**

- A. Photographer: CM will engage a qualified photographer to take construction photographs.
- B. General: Photographer will take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.
1. Maintain key plan with each set of construction photographs that identifies each photographic location.
- C. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
1. Date and Time: Include date and time in file name for each image.

2. Field Office Images: Maintain one set of images accessible in the field office at Project site, available at all times for reference. Identify images in the same manner as those submitted to CM.
- D. Preconstruction Photographs: Before starting construction, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by CM.
  1. Flag construction limits before taking construction photographs.
  2. Take 20 photographs to show existing conditions adjacent to property before starting the Work.
  3. Take 20 photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
  4. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.
- E. Periodic Construction Photographs: Take 20 photographs monthly, coinciding with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.
- F. Time-Lapse Sequence Construction Photographs: Take 20 photographs as indicated, to show status of construction and progress since last photographs were taken.
  1. Frequency: Take photographs monthly, coinciding with the cutoff date associated with each Application for Payment.
  2. Vantage Points: Following suggestions by CM and Contractor, photographer to select vantage points. During each of the following construction phases, take not less than two of the required shots from same vantage point each time to create a time-lapse sequence as follows:
    - a. Commencement of the Work, through completion of subgrade construction.
    - b. Above-grade structural framing.
    - c. Exterior building enclosure.
    - d. Interior Work, through date of Substantial Completion.
- G. Final Completion Construction Photographs: Take 20 color photographs after date of Substantial Completion for submission as project record documents. CM will inform photographer of desired vantage points.
  1. Do not include date stamp.

- H. Additional Photographs: CM may request photographs in addition to periodic photographs specified. Additional photographs will be paid for by Change Order and are not included in the Contract Sum.
1. Three days' notice will be given, where feasible.
  2. In emergency situations, take additional photographs within 24 hours of request.
  3. Circumstances that could require additional photographs include, but are not limited to, the following:
    - a. Special events planned at Project site.
    - b. Immediate follow-up when on-site events result in construction damage or losses.
    - c. Photographs to be taken at fabrication locations away from Project site. These photographs are not subject to unit prices or unit-cost allowances.
    - d. Substantial Completion of a major phase or component of the Work.
    - e. Extra record photographs at time of final acceptance.
    - f. Owner's request for special publicity photographs.

### 3.3 CONSTRUCTION VIDEO RECORDINGS BY THE CONSTRUCTION MANAGER

- A. Video Recording Photographer (If authorized by the CM): CM may engage a qualified videographer to record construction activities.
- B. Recording: Mount camera on tripod before starting recording unless otherwise necessary to show area of construction. Display continuous running time and date. At start of each video recording, record weather conditions from local newspaper or television and the actual temperature reading at Project site.
- C. Narration: Describe scenes on video recording by audio narration by microphone while video recording is recorded. Include description of items being viewed, recent events, and planned activities. At each change in location, describe vantage point, location, direction (by compass point), and elevation or story of construction.
1. Confirm date and time at beginning and end of recording.
  2. Begin each video recording with name of Project, Contractor's name, videographer's name, and Project location.



- D. Transcript: Provide a typewritten transcript of the narration. Display images and running time captured from video recording opposite the corresponding narration segment.
- E. Preconstruction Video Recording: Before starting demolition or construction, record video recording of Project site and surrounding properties from different vantage points, as directed by Architect.
  - 1. Flag construction limits before recording construction video recordings.
  - 2. Show existing conditions adjacent to Project site before starting the Work.
  - 3. Show existing buildings either on or adjoining Project site to accurately record physical conditions at the start of demolition or construction.
  - 4. Show protection efforts by Contractor.
- F. Periodic Construction Video Recordings: Record video recording monthly, coinciding with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last video recordings were recorded. Minimum recording time shall be 30 minutes(s).
- G. Time-Lapse Sequence Construction Video Recordings: Record video recording to show status of construction and progress.
  - 1. Frequency: During each of the following construction phases, set up video recorder to automatically record one frame of video recording every five minutes, from same vantage point each time, to create a time-lapse sequence of 30 minutes in length as follows:
    - a. Commencement of the Work, through completion of subgrade construction.
    - b. Above-grade structural framing.
    - c. Exterior building enclosure.
  - 2. Timer: Provide timer to automatically start and stop video recorder so recording occurs only during daylight construction work hours.
  - 3. Vantage Points: Following suggestions by CM and Contractor, photographer shall select vantage points.

### 3.4 WEB-BASED CONSTRUCTION PHOTOGRAPHIC DOCUMENTATION

- A. Live Streaming Construction Site Images: CM may provide Web-accessible image of current site image from viewer-controlled location camera(s), updated at 15 Insert number minute intervals during daytime operation.
- B. Time-Lapse Sequence Construction Site Recordings: Provide video recording from a fixed-location camera to show status of construction and progress.
  - 1. Frequency: Record one frame of video recording every 15 minutes, from same vantage point each time, to create a time-lapse sequence of construction activities.
  - 2. Timer: Provide timer to automatically start and stop video recorder so recording occurs only during daylight construction work hours.
- C. Maintain cameras and Web-based access in good working order according to Web-based construction photographic documentation service provider's written instructions until final completion. Provide for service of cameras and related networking devices and software.

END OF SECTION 013233

## **SECTION 013300 - SUBMITTAL PROCEDURES**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Provide the work of this Section in accordance with requirements of the Contract Documents.
- B. This Section includes but is not limited to requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- C. Related Requirements:
  - 1. Division 01 Section 012900 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
  - 2. Division 01, Section 012500 "Substitution Procedures" for submitting substitution requests.
  - 3. Division 01, Section 013100 "Project Management and Coordination" for submitting Coordination Drawings, RFIs and Meeting/Conference minutes.
  - 4. Division 01 Section 013200 "Construction Schedule and Progress Documentation" for submitting schedules and reports including Contractor's construction schedule.
  - 5. Division 01 Section 016000 "Product Requirements" for administrative and procedural requirements for selection of products for use in Project, and for submitting comparable product requests.
  - 6. Division 01 Section 017823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
  - 7. Division 01 Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
  - 8. Division 01 Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

#### **1.2 DEFINITIONS**

- A. Action Submittals: Written and graphic information and physical samples that require Construction Manager and/or Architect/Engineer's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals"
- B. Informational Submittals: Written and graphic information that do not require Construction Manager and/or Architect/Engineer's responsive action. Submittals may

be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

- C. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.
- D. Construction Contract Administration (CCA): The project will be using Procore software system for tracking and responding to communications from the Contractor and for submitting requests, responses and information to the Contractor. Forms included in the Project Manual are printed facsimiles of the response forms which will be generated by the software.

### 1.3 ACTION SUBMITTALS

- A. Submittal Schedule: Submit a master schedule of submittals, arranged in chronological order by dates required by the construction schedule. Include the time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Construction Manager and/or Architect/Engineer and additional time for handling and reviewing submittals required by those corrections.
  - 1. Coordinate submittal schedule with list of subcontracts, the Schedule of Values, and Contractor's construction schedule.
  - 2. Initial Submittal: Submit concurrently with initial construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
  - 3. Six-Week Look-Ahead Schedules: Maintain and update submittal schedules to reflect current conditions at the project site and project status. Submit revised submittal schedules highlighting the submittals planned in the subsequent six weeks.
  - 4. Format: Arrange the following information in a tabular format:
    - a. Scheduled date for first submittal.
    - b. Specification Section number and title.
    - c. Submittal category: Action; informational.
    - d. Name of subcontractor.
    - e. Description of the Work covered.
    - f. Scheduled date for Construction Manager and/or Architect/Engineer's 'final release or approval.
    - g. Scheduled date of fabrication.
    - h. Scheduled dates for purchasing.
    - i. Scheduled dates for installation.
    - j. Activity or event number.

5. Submittal Schedule Review: CM shall review the Submittal Schedule for compliance with the Contract Documents and assure staffing necessary to review and process submittals during construction. Make necessary adjustments requested by the CM. Schedule shall be submitted as one of the conditions precedent to the CM releasing CAD/BIM files for Contractor's use.
6. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
  - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Pre-Construction Photographs: Conduct a pre-construction Survey and submit pre-construction photographs to document existing conditions of the property and surrounding properties, which could be misconstrued as damage resulting from demolition and other construction operations; including but not limited to physical plant, structural surfaces, equipment, finishes and facades. File copies with Owner's Representative prior to commencing Work.

#### 1.5 FABRICATION ENGINEERING SUBMITTALS

- A. Fabrication Engineering Data: Submit comprehensive engineering calculations demonstrating conformance to the requirements of the Contract Documents and comply with requirements of authorities having jurisdiction.
  1. Calculations shall be legible and incorporate sufficient cross-references to shop drawings to make calculations readily understandable and reviewable.
  2. At a minimum, engineering calculations shall contain:
    - a. Analysis of design elements or component members;
    - b. Section property computations for structural framing members;
    - c. Analysis of anchors, including anchors embedded in concrete;
    - d. Signature and seal of the qualified licensed professional engineer responsible for their preparation.
  3. Test reports are not an acceptable substitute for calculations.

#### 1.6 QUALITY ASSURANCE

- A. Fabrication Engineering Professional: A professional Engineer engaged by the Contractor to provide fabrication engineering of materials, components or assemblies defined in technical sections of the Specifications to require fabrication engineering, who has an active license to practice in the jurisdiction of the Project, and who is experienced in providing the engineering design services required.
  1. Except as otherwise identified in Technical Sections of the Specifications, the Professional Engineer shall have at least 5 consecutive years' experience

providing engineering design services on projects of comparable size and scope, including material, design complexity to this project, that has resulted in applications with a record of successful in-service performance.

## 1.7 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Electronic Data: Electronic digital data files of the Contract Drawings will be provided by CM for Contractor's use in preparing submittals upon execution of the "Electronic Data Transfer Agreement".
- B. The Architect/Engineer's digital data drawings convey design intent and are not considered construction drawings. Contractors are given the digital data drawings to help facilitate their work. Contractors are required to prepare and submit construction shop drawings that detail the construction of their work, coordinating with adjacent materials, assemblies and components for the purpose of building the project. Submission of the A/E's digital data drawing files in lieu of shop drawings is strictly forbidden.
  - 1. Process: The CM will use Procore, a web-based software system for tracking and responding to communications from the Contractor and for submitting requests and information to the Contractor.
- C. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
  - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  - 2. Submittal items required for each Specification Section shall be submitted concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
  - 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
  - 4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
    - a. CM reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
  - 5. Arrange for preparation of required submittals in sufficient detail to permit analysis and review by Construction Manager and/or Architect/Engineer, sufficiently early to allow for review, and accommodate the rate of construction progress required under the Contract. Delete or mark out extraneous material not relevant to the Project.
  - 6. Incomplete Submittals and Excessive Errors: Shop drawings, product data, samples, and administrative submittals that contain excessive errors or that are

- incomplete will be returned unchecked and any delay caused thereby will be the responsibility of the Contractor.
7. Arrange for preparation of required submittals in sufficient detail to permit analysis and review by Construction Manager and/or Architect/Engineer sufficiently early to allow for review, and accommodate the rate of construction progress required under the Contract. Delete or mark out extraneous material not relevant to the Project.
  8. Deviations: Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.
  9. Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
  10. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  11. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination. Package submittals to cover complete assemblies or systems.
- D. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on the first full working day following CM's receipt of submittal.
1. Submittals received by the CM after 1:00 p.m. and on weekends will be considered as received the following working day.
  2. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
  3. Initial Submittal Review: Allow 15 consecutive working days for initial review of each submittal. Allow additional time if processing must be delayed to permit coordination with subsequent submittals or if concurrent review is required. The CM will advise Contractor when a submittal being processed must be delayed for coordination or concurrent review.
  4. Sequential Review: Where sequential review of submittals by Construction Manager and/or Architect's consultants, Owner, or other parties is indicated, allow 15 consecutive working days for initial review of each submittal.
  5. Shop Fabrication Drawing Review: Fifteen (15) consecutive working days from when the submittal is received by the CM will be required for the review of any shop drawings and other submittals requiring review by the Construction Manager and/or Architect if received in quantity equal to or less than fifty (50) sheets during five (5) consecutive working days. For each sheet or other item in excess of over fifty (50) sheets received in five (5) consecutive working days, additional time will be required for review time. The Architect will advise the of additional time required. CM will advise Contractor when a submittal being processed must be delayed for coordination or concurrent review.

6. Concurrent Consultant Review: Where concurrent review of submittals by Construction Manager and/or Architect's consultants, Owner, or other parties is required, allow 20 working days for initial review of each submittal.
  7. Resubmittal Review: Allow an average of 15 consecutive working days for review of each resubmittal.
  8. The Design Consultants will review each submittal a maximum of two (2) times - the initial submittal plus (1) one resubmittal. The Contractor shall process submittals in complete packages to allow Submittal reviews to be completed within the requisite 2 review period. The CM has the right to back charge the Contractor for the Construction Manager and/or Architect/Engineer's time for review of resubmittals beyond two.
    - a. No additional time will be allowed the Contractor for delays caused by excess number of resubmittals
  9. Extended Review: Allow an average 20 working days for initial review of the following submittals, with the listing to be finalized by the Architect:
    - a. Coordination drawings.
    - b. Architectural and Structural precast concrete.
    - c. Aluminum-framed entrances.
    - d. Structural Steel for support of Exterior Wall
    - e. Windows and curtain walls.
    - f. Fabrication engineering fabrications.
    - g. Casework drawings.
    - h. Door hardware.
    - i. Electronic security systems.
    - j. Sloped glazing assemblies.
    - k. HVAC temperature controls.
    - l. HVAC balancing report.
    - m. Elevators, Escalators and other Conveyors.
    - n. The Contractor shall prioritize submission and processing submittals in accordance with the Project Construction Schedule. No more than five Submittals of a single trade may be received and processes in one week, with a maximum 50 pages.
- E. Paper Submittals will not be accepted for the Project.
- F. Electronic Submittals: Two-dimensional documents, such as schedules, shop drawings, product data, and general information, shall be submitted electronically in portable document format (PDF) file. Identify and incorporate information in each electronic submittal file as follows:
1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
  2. File Naming: Each Submission shall have a file name consisting of project name, submittal section name, item number, and revision number. The Project



Shop Drawing review stamp will read and incorporate this file name. It is therefore imperative that each submittal file use the following naming convention:

- a. Each Submittal shall be created with a four-part alpha numeric file naming system, with each part separated by a dash. Each item is **bolded** and **underlined** to draw attention to it in the examples below:
  - 1) The first part is the project abbreviation (e.g. **IDENT**-061000-0001-01).
  - 2) The second part is the specification section number (e.g. IDENT-**061000**-0001-01).
  - 3) The third part is the item number of each Submittal required in that specific specification section. Each item shall have an individual number. Do not group multiple items in a single item number, as they will be returned not logged in and without an action reserved for proper submissions. The first item shall be 0001, the next item 0002, etc. (e.g. IDENT—061000-**0001**-01).
  - 4) The fourth part represents the number of times the item has been submitted for review. **No submission shall start with 00**. The first submission shall be 01, the second submission shall be 02, etc. (e.g. IDENT-061000-0001-**01**).
  - 5) Place a single dash between each part of the File Name.
3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Construction Manager and/or Architect/Engineer.
4. Metadata: Include the following information as keywords in the electronic submittal file metadata:
  - a. Project name.
  - b. Number and title of appropriate Specification Section.
  - c. Manufacturer name.
  - d. Product name.
5. Include Contractor's certification/approval stamp stating that information submitted complies with requirements of the Contract Documents.
- G. Options: Identify options requiring selection by Construction Manager and/or Architect/Engineer.
- H. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Construction Manager and/or Architect/Engineer on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations.
  1. Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals. Provide accompanying detailed written explanation for each deviation. Include same identification information as related submittal.

- I. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
  - 1. Note date and content of previous submittal.
  - 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
  - 3. Resubmit submittals until they are marked with approval notation from Construction Manager and/or Architect/Engineer's ' action stamp.
  - 4. Transmittal shall contain the same information as the first transmittal except that numbers shall run consecutively following naming and numbering protocol.
  - 5. No new material shall be included on the same transmittal for a resubmission.
  - 6. On resubmissions of shop drawings, the Construction Manager and/or Architect/Engineer's review shall be generally restricted to review of revisions to the original shop drawing. Changes (revisions) to re-submitted shop drawings must be clearly encircled or otherwise highlighted.
- J. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- K. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with **"A - REVIEWED"** or **"B - REVIEWED AS NOTED"** from Construction Manager and/or Architect/Engineer's separate action stamp.

## PART 2 - PRODUCTS

### 2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
  - 1. Post electronic submittals as PDF electronic files directly to the CM's Procore site specifically established for Project.
    - a. CM will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
  - 2. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
    - a. Provide a digital signature with digital certificate on electronically submitted certificates and certifications where indicated.

## 2.2 ACTIONABLE SUBMITTALS

- A. The following items will receive **"A", "B", "C", and "D"** actions.
- B. 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. Delete or mark out extraneous material that is not applicable to the Work. Edit material to conform to project requirements, and to clearly show model number, type and size proposed. Provide additional information as necessary to supplement standard information.
  - 3. Include the following information, as applicable:
    - a. Manufacturer's catalog cuts.
    - b. Manufacturer's product specifications.
    - c. Manufacturer's written recommendations.
    - d. Standard color charts.
    - e. Statement of compliance with specified referenced standards.
    - f. Testing by recognized testing agency.
    - g. Application of testing agency labels and seals.
    - h. Notation of coordination requirements.
    - i. 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. Mill reports.
    - e. Standard product operating and maintenance manuals.
    - f. Compliance with recognized trade association standards.
    - g. 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.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal based on Architect/Engineer's digital data drawing files is otherwise permitted.

1. General: Submittals containing reproduction of Contract Drawings are not considered Shop Drawings and will be returned without action. Any delay due to such rejection will not be grounds for an extension of Contract Time.
  2. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
    - a. Dimensions.
    - b. Identification of products.
    - c. Fabrication and installation drawings.
    - d. Roughing-in and setting diagrams.
    - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring. Differentiate between manufacturer installed and field installed wiring.
    - f. Shop fabrication instructions.
    - g. Templates and patterns.
    - h. Schedules.
    - i. Design calculations.
    - j. Compliance with specified standards.
    - k. Notation of coordination requirements.
    - l. Notation of dimensions established by field measurement.
    - m. Relationship and attachment to adjoining construction clearly indicated.
    - n. Design calculations with seal and signature of professional engineer if specified.
    - o. Highlight deviations from the Contract Documents.
  3. Number each shop drawing sheet uniquely complying with file numbering system specified.
  4. Do not use Shop Drawings for ordering, fabrication, or construction without an appropriate final stamp from the Contractor and Construction Manager and/or Architect indicating action taken in connection with construction.
  5. Submit Shop Drawings in the following format:
    - a. PDF electronic file.
  6. BIM File Incorporation: Develop and incorporate Shop Drawing files based on the Project BIM Manual requirements.
- D. Samples: Submit Samples for review of size, kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as delivered and installed. Provide additional samples for the Construction Manager. Contractor shall retain one set of samples on the Project site.
1. Samples are required for comparable products, substitutions, and custom fabricated items, unless samples are specifically required by the individual Sections.

- a. Samples are not required and will not be reviewed if a specified item is being provided.
  - b. Samples are required, and action will be taken if the specified item is no longer available, the manufacturer's current catalog numbers vary from those specified, named manufacturer's product data differs from requirements, or where custom colors require evaluation.
2. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
3. Mount, or display, Samples to facilitate review of qualities specified. Prepare Samples to match the Construction Manager and/or Architect/Engineer's sample. Include the following identification label on unexposed side of Samples that includes the following:
  - a. Generic description of Sample.
  - b. Product name and name of manufacturer.
  - c. Sample source.
  - d. Number and title of applicable Specification Section.
  - e. Specification paragraph number, submittal number, and generic name of each item.
  - f. Compliance with recognized standards.
  - g. Availability and delivery time.
4. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
5. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
  - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
  - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
6. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available. Color charts shall show actual colors-- photographic representations or reproductions will not be accepted.
  - a. Number of Samples: Submit two (2) full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Construction Manager will return submittal with options selected.
7. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in

manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

- a. Number of Samples: Submit three (3) sets of Samples. CM will retain two Sample sets; remainder will be returned.
  - 1) Submit additional samples if required by the manufacturer or contractor for their reference.
  - 2) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
  - 3) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least four sets of paired units that show approximate limits of variations.

## 2.3 INFORMATIONAL SUBMITTALS

- A. The following items will receive **"E"** or **"F"** actions.
- B. Contractor's Submittal Schedule: Comply with requirements specified in this Section under SUBMITTAL ADMINISTRATIVE REQUIREMENTS.
- C. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section 013200 "Construction Schedule and Progress Documentation."
- D. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.
- E. Coordination Drawing Submittals: Comply with requirements specified in Division 01 Section 013100 "Project Management and Coordination."
- F. Application for Payment and Schedule of Values: Comply with requirements specified in Division 01 Section 012900 "Payment Procedures."
- G. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
  1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
  2. Manufacturer and product name, and model number if applicable.
  3. Number and name of room or space.

4. Location within room or space.
5. Submit product schedule in the following format:
  - a. PDF electronic file.
- H. Subcontract List: 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. Use CSI Form 1.5A. Include the following information in tabular form:
  1. Name, address, and telephone number of entity 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.
- I. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- J. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Division 01 Section 014000 "Quality Requirements."
- K. Sustainability Submittals: Comply with requirements specified in Division 01 018114 "Sustainable Design Requirements" Sections.
- L. Certificates:
  1. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.
  2. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
  3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
  4. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
  5. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- M. Test Reports

1. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
  2. Manufacturer's Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified independent testing agency, or on comprehensive tests performed by a qualified testing agency.
  3. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
    - a. Name of evaluation organization.
    - b. Date of evaluation.
    - c. Time period when report is in effect.
    - d. Product and manufacturers' names.
    - e. Description of product.
    - f. Test procedures and results.
    - g. Limitations of use.
  4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
  5. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- N. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:
1. Preparation of substrates.
  2. Required substrate tolerances.
  3. Sequence of installation or erection.
  4. Required installation tolerances.
  5. Required adjustments.
  6. Recommendations for cleaning and protection.
- O. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:
1. Name, address, and telephone number of factory-authorized service representative making report.



2. Statement on condition of substrates and their acceptability for installation of product.
  3. Statement that products at Project site comply with requirements.
  4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
  5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
  6. Statement whether conditions, products, and installation will affect warranty.
  7. Other required items indicated in individual Specification Sections.
- P. Fabrication Engineering Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
- Q. Preconstruction Photographs: Before starting construction, submit photographs of Project site and surrounding properties, including existing items to remain during construction.
1. Provide photographs showing existing conditions adjacent to property before starting the Work.
  2. Provide photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
  3. Provide photographs as required to record settlement or cracking of adjacent structures, pavements and improvements.
- R. Progress Photographs: Submit photographs taken on the date coinciding with the cutoff date associated with each Application for Payment.

## 2.4 SUSTAINABILITY SUBMITTALS

- A. Actionable Sustainability Submittals: Comply with requirements specified in Division 01 Section "Sustainable Design Requirements".
1. Submit Sustainability submittals in the following format:
    - a. PDF electronic file.
  2. Sustainability submittals addressing LEED, SITES and ASHRAE 189.3 requirements will be processed at the same time and as part of other submittals required in this Section. Submittals that are received without documentation shall be considered partial submittals and shall either not be given an "A" or "B" action.

- a. If partial submittals have received an "A" or "B" action and the Submittal does not provide compliance with later received requirements, that action may be overturned.
- B. Informational Sustainability Submittals: The following certifications and statements are for information purposes only and will receive "E" and "F" actions.
  - 1. Third party certifications
  - 2. Corporate Sustainability Reporting (CSR)
  - 3. Extended Producer Responsibility
  - 4. Cradle-to-Cradle Certification (C2C)
- C. Sustainability Submittals for Declaration Purposes: Product Optimization submittals for declaration purposes are requested strictly for the purpose of compliance with requirements of the LEED program. The Contractor shall file them directly with the USGBC. Their content will not be reviewed, and their submittal will be actioned "Not Reviewed". These include:
  - 1. Environmental Product Declaration (EPD)
  - 2. Health Product Declaration (HPD)
  - 3. Certifications that contain chemical precautions.
- D. Safety Data Sheets (SDS's): Not a required submittal, nor subject to Construction Manager and/or Architect's review or approval, since Contractor remains solely responsible for job site safety controls, procedures, and programs.]
  - 1. Retain SDS's for Contractor's Safety Program at Project site; do not submit to Construction Manager.
    - a. CM will not review SDS's for conformance with the specifications and will return without an action."

## 2.5 CLOSEOUT SUBMITTALS

- A. General: The following closeout submittals complement the closeout requirements specified in Division 01 Section "Closeout Procedures."
- B. Closeout Submittals and Maintenance Material Submittals: Provide copies of final approved shop drawings, accepted substitutions, and copies of other final submittals specified in this section with a record copy to the Owner at Substantial Completion. Comply with requirements specified in Division 01 Section 017700 "Closeout Procedures."
- C. Project Record Documents: Comply with requirements specified in Division 01 Section 017839 "Project Record Documents."

- D. Maintenance Data: Comply with requirements specified in Division 01 Section 017823 "Operation and Maintenance Data."
- E. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- F. Final Completion Construction Photographs: Arrange with CM, Owner, Subcontractors, Consultants, and other interested parties for photographs of the finished construction. Provide at a minimum, photographs of each exterior elevation; landscaping; interior finishes and notable portions of the building.

## 2.6 FABRICATION ENGINEERING SERVICES

- A. Fabrication Engineering: When identified in the Contract Documents, the Architect/Engineer responsible for the overall professional design services of the Project may delegate design services required for components related to systems, materials or equipment to the Contractor.
  - 1. The Architect/Engineer's Drawings for Fabrication Engineering may be diagrammatic, may not identify or imply solutions to engineering, but are intended to show the:
    - a. Design intent, profiles and overall dimensions, shapes and forms,
    - b. Materials and relationships between items,
    - c. Location, identification of assemblies, components, accessories and other items,
    - d. Schematic attachment details and diagrams of connections.
  - 2. The Architect/Engineer's Specifications for Fabrication Engineering will identify performance criteria required.
    - a. If performance criteria specified or indicated are not sufficient to perform services, submit a written request for additional information to Architect/Engineer.
- B. Contractor's Responsibility: Engage an engineering professional licensed to practice in the State of Indiana complying with requirements specified in the Quality Assurance Article to provide engineering services; including but not limited to, signed and sealed shop drawings, product data and calculations using the design criteria, performance specifications, and other requirements provided in the Contract Documents. Contractor shall be responsible for the following:
  - 1. Maintaining design intent, conforming to the design shown on the Drawings and the performance requirements in the Specifications.
  - 2. Providing fabrication assemblies including materials, products, components, and accessories required for a complete design, whether or not such items are indicated on the Drawings or in the Specifications.

3. Providing anchors, attachments, inserts, fasteners, clips, bracing, framework, connections and similar items required to comply with specified design performance requirements.
  4. Securely attaching Fabrication Engineering Work to adjacent supports, related adjoining work; whether or not such items are indicated on the Drawings or in the Specifications.
- C. Deviations: In the interest of certain fabrication or erection methods, minor dimensional changes and detailing adjustments to the original design communicated in the Contract Documents may become necessary.
1. Identify proposed changes and deviations clearly in the Fabrication Engineering Submittal, highlighting items and bringing deviations to the Architect/Engineer's attention for review.
- D. Fabrication Engineering Services Certification: Submit digitally signed and sealed PDF electronic Shop Drawings, Product Data, engineering calculation files and other required submittals, signed and sealed by the qualified design professional responsible for preparation of Fabrication Engineering services.
1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.
- E. Substituted Engineering Design: The Architect/Engineer has provided engineering design for elements of the Project based on design criteria, performance specifications, and other requirements as documented in the Contract Documents.
1. Where Contractor proposes to vary from the engineering design indicated in the Contract Documents, the Contractor shall engage an engineering design professional to provide engineering design and shall be the Engineer of record for those components that are substituted engineering design.
  2. Submittals for substituted engineering shall comply with processes outlined in Division 01 Substitutions.
  3. If performance criteria indicated are not sufficient to perform services, submit a written request for additional information to Architect/Engineer.
- F. BIM File Incorporation: Incorporate Fabrication Engineering and substituted engineering drawings and data files into Building Information Model established for Project, based on BIM protocols for the project.
1. Prepare drawings in the following format: Same digital data software program, version, and operating system as the original.

## **PART 3 - EXECUTION**

### **3.1 CONTRACTOR'S REVIEW**

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect/Engineer .
1. Ensure submittal is specifically required by the Contract Documents. Submittals not required shall not be submitted and will not be processed or reviewed by the Construction Manager and/or Architect.
  2. Contractor shall verify:
    - a. Field measurements.
    - b. Field construction criteria.
    - c. Catalog numbers and similar data.
    - d. Proper interface with adjacent or related work.
  3. Coordinate each submittal with adjacent work and requirements of Contract Documents.
  4. Coordinate each submittal with previous transmittal requirements for numbering each submittal.
  5. Each specified material, product, or item shall be submitted individually, as a separate, uniquely identified submittal complying with file numbering system specified. Assembled booklets containing multiple products or systems from different sections will not be permitted and will be returned without action.
- B. Project Closeout and Maintenance Material Submittals: See requirements in Division 01 Section 017700 "Closeout Procedures."
- C. Contractor's Approval Stamp: Insert a uniform, approval stamp on each submittal. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
1. Language on the Contractor's submittal review stamp shall be consistent with the Agreement and requirements of the General Conditions of the Contract for Construction. A stamp containing language which defers or assigns Contractor's responsibilities to subcontractor will not be permitted.
  2. CM will take no action on submittals that do not have the Contractor's stamp and that have not been certified.
  3. Any delay due to such rejections will not be grounds for an extension of time.
- D. Processing of Submittals to the CM is an acknowledgement that the Contractor has reviewed submittal against the Contract Documents the work of other trades and fully

coordinated work shown on the submittal, whether or not it contains a Contractor's stamp.

### 3.2 CONSTRUCTION MANAGER and/or ARCHITECT/ENGINEER'S 'S ACTION

- A. General: The CM and/or the Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Construction Manager and/or Architect/Engineer will review each submittal, make marks to indicate corrections or revisions required, and return it. Construction Manager and/or Architect/Engineer will insert an action stamp on each submittal, marked appropriately to indicate required action, as follows:
  - 1. **A - REVIEWED:** Submittal has been reviewed for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents and no exceptions are taken.
    - a. Proceed with work represented in Submittal. Construction Manager and/or Architect/Engineer's review is not for determining the accuracy or completeness of other details, such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment and systems, remain the responsibility of the Contractor.
    - b. Review shall not constitute approval of safety precautions, or of construction means, methods and techniques, sequences or procedures.
    - c. Approval of a specific item shall not indicate approval of an assembly of which the item is a component.
    - d. Comments and corrections do not authorize changes to the Contract Documents.
  - 2. **B - REVIEWED AS NOTED:** Submittal has been reviewed as stated in Subparagraph 1, above, but certain exceptions are noted. Contractor may proceed with work represented in submittal, provided Contractor agrees to incorporate comments and corrections noted by Construction Manager and/or Architect/Engineer .
    - a. Resubmittal is not required. Comments do not authorize changes to Contract Documents.
  - 3. **C - REVISE & RESUBMIT:** Submittal has been reviewed as stated in Subparagraph 1, above, but certain comments and corrections are noted, that as a minimum, are necessary for conformance with the design concept expressed in the Contract Documents.
    - a. Do not proceed with the Work covered by this Submittal. Revise Submittal responding to comments and corrections and resubmit to Construction Manager for review until "APPROVED" or "APPROVED AS NOTED" action is given.
    - b. In resubmissions, limit corrections made to items noted in this Submittal.

4. **D - REJECTED:** Submittal has been reviewed as stated in Subparagraph 1, above and is not acceptable. Do not proceed with Work covered in this Submittal, for one or more of the following reasons:
  - a. Work represented in Submittal does not fulfill the requirements of the Contract Documents; submit specified item.
  - b. Submittal has not been made in accordance with procedures specified.
  - c. Insufficient and incomplete information is provided; accurate determination is not possible.
  - d. Submittal contains errors or omissions; accurate determination is not possible.
  - e. Information provided does not conform to information included in the Contract Documents.
  - f. Submittal contains extraneous materials; accurate determination is not possible.
- C. Informational Submittals: Construction Manager and/or Architect/Engineer are not required to review informational submittals. Informational submittals will be returned if contradictions are discovered with the following actions:
  1. **E – REVIEWED FOR INFORMATION:** Submittal has been processed for information only.
  2. **F – REVIEWED FOR INFORMATION AS NOTED:** Submittal has been processed and has been found to contain discrepancies noted. Contractor may proceed, provided Contractor agrees to incorporate comments noted. Resubmit only if noted in this submittal.
- D. Fabrication Engineering and Review: The Construction Manager and/or Architect/Engineer are entitled to rely upon the adequacy, accuracy and completeness of engineering design services provided by the Contractor and the Contractor's Fabrication Engineering Professional. The Construction Manager and/or Architect/Engineer's review of these submittals shall be limited to verification that the Contractor's fabrication engineering documents:
  1. Are in general conformance with the design intent, including design criteria, performance requirements contained in technical sections of the specifications, and other requirements of the Contract Documents
  2. Are in general conformance with the overall Project Design, and
  3. Can be integrated into the overall Project Design.
- E. HDP Sustainability Submittals for Declaration Purposes: Sustainability Submittals for declaration of material ingredients will receive the following action:
  1. **NOT REVIEWED:** This document is for declaration purposes only. Document is for Owner's record of materials used on the project. The CM does not have the expertise to evaluate documentation pertaining to a building product's medical or

health effects. This document was received on behalf of the Owner and is passed-through to the Owner for the Owner's information, review and use.

- a. THE OWNER IS ADVISED THAT CERTAIN HAZARDOUS SUBSTANCES (INCLUDING KNOWN CARCINOGENES) MAY BE DISCLOSED IN THE ATTACHED INFORMATION.
  - b. Determination of whether an actual hazard exists is a fact-based analysis requiring the expertise of appropriate scientists and/or toxicologists; all of which is beyond the expertise of the Architect.
  - c. The Owner is advised to retain appropriate experts to review the information provided herein and to take appropriate actions including recommending necessary and appropriate safety guidelines for use of this product.
- F. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect/Engineer. Partial submittals not authorized will be returned with no action taken. Delays caused by non-compliance with the requirement to submit combined submittals for each section, shall be the Contractor's responsibility. Incomplete submittals and submittals with errors are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- G. CM will return without review submittals received from sources other than the Contractor.
- H. Submittals not required by the Contract Documents, or including manufacturer's instructions to the Contractor relative to Contractor's responsibility for means, methods, procedures and safety precautions, may be returned or discarded by the CM without action.

END OF SECTION 01330



## **SECTION 014000 - QUALITY REQUIREMENTS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Provide the work of this section in accordance with requirements of the Contract Documents.
- B. This Section includes but is not limited to administrative and procedural requirements for quality assurance and quality control.
- C. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
  - 1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
  - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
  - 3. Requirements for Contractor to provide quality-assurance and -control services required by Construction Manager, Owner, Commissioning Authority, , or authorities having jurisdiction are not limited by provisions of this Section.
  - 4. Specific test and inspection requirements are not specified in this Section.
- D. Related Requirements:
  - 1. Division 01 Section 012100 "Allowances" for testing and inspecting allowances.
  - 2. Division 01 Section 014529 "Testing Laboratory Services" for specific testing and reporting requirements.

#### **1.2 DEFINITIONS**

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

- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by CM.
- C. Mockups: Full-size physical assemblies that are factory manufactured or constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, 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. Mockups are not Samples. Unless otherwise indicated, approved mockups shall not be considered or accepted to relax the technical or quality requirements of the work but shall physically demonstrate the standard of the Work.
  - 1. Integrated Exterior Mockups: Mockups of the exterior envelope erected separately from the building but on Project site, consisting of multiple products, assemblies, and sub- assemblies.
  - 2. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes, doors, windows, millwork, casework, specialties, furnishings and equipment, and lighting as required in Division 01 Section 014339 – “Room Mockups”.
- D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
- E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- F. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.
- G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
  - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or

unionized individuals, or that requirements specified apply exclusively to specific trade(s).

- J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

### 1.3 FABRICATION ENGINEERING

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
1. Professional Structural Engineer Qualifications: Must be legally qualified to practice in the State of Indiana with at least 10 consecutive years' experience providing engineering services for projects similar in material, design, complexity, and extent to this Project, and whose products have resulted in applications with a record of successful in-service performance.
  2. Fabrication Engineering: Means the complete planning, arrangement, and coordination of a discrete portion of the work, along with its graphic and written communication, including determination and engineering of the item's organization and structure in response to aesthetic requirements, functional requirements, dimensional and geometric limits, and the arrangement, performance, and other criteria indicated in the Contract Documents.
  3. Engineering Services: Means structural engineering services performed for the design, fabrication, and installation of systems, assemblies, and components similar in material, design, complexity and extent to that indicated for this Project.
  4. Engineering Requirements: Engineer design portions of the Work to:
    - a. Meet or exceed the specified performance criteria;
    - b. Conform to the profiles indicated and to other requirements of the Contract Documents;
    - c. Satisfy the requirements of the agencies having jurisdiction; and
    - d. Provide structurally sound, leak-proof, non-corroding, and weather tight assemblies, as applicable, that accommodate, resist, distribute, or transfer, as applicable, the minimum specified in-service loads, and thermal, seismic, and wind sway, or other types of movement, without incipient or catastrophic failure.

5. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Design Intent and Coordination

1. Unless otherwise indicated or specified, maintain the design intent and conform to the performance requirements indicated on the Drawings and in the Specifications, as determined by the Construction Manager and/or Architect.
  - a. In the interest of certain fabrication or erection methods, minor dimensional changes and detailing adjustments to the original design communicated in the Contract Documents may become necessary.
  - b. Obtain written approval from the Architect for proposed changes and adjustments before procurement, fabrication, manufacture, assembly, or installation, as applicable.
  - c. Document proposed changes and adjustments in submittals; clearly indicate deviations from Contract Documents.
  - d. Architect will review proposed changes and adjustments and approve through the submittal review process.

C. Administrative Requirements

1. Portions of the Contract Documents may designate fabrication engineering of certain items by the Contractor, or may otherwise specify "fabrication engineering requirements" in individual specification Sections.
2. The Contractor is professionally liable for fabrication engineering work, including design, engineering, and conformance to specified performance requirements.
3. Drawings of fabrication engineering portions of Work are diagrammatic; they do not identify or imply solutions to engineering issues, and are intended to only show:
  - a. the design intent of finished materials, profiles, shapes and forms;
  - b. relationships between items;
  - c. location, identification, dimension and size of components, assemblies, accessories, and other items; and
  - d. schematic attachment details and diagrams of fasteners and connections.
4. Specifications for fabrication engineering portions of the Work are the performance type, and establish the minimum criteria for materials, fabrications, products, systems, assemblies, and methods of execution, along with the minimum performance requirements for indicated portions of the Work.

D. Review of Fabrication Engineering:

1. The Construction Manager and/or Architect/Engineer reviews and determines whether or not the Contractor's fabrication engineering:
  - a. conform to the overall project design;
  - b. conform to the specified performance requirements, including subsequent modifications; and
  - c. are appropriately integrated into the overall design of the Project.
2. In the event of a dispute regarding the Contractor's proposed fabrication engineering solutions and the design intent of the Contract Documents, the decision of the Construction Manager is final.

#### 1.4 CONFLICTING REQUIREMENTS

- A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements are specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to CM for a decision before proceeding.
- C. Items indicated on the drawings but not included in the specifications, or included in the specifications and not indicated on the drawings, shall have the same effect as if indicated or included in both. In case of conflict or inconsistency between the drawings and the specifications, the Contractor shall request additional information or interpretation as specified in Division 01 Section 013100 "Project Management and Coordination." Any adjustment by the Contractor without such determination shall be at its own risk and expense.

#### 1.5 ACTION SUBMITTALS

- A. Shop Drawings: For integrated exterior and laboratory mockups, provide plans, sections, and elevations, indicating materials and size of mockup construction.
  1. Indicate manufacturer and model number of individual components.

2. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.
- B. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- C. Fabrication Engineering Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.
- B. Qualification Data: For Contractor's quality-control personnel.
- C. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems:
  1. Seismic-force-resisting system, designated seismic system, or component listed in the designated seismic system quality-assurance plan prepared by Architect.
  2. Main wind-force-resisting system or a wind-resisting component listed in the wind-force-resisting system quality-assurance plan prepared by Architect.
- D. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- E. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
  1. Specification Section number and title.
  2. Entity responsible for performing tests and inspections.
  3. Description of test and inspection.
  4. Identification of applicable standards.

5. Identification of test and inspection methods.
  6. Number of tests and inspections required.
  7. Time schedule or time span for tests and inspections.
  8. Requirements for obtaining samples.
  9. Unique characteristics of each quality-control service.
  10. Include all Owner's Quality Assurance testing.
  11. Include all testing required by Commissioning Authority.
- F. Reports: Prepare and submit certified written reports and documents as specified.
- G. Permits, Licenses, and Certificates: For Owner'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.

#### 1.7 CONTRACTOR'S QUALITY-CONTROL PLAN (QCP) - GENERAL

- A. Quality-Control Plan (QCP), General: Submit quality-control plan within ten (10) working days of Notice to Proceed, and not less than five working days prior to preconstruction conference. Submit in format acceptable CM. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's construction schedule. The CM reserves the right to review and reject all or part of the Quality Control Program as proposed by the Contractor. The Contractor shall revise and resubmit as appropriate until satisfactory to the CM. The basic objectives of the Quality Control Program are as follows:
1. To ensure that all Work adheres strictly to all requirements of the Contract Documents and governing agencies.
  2. To produce first class workmanship.
  3. To prevent deficiencies through pre-construction quality control coordination.
  4. To detect and correct deficiencies in a timely manner.
  5. To provide an auditable record of all tests, inspections, procedures, non-compliance and corrections, and any other pertinent data as required by the Owner.
- 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 required for Project.

1. Project quality-control manager shall not have other Project responsibilities.
- C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.
- D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:
1. Contractor-performed tests and inspections including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections.
  2. Special inspections required by authorities having jurisdiction and indicated on the "Statement of Special Inspections."
  3. Owner-performed tests and inspections indicated in the Contract Documents, including tests and inspections indicated to be performed by the Commissioning Authority.
- E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.
- F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.
- G. Failure to comply with the Quality Control Program requirements stated herein may result in the withholding of monthly progress payments and/or termination of the Contractor for cause by the Owner in accordance with the General Conditions.

#### 1.8 QUALITY CONTROL PLAN (QCP) – SPECIFIC MINIMUM REQUIREMENTS

- A. Construction will be permitted to begin only after acceptance of the Contractor's Quality Control Plan (QCP) or acceptance of an interim plan applicable to the particular feature of work to be started. Work outside of the accepted interim plan will not be permitted to begin until acceptance of a QCP or another interim plan containing the additional work.



1. Content of the QCP shall be as follows. Include, as a minimum, the following to cover all construction operations, both onsite and offsite, including work by subcontractors, fabricators, suppliers, and purchasing agents subcontractors, designers of record, consultants, architect/engineers (AE), fabricators, suppliers, and purchasing agents:
  - a. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the QCP staff will implement the three-phase control system for all aspects of the work specified. Include a QCP Manager who reports to the project superintendent.
  - b. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a QCP function.
  - c. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, and purchasing agents subcontractors, designers of record, consultants, Architect engineers (AE), offsite fabricators, suppliers, and purchasing agents. These procedures must be in accordance with Section 013300 – “Submittal Procedures”
  - d. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test.
  - e. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.
  - f. Procedures for tracking construction deficiencies from identification through acceptable corrective action. Establish verification procedures that identified deficiencies have been corrected.
  - g. Reporting procedures, including proposed reporting formats.
  - h. A list of the definable features of work (DFOW). A definable feature of work is a task which is separate and distinct from other tasks, has separate control requirements, and may be identified by different trades or disciplines, or it may be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable feature under a particular section. This list will be agreed upon during the coordination meeting.
2. Acceptance of Plan as follows. Acceptance of the Contractor's plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The CM reserves the right to require the Contractor to make changes in his QCP and operations including removal of personnel, as necessary, to obtain the quality specified.

3. Notification of Changes as follows. After acceptance of the QCP, notify the CM in writing of any proposed change. Proposed changes are subject to acceptance by the CM.
4. Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. At least three phases of control must be conducted by the QCP Manager for each definable feature of the construction work as follows:
  - a. Preparatory Phase as follows. This phase is performed prior to beginning work on each definable feature of work, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. This phase includes:
    - 1) A review of each paragraph of applicable specifications, reference codes, and standards. Make available during the preparatory inspection a copy of those sections of referenced codes and standards applicable Section 014200 to that portion of the work to be accomplished in the field. Maintain and make available in the field for use by Owner personnel until final acceptance of the work.
    - 2) Review of the contract drawings.
    - 3) Check to assure that all materials and/or equipment have been tested, submitted, and approved.
    - 4) Review of provisions that have been made to provide required control inspection and testing.
    - 5) Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.
    - 6) Examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.
    - 7) Review of the appropriate activity hazard analysis to assure safety requirements are met.
    - 8) Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.
    - 9) Check to ensure that the portion of the plan for the work to be performed has been accepted by the CM.
    - 10) Discussion of the initial control phase.
    - 11) The CM must be notified at least 24 hours in advance of beginning the preparatory control phase. Include a meeting conducted by the QCP Manager and attended by the

superintendent, other QCP personnel (as applicable), and the foreman responsible for the definable feature. Document the results of the preparatory phase actions by separate minutes prepared by the QCP Manager and attach to the daily QCP report. Instruct applicable workers as to the acceptable level of workmanship required to meet contract specifications.

- b. Initial Phase as follows. This phase is accomplished at the beginning of a definable feature of work. Accomplish the following:
  - 1) Check work to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.
  - 2) Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing.
  - 3) Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.
  - 4) Resolve all differences.
  - 5) Check safety to include compliance with the safety plan and activity hazard analysis. Review the activity analysis with each worker.
  - 6) The CM must be notified at least 48 hours in advance of beginning the initial phase. Prepare separate minutes of this phase by the QCP Manager and attach to the daily QCP report. Indicate the exact location of initial phase for future reference and comparison with follow-up phases.
  - 7) The initial phase should be repeated for each new crew to work onsite, or any time acceptable specified quality standards are not being met.
- c. Follow-up Phase, perform daily checks to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the feature of work. Record the checks in the QCP documentation. Conduct final follow-up checks and correct all deficiencies prior to the start of additional features of work which may be affected by the deficient work. Do not build upon nor conceal non-conforming work.
- d. Additional Preparatory and Initial Phases
  - 1) Conduct additional preparatory and initial phases on the same definable features of work if: the quality of on-going work is unacceptable; if there are changes in the applicable QCP staff, onsite production supervision or work crew; if work on a definable feature is resumed after a substantial period of inactivity; or if other problems develop.

## 1.9 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare certified written reports specified in other Sections. Include the following:
1. Date of issue.
  2. Project title and number.
  3. Name, address, and telephone number of testing agency.
  4. Dates and locations of samples and tests or inspections.
  5. Names of individuals making tests and inspections.
  6. Description of the Work and test and inspection method.
  7. Identification of product and Specification Section.
  8. Complete test or inspection data.
  9. Test and inspection results and an interpretation of test results.
  10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
  11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
  12. Name and signature of laboratory inspector.
  13. Recommendations on retesting and reinspecting.
- B. 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:
1. Name, address, and telephone number of technical representative making report.
  2. Statement on condition of substrates and their acceptability for installation of product.
  3. Statement that products at Project site comply with requirements.
  4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
  5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
  6. Statement whether conditions, products, and installation will affect warranty.
  7. Other required items indicated in individual Specification Sections.
- C. 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:

1. Name, address, and telephone number of factory-authorized service representative making report.
2. Statement that equipment complies with requirements.
3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Statement whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

#### 1.10 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in the State of Indiana and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.
- F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
  1. Requirements for specialists shall not supersede building codes and similar regulations governing the Work, nor interfere with local trade jurisdiction settlements and similar conventions.

- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
  2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
  3. Each testing and inspection agency shall be authorized by the authorities having jurisdiction to perform testing and inspection services in the jurisdiction where Project is located.
  4. The testing agency shall employ inspections and testing personnel who are certified by the following organizations for the material testing categories listed.
    - a. ACI (American Concrete Institute): Concrete and laboratory.
    - b. NICET (National Institute for Certification in Engineering Technology): Soils and concrete.
    - c. ASNT (American Society for Nondestructive Testing): Metal fabrications and architectural precast concrete connections.
    - d. AWS (American Welding Society): Metal fabrications and architectural precast concrete connections.
- H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
1. Contractor responsibilities include the following:
    - a. Provide test specimens representative of proposed products and construction.
    - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.

- c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
  - d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
  - e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
  - f. When testing is complete, remove test specimens, assemblies, and mockups, and laboratory mockups; do not reuse products on Project.
- 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect and Commissioning Authority, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- K. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
  - 1. Build mockups in location and of size indicated or, if not indicated, as directed by CM.
  - 2. Notify CM seven working days in advance of dates and times when mockups will be constructed.
  - 3. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at Project.
  - 4. Demonstrate the proposed range of aesthetic effects and workmanship.
  - 5. Obtain CM's approval of mockups before starting work, fabrication, or construction.
    - a. Allow seven working days for initial review and each re-review of each mockup.
  - 6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
  - 7. Demolish and remove mockups when directed unless otherwise indicated.
- L. Integrated Exterior Mockups: Construct integrated exterior mockup according to approved Shop Drawings. Coordinate installation of exterior envelope materials and products for which mockups are required in individual Specification Sections, along with supporting materials.

## 1.11 QUALITY CONTROL

- A. Construction Manager Responsibilities: Where quality-control services are indicated as CM's responsibility, CM will engage a qualified testing agency to perform these services.
1. CM will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
  2. Payment for these services will be made from testing and inspecting allowances, as authorized by Change Orders.
  3. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to CM are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
  2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
    - a. Contractor shall not employ same entity engaged by CM, unless agreed to in writing by CM.
  3. Notify testing agencies at least 48 hours in advance of time when Work that requires testing or inspecting will be performed.
  4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
  5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
  6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section 013300 "Submittal Procedures."
- D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's



technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

- E. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- F. Testing Agency Responsibilities: Cooperate with CM, Commissioning Authority,, and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
  - 1. Notify CM, Commissioning Authority, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
  - 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
  - 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
  - 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
  - 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
  - 6. Do not perform any duties of Contractor.
- G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
  - 1. Access to the Work.
  - 2. Incidental labor and facilities necessary to facilitate tests and inspections.
  - 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
  - 4. Facilities for storage and field curing of test samples.
  - 5. Delivery of samples to testing agencies.
  - 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
  - 7. Security and protection for samples and for testing and inspecting equipment at Project site.

- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
  - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of Contractor's quality-control plan. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses.
  - 1. Distribution: Distribute schedule to CM, Owner, Architect, Commissioning Authority, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

#### 1.12 PRE-INSTALLATION CONFERENCES

- A. Pre-installation Conferences: Conduct a pre-installation conference at Project site before each construction activity is a definable feature of Work.
  - 1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise CM and Owner's Commissioning Authority of scheduled meeting dates.
  - 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
    - a. Contract Documents.
    - b. Options.
    - c. Related RFI's.
    - d. Related Change Orders.
    - e. Purchases.
    - f. Deliveries.
    - g. Submittals.
    - h. LEED requirements.
    - i. Review of mockups.
    - j. Possible conflicts.
    - k. Compatibility requirements.
    - l. Time schedules.
    - m. Weather limitations.
    - n. Manufacturer's written instructions.
    - o. Warranty requirements.
    - p. Compatibility of materials.
    - q. Acceptability of substrates.

- r. Temporary facilities and controls.
  - s. Space and access limitations.
  - t. Regulations of authorities having jurisdiction.
  - u. Testing and inspecting requirements.
  - v. Installation procedures.
  - w. Coordination with other work.
  - x. Required performance results.
  - y. Protection of adjacent work.
  - z. Protection of construction and personnel.
3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

#### 1.13 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner will engage a qualified testing agency or special inspector to conduct special tests and inspections as the responsibility of Owner, as indicated in the summary of Special Inspection Service indicated on the structural Drawings and in the Division 01 Section – 014533 “Special Inspection Requirements” for the Project.
- B. Special Tests and Inspections: Conducted by a qualified testing agency or special inspector, as indicated in individual Specification Sections and in Statement of Special Inspections attached to this Section, and as follows:
  1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
  2. Notifying CM, Commissioning Authority, and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
  3. Submitting a certified written report of each test, inspection, and similar quality-control service to CM and Commissioning Authority,, with copy to Contractor and to authorities having jurisdiction.
  4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
  5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.

6. Retesting and reinspecting corrected work.

## **PART 2 - PRODUCTS (Not Used)**

## **PART 3 - EXECUTION**

### **3.1 TEST AND INSPECTION LOG**

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
  1. Date test or inspection was conducted.
  2. Description of the Work tested or inspected.
  3. Date test or inspection results were transmitted to Architect.
  4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for CM's and Commissioning Authority's reference during normal working hours.

### **3.2 REPAIR AND PROTECTION**

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
  1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Division 01 Section 017300 "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

## SECTION 014200 - REFERENCES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Provide the work of this Section in accordance with requirements of the Contract Documents.

#### 1.2 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Reviewed": When used to convey Construction Manager's and/or Architect's action on Contractor's submittals, applications, and requests, "reviewed" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Construction Manager. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
  - 1. "Installer": Entity engaged by the Contractor, either as an employee or subcontractor, to perform an "Install" construction activity.
    - a. Installer shall be experienced in the operations they are engaged to perform.

2. "Experienced Installer": Entity that has successfully completed a minimum of five previous projects similar in size and scope to this Project; is familiar with the special requirements indicated; and has complied with requirements of authorities having jurisdiction.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.
- J. Trades: Using terms such as 'carpentry' is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as carpenter. It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.

### 1.3 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
  1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

### 1.4 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Thomson Gale's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S."
- B. Materials, equipment, and operations specified by reference to published standards and specifications of a technical society, trade association, or other agency standard, shall comply with the requirements of the current edition of the listed document that is in effect on the issue date of the Specifications or

Addendum page making reference thereto, unless otherwise specified. Make available at site, copies of referenced documents as Construction Manager and/or Architect may request.

1. No provision of a referenced standard, specification, manual, or code shall be effective to change the duties and responsibilities of the Owner, the Construction Manager, the Contractor, the Architect and their consultants, their agents and employees from those duties and responsibilities set forth in the Contract Documents.

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

IAPMO	International Association of Plumbing and Mechanical Officials <a href="http://www.iapmo.org">www.iapmo.org</a>	(909) 472-4100
ICC	International Code Council <a href="http://www.iccsafe.org">www.iccsafe.org</a>	(888) 422-7233
ICC-ES	ICC Evaluation Service, Inc. <a href="http://www.icc-es.org">www.icc-es.org</a>	(800) 423-6587 (562) 699-0543

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

CPSC	Consumer Product Safety Commission <a href="http://www.cpsc.gov">www.cpsc.gov</a>	(800) 638-2772 (301) 504-7923
EPA	Environmental Protection Agency <a href="http://www.epa.gov">www.epa.gov</a>	(202) 272-0167
FAA	Federal Aviation Administration <a href="http://www.faa.gov">www.faa.gov</a>	(866) 835-5322
NIST	National Institute of Standards and Technology <a href="http://www.nist.gov">www.nist.gov</a>	(301) 975-6478
OSHA	Occupational Safety & Health Administration	(800) 321-6742

	www.osha.gov	(202) 693-1999
PHS	Office of Public Health and Science <a href="http://www.hhs.gov/ophs/">http://www.hhs.gov/ophs/</a>	(202) 690-7694
USPS	Postal Service <a href="http://www.usps.com">www.usps.com</a>	(202) 268-2000
E.	Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.	
ADAAG	Americans with Disabilities Act (ADA) Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities Available from U.S. Access Board <a href="http://www.access-board.gov">www.access-board.gov</a>	(800) 872-2253 (202) 272-0080
UFAS	Uniform Federal Accessibility Standards Available from Access Board <a href="http://www.access-board.gov">www.access-board.gov</a>	(800) 872-2253 (202) 272-0080

## **PART 2 - PRODUCTS (Not Used)**

## **PART 3 - EXECUTION (Not Used)**

END OF SECTION 014200



## **SECTION 014529 – TESTING LABORATORY SERVICES**

### **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 requirements for:
  - 1. Contractor provided quality assurance testing laboratory services (Concrete mix designs, required material certification testing, material certification tests, and similar specified testing). Testing, inspection, and certifications paid for by the Contractor shall be performed by agencies approved by the Construction Manager.
  - 2. Construction Manager provided quality control testing laboratory services.
  - 3. Testing laboratory qualifications, procedures, limits of authority, and testing laboratory submittal requirements.

#### **1.3 RELATED WORK**

- A. Related Work of Other Sections:
  - 1. Section 014533 "Special Inspection Requirements" for Life Safety Code required special inspections in accordance with "Statement of Special Inspections" and "Schedule of Special Inspections" provisions.
  - 2. Section 033000 "Cast-In-Place Concrete."
  - 3. Section 042000 "Unit Masonry."
  - 4. Section 051200 "Structural Steel Framing."
  - 5. Section 053100 "Steel Decking."
  - 6. Section 054000 "Cold-Formed Metal Framing."
  - 7. Section 055000 "Metal Fabrications."
  - 8. Section 078100 "Applied Fireproofing."
  - 9. Section 312200 "Earthwork."
  - 10. Section 316100 "Rammed Aggregate Pier."
  - 11. Section 316200 "Steel Helical Piles."
  - 12. Section 321216 "Asphalt Paving."
  - 13. Section 321313 "Concrete Paving."

#### 1.4 GENERAL REQUIREMENTS FOR OWNERS QUALITY CONTROL TESTING

- A. The CM will employ a testing laboratory and/or geotechnical engineering service to perform quality control tests and to transmit copies of test reports to Contractor. Sampling and testing that the CM may require is specified in this Section and in the various technical Sections requiring quality control testing. Cooperate with CM's testing laboratory personnel, provide access to the Work, to manufacturer and fabricator's operations, furnish incidental labor and facilities, and samples for test and inspections, as specified.
- B. Employment of testing laboratory to perform quality control tests is for benefit of CM in confirming that performance and quality of the Work is in conformance with the Contract Documents.
- C. Employment of a testing laboratory by CM in no way relieves Contractor's obligation to perform work in accordance with Contract Documents.
- D. CM's testing laboratory shall not be the same as Contractor's testing laboratory used for design and certification testing unless otherwise acceptable to the CM and Owner.
- E. Where the terms "Inspector" and "Laboratory" are used, they mean and refer to an officially designated and accredited inspector of the testing laboratory engaged by the CM.
- F. The inspecting agency shall make all inspections and perform all tests in accordance with the rules and regulations of the building code, local authorities, the Specifications of the ASTM and these Contract Documents.
- G. Commercial Testing Laboratories: In general, a commercial testing laboratory selected and paid for by the CM will perform all quality control testing. Retesting will also be paid by the CM, but will be re-invoiced at cost to the Contractor. The number of copies of test reports will be determined for each individual project but in general will include:
  - 1. Two copies for the Contractor;
  - 2. One copy for CM.
  - 3. One copy for the Architect and Structural Engineer.
  - 4. One copy for the Owner's Representative.
- H. CM's quality control testing and sampling may include the following and other services and testing to ensure Contract performance.
  - 1. Compacted Fill and Backfill (Section 31 Section 312200 "Earthwork): Perform field density tests.
  - 2. Footing Subgrades (Section 31 Sections 312200, 316100, 316200- Earthwork Rammed Aggregate Piers, Steel helical Piles): Perform tests and visual comparisons of footing subgrades to verify design-bearing capacities.

## 1.5 GENERAL REQUIREMENTS FOR CONTRACTOR'S LABORATORY SERVICES

- A. Contractor's Design and Certification Testing: Provides services of an independent testing laboratory or facility acceptable to the Construction Manager to perform design and certification testing services.
  - 1. Submit written description of testing laboratory giving qualifications of personnel, laboratory facilities and equipment, and other information as may be requested by CM.
  - 2. Contractor's testing laboratory shall not be the same as CM's testing laboratory used for quality control testing unless otherwise acceptable to the CM.
- B. Contractor's design testing and certification testing includes:
  - 1. Section 312200 "Earthwork": Identify suitable soil material at borrow material location, sampling soil material, and testing of soil material samples.
  - 2. Performing certified welding procedure qualification and requalification testing specified in Section 051200 "Structural Steel Framing," Section 053100 "Steel Decking," Section 054000 - Cold Formed Metal Framing," and Section 055000 "Metal Fabrications."
  - 3. Testing of above materials when mill certificates are unavailable.
  - 4. Testing when source of material is changed after initial tests have been performed.
  - 5. Samples of concrete aggregates and delivery to the Testing Laboratory providing services for the Contractor.
  - 6. Certification of reinforcing steel.
  - 7. Certification of Portland cement, lime, fly ash.
  - 8. Other testing required by other Sections of the Specifications.

## 1.6 QUALITY ASSURANCE

- A. Laboratory Qualifications and Procedures:
  - 1. Meet "Recommended Requirements for Independent Laboratory Qualification," latest edition published by American Council of Independent Laboratories. Testing agencies shall meet the requirements of ASTM E 329, "Recommended Practice for Inspection and Testing Agencies for Concrete, Steel and Bituminous Materials as Used in Construction" and ASTM E 543, "Determining the Qualification of Nondestructive Testing Agencies."
  - 2. Testing agencies shall each be insured against errors and omissions by a professional liability insurance policy having a limit of liability not less than \$500,000.00.
  - 3. The inspection and testing services of the testing agency shall be under the direction of a Registered Engineer licensed in the State of Indiana, charged with engineering managerial responsibility, and having at least five years engineering experience in inspection and testing of construction materials.
  - 4. Inspecting personnel monitoring concrete work shall be ACI certified inspectors.

5. Submit copy of report of inspection of facilities made by Materials Reference Laboratory of National Bureau of Standards during most recent tour of inspection. Include memorandum of remedies of deficiencies reported by this inspection.
  6. Testing Equipment: Calibrated at reasonable intervals by devices of accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.
  7. Tests and inspections shall be conducted in accordance with specified requirements and if not specified, in accordance with applicable standards of the American Society for Testing and Materials and other recognized authorities as approved.
  8. Primary inspectors performing structural steel inspection shall be currently certified AWS Certified Welding Inspectors (CWI), in accordance with the provisions of AWS QCI, "Standard and Guide for Qualification and Certification of Welding Inspectors." The inspector may be supported by assistant inspectors who may perform specific inspection functions under the supervision of the inspector. Assistant inspectors shall be currently certified ASW Certified Associate Welding Inspectors (CAWI). The work of assistant inspectors shall be regularly monitored by the inspector, generally on a daily basis.
- B. Laboratory Duties: Cooperate with CM and Contractor. Upon notice, provide qualified personnel to perform required tests and inspections. In performing tests and inspections, Laboratory shall:
1. Comply with specified standards. Comply with building and each material code requirements for "Special Inspection" whether or not such inspections are specified herein.
  2. Ascertain compliance of materials with requirements of Contract Documents. If the material furnished and/or work performed fails to meet requirements of contract documents, laboratory inspector shall promptly notify both the Contractor and the Architect/Engineer of such failure.
  3. Promptly notify CM and Contractor of observed irregularities or deficiencies in the Work.
  4. A representative of the CM's testing laboratory, who has reviewed and is familiar with the project and specifications, shall participate in all preconstruction conferences. It shall coordinate material testing and inspection requirements with the Contractor and its subcontractors consistent with the planned construction schedule. The laboratory representative shall attend, throughout the course of the project, such conferences as may be required or requested to address quality control issues.
  5. Laboratory personnel shall inspect and/or test materials, assemblies, specimens, and work performed, including design mixes, methods, and techniques and report to the CM the progress thereof.
- C. Limits of Testing Laboratory Authority: Laboratory is not authorized to:
1. Release, revoke, alter, relax, or enlarge requirements of Contract Documents.
  2. Approve or reject any portion of the Work.

3. Perform any duties of the Contractor and subcontractors.
4. Laboratory technicians do not act as foremen, or perform other duties for Contractor. Work will be checked as it progresses, but failure to detect any defective work or materials shall not, in any way, prevent later rejection when such defect is discovered.
5. The laboratory inspector is not authorized to revoke, alter, relax, enlarge, or release any requirement of the Contract Documents or to approve or accept any portion of the work, except where such approval is specifically called for in the Specifications.

D. Contractor's Responsibilities:

1. Cooperate with laboratory personnel; provide access to Work; provide access to manufacturer and fabricator's operations wherever work is in preparation or progress.
2. Secure and deliver to the laboratory without cost to CM adequate quantities of representative samples of materials proposed to be used and which require testing.
3. Furnish Incidental Labor and Facilities:
  - a. To provide access to Work to be tested.
  - b. To obtain and handle samples at the Project Site or at the source of the product to be tested.
  - c. To facilitate inspections and tests. Furnish such labor as is required to assist laboratory personnel in obtaining and handling samples at the site.
  - d. For safe storage and curing of concrete test cylinders at project site and other test samples as required for field curing by ASTM C31.
4. Costs of tests, samples, and mock-ups of substitute material, where the Contractor requests the substitution and the tests are necessary in the opinion of the CM to establish equality with specified items, shall be borne by the Contractor.
5. Costs of tests, samples, and mock-ups performed solely for the benefit or convenience of the Contractor.
6. Notify laboratory sufficiently in advance of construction operations to allow laboratory to complete required checks or tests and to make assignment of personnel and scheduling of tests.
7. CM's testing laboratory will conduct additional tests at Contractor's expense when initial quality control testing indicates work is defective or does not conform to requirements. Materials and workmanship not meeting the required standards or performance obligations are to be removed and replaced. Replacement and subsequent testing shall be at the expense of the Contractor.
8. Furnish concrete mix designs, in accordance with ACI 301, Section 3.9, made by an independent testing laboratory or qualified concrete supplier. Where mix designs by an independent testing laboratory are required, the laboratory shall be selected by the Contractor, approved by the CM, and paid by the Contractor.

9. Obtain required inspections or approvals of the building official when required. All inspection requests and notifications required by the building code, are the responsibility of the Contractor.
10. Provide current welder certifications for each welder to be employed.
11. Furnish fabrication/erection inspection and testing of all welds in accordance with AWS D1.1, Chapter 6.
12. Prequalification of all welding procedures to be used in executing the work.

## 1.7 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
  1. Date issued.
  2. Project title and number.
  3. Testing laboratory name, address, and telephone number.
  4. Dates and locations of samples and tests or inspections.
  5. Names of individuals making tests and inspections.
  6. Description of the Work and test and inspection method.
  7. Identification of product and Specification Section.
  8. Complete test or inspection data.
  9. Test and inspection results and an interpretation of test results.
  10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
  11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
  12. Name and signature of laboratory inspector.
  13. Recommendations on retesting and reinspecting.
- B. State in report all details of each inspection and test. Indicate compliance or noncompliance with requirements of the Contract Documents. Also state in report any and all unsatisfactory conditions.
- C. In addition to furnishing a written report, notify the CM and the Contractor verbally of any uncorrected conditions or failures to comply with the requirements of the Contract Documents.
- D. At completion of each trade or branch of work requiring inspecting and testing, submit a final certificate attesting to satisfactory completion of work and full compliance with requirements of Contract Documents.
- E. Upon completion of building, testing laboratory shall furnish, to CM, statement (certified by Notary Public) that all required tests and inspections were made in accordance with requirements of Contract Documents.

## 1.8 REFERENCED STANDARDS

- A. The latest adopted edition of all standards references in this section shall apply as of the date of the Contract Document, unless noted otherwise. In case of conflict between these Contract Documents and a referenced standard, the Contract Documents shall govern. In case of conflict between these Contract Documents and the Building Code, the more stringent shall govern.

## **PART 2 - PRODUCTS**

(NOT USED)

## **PART 3 - EXECUTION**

### **3.1 TESTING LABORATORY PROCEDURES, GENERAL**

- A. Provide inspection, sampling, testing, and reporting services as specified in technical Sections for the Project. However, the quantities of testing their frequency duration or technical requirements shall not be less than the following.
  - 1. Contractor shall advise the CM of varying demands for testing and sampling if conflicts in the requirements are discovered.

### **3.2 EARTHWORK OPERATIONS**

- A. Visual Inspection and Classification of Footing Subgrade Soils by Geotechnical Engineer: Perform at least 1 test to verify required design bearing capacity; subsequent verification and approval of each footing subgrade may be based on a visual comparison of each subgrade with related tested strata when acceptable to the Geotechnical Engineer.
- B. Field Density Tests: Perform field density tests of subgrade below building and paving slabs, and backfill and fill layers in accordance with ASTM D 1556, ASTM D 2167, or ASTM D 2922
  - 1. Perform 1 test of each 2,000 sq. ft. building and paving subgrade (minimum of 3 tests)
  - 2. Perform 1 test of each 2,000 sq. ft. of compacted backfill and fill layer (minimum of 3 tests), and 1 test each of lower, middle and upper trench compacted backfill lifts in each 100 lineal feet of trench (minimum of 6 tests).
  - 3. Confirm Contractor's Atterberg limits tests for backfill and fill material in accordance with ASTM D 4318.

### **3.3 ASPHALT PAVING COMPACTION OPERATIONS**

- A. Perform compaction tests on base and surface courses in accordance with specified standards specified in Section 32 Section 321216 - Asphalt Paving.

1. Perform 1 test for each 500 sq. yd. of each course (minimum of 3 tests each course).
2. Perform 1 stability test for each 500 sq. yd. of surface course (minimum of 3 tests).

### 3.4 REINFORCING STEEL MECHANICAL SPLICES

- A. Visually inspect and report on the completed condition of each mechanical splice of reinforcing steel.
- B. Each mechanical splice shall be visually inspected to ensure compliance with the I.C.B.O. Reports and the manufacturer's published criteria for acceptable completed splices.
- C. Special emphasis shall be placed on inspection of the end preparation of each bar to be spliced, as required by the I.C.B.O. Report.
- D. Submit copies of manufacturer's published criteria for acceptable completed splices prior to observing mechanical splices.
- E. Reports on each mechanical splice shall indicate location of the splice, size of bars spliced, and acceptability or rejection of splice. Reasons for rejection shall be shown on each report.

### 3.5 POURED-IN-PLACE CONCRETE REINFORCING STEEL AND EMBEDDED METAL ASSEMBLIES

- A. Inspect all concrete reinforcing steel prior to placing of concrete for compliance with Contract Documents and approved shop drawings. All instances of noncompliance with Contract Documents and approved shop drawings shall be immediately brought to the attention of the Contractor for correction and then, if uncorrected, reported to the CM.
- B. Observe and Report on the Following:
  1. Number and size of bars.
  2. Bending and lengths of bars.
  3. Splicing.
  4. Clearance to forms including chair heights.
  5. Clearance between bars or spacing.
  6. Rust, form oil, and other contamination.
  7. Grade of steel.
  8. Securing, tying, and chairing of bars.
  9. Excessive congestion or reinforcing steel.
  10. Installation of anchor rods and placement of concrete around such rods.
  11. Fabrication of embedded metal assemblies, including visual inspection of all welds.



12. Visually inspect studs and deformed bar anchors on embedded assemblies for compliance with Contract Documents. Check number, spacing and weld quality. If after welding visual inspection reveals that a sound weld or a full 360 degree fillet has not been obtained for a particular stud or bar, strike such stud or bar with a hammer and bend 15 degrees off perpendicular and then bend back into position. Replace anchors failing this test.
- C. Arrange for Independent Testing Laboratory to provide an experienced technician to inspect reinforcing steel.

### 3.6 POURED-IN-PLACE CONCRETE INSPECTION AND TESTING

- A. Receive and evaluate all proposed concrete mix designs submitted by the Contractor. If the mix designs comply with the Drawings and Specifications, the laboratory shall submit a letter to the Architect/Engineer certifying compliance. Mix designs not complying with the Drawings and Specifications shall be returned by the laboratory as unacceptable.
- B. Sample fresh concrete in accordance with ASTM C172, except modify for slump requirements of ASTM C 94.
1. Perform 1 slump test (ASTM C 243 and ASTM C 172) for each load of concrete at point of discharge and 1 test for each set of compressive strength cylinders. Make additional slump tests whenever the consistency of concrete appears to vary. Do not permit placement of concrete having a measured slump outside the limits given on the Drawings, except when approved by the CM. Slump tests corresponding to samples from which strength tests are made shall be reported with the strength test results. Other slump tests need not be reported.
  2. Perform 1 air content test (ASTM C 231) for each set of compressive strength cylinders.
  3. Determine temperature of concrete sample for each strength test.
- C. Mold and cure cylinders from each day's pour of 50 cu. yd., or fraction thereof, of building concrete and for each 150 cu. yds. of paving concrete of 4,000 psi and less compressive strength concrete required in accordance with ASTM C 31. Supervise the curing and protection provided (by others) for test specimens in the field, and the transportation from the field to the laboratory. Store test cylinders in the field 24 hours and then be carefully transported to the laboratory and cure in accordance with ASTM C 31. Test specimens in accordance with ASTM C 39 as follows.
1. Test 1 cylinder at 7 days for information;
  2. Test 2 cylinders at 28 days; and
  3. Retain 1 cylinder for testing at 56 days, if directed by CM.
  4. Report test results within 24 hours of test, to CM and Contractor. Indicate the slump test result taken at time of sampling, air content, air temperature, and concrete strength class used and the placing location at Project Site in each test report.

- D. The testing agency shall furnish and maintain a competent inspector at the mixing plant at the start of each day's mixing. The inspector shall examine concrete materials for compliance with Specifications and approved mix design, weighing and measuring devices, proportioning and mixing of materials, the water and cement content of each batch, the general operation of the plant and the transportation of concrete to the jobsite. The inspector shall verify that the amount of free surface moisture contained in the fine and coarse aggregate has been properly accounted for in the concrete mixing to achieve the required consistency and water cement ratio.
- E. The testing laboratory shall monitor the addition of water to the concrete at the jobsite and the length of time the concrete is allowed to remain in the truck before placement. The inspector shall compare the mixture with the criteria on the approved mix design and report any significant deviation to the CM, Contractor, and concrete supplier. Do not permit the addition of water which will exceed the maximum water/cement ratio for the mix as given on the approved mix design.
- F. Observe the placing of all structural concrete and concrete paving, except concrete toppings, walks, housekeeping pads, and similar non-structural concrete work. Observe and report on placing method, consolidation, cold joints, length of drop, and displacement of reinforcement. Report deficiencies to the Contractor immediately for corrective action. Inspections may be reduced to a periodic basis when the laboratory has deemed all procedures satisfactory.
- G. The testing laboratory shall certify each delivery ticket indicating class of concrete delivered (or poured), amount of water added and the time at which the cement and aggregate was dispensed into the truck, and the time at which the concrete was discharged from the truck.
- H. Evaluation and Acceptance:
  - 1. If the measured slump or air content of air entrained concrete falls outside specified limits, make a check test immediately on another portion of the same sample. In the event of a second failure, consider concrete to have failed to meet the requirements of the specifications, and do not use such concrete in the structure.
  - 2. The strength level of the concrete will be considered satisfactory if the averages of all sets of three consecutive strength test results are equal to, or exceed specified strength and no individual test result (average of two cylinders) is below specified strength by more than 500 psi.
  - 3. Completed concrete work will be accepted when the requirements of "Specifications for Structural Concrete for Buildings," ACI 301, Chapter 18, have been met.
- I. Concrete Test Reports:
  - 1. Reports shall be made and distributed immediately after the respective tests or inspections are made.

2. Where reports indicate deviations from the Contract Documents, they shall also include a determination of the probable cause of the deviation and, where applicable, a recommendation for corrective action.
  3. Whenever the testing laboratory recognizes a trend of decreasing quality in the concrete due to changing seasons, conditions of curing, or other cause; this shall be brought to the attention of the Architect/Engineer, along with a recommendation for corrective action to be taken before the materials fall below the requirements of these Specifications.
- J. Comply with ACI 311, "Guide for Concrete Inspection" and "ACI Manual of Concrete Inspection" (SP-2).
- K. Inspect the application of curing compound and monitor all curing conditions to assure compliance with specification requirements. Report curing deficiencies to the Contractor immediately and submit a written report to the CM.

### 3.7 NON-SHRINK GROUT FOR BASE PLATES

- A. Compressive Strength Tests (by the Testing Laboratory providing services for the CM): Compressive strength of grout shall be determined by testing grout cubes according to the requirements of ASTM C109 - Modified. Test one set of three cubes at 1 day, and one set of three cubes at 28 days.
- B. Frequency of Testing: One set of cubes (6 cubes) shall be made for every ten base plates and bearing plates or fraction thereof but not less than one set for each day's operation. One set of cubes shall be made for each day's operation of grouting wall panels.

### 3.8 UNIT MASONRY

- A. Prism Tests:
1. Prism Preparation: The Masonry Subcontractor shall make all prisms for the tests in the presence of the Testing Laboratory for each class of masonry (hollow masonry, grouted masonry, or composite masonry) on the project using an assembly of actual masonry units, mortar, and grout (if specified) as planned in the work.
  2. Compressive Strength Test Method: Tests shall be run according to the requirements of ASTM C1314. Each strength test shall be defined as the average of three test prisms from the same class of masonry.
  3. Frequency of Testing:
    - a. The Testing Laboratory providing services for the Contractor shall, in conjunction with the Contractor and the Masonry Supplier, verify that the materials proposed for use in the masonry construction comply with the contract documents. This will include verifying the strength ( $f'_m$ ) of the

masonry assembly using prism tests prior to construction according to the specifications.

- b. The Testing Laboratory providing services for the CM shall conduct prism tests during construction at the frequency specified below.
  - 1) Interior Non-Load Bearing Walls: One strength test shall be run for each 5,000 square feet of wall or fraction thereof.
  - 2) Exterior Walls and All Load Bearing Walls: One strength test shall be run for each 5,000 square feet of wall area but not less than one strength test for each day's operation for each class of wall. An additional test should be run whenever there is a change in mortar or grout proportions.

B. Mortar:

- 1. The Testing Laboratory providing services for the Contractor, acting in conjunction with the Contractor and his Masonry Subcontractor, shall provide testing services as required to assist the Contractor in submitting mix designs in accordance with the Specifications for each class of mortar indicated on the structural drawings. Refer to the Unit Masonry Specifications for mix design requirements.
- 2. The Testing Laboratory providing services for the CM shall review the submitted mix designs for conformance to the specifications and for suitability for use in the project.
- 3. Field Inspection and Testing: The Testing Laboratory providing services for the CM shall verify that the proportions of the mortar comply with the submitted mix design and the specifications. This verification shall be done at the beginning of each day of masonry construction from the beginning and continuously during masonry construction.

C. Grout:

- 1. The Testing Laboratory providing services for the Contractor, acting in conjunction with the Contractor and his Masonry Subcontractor, shall provide testing services as required to assist the Contractor in submitting mix designs in accordance with the Specifications for each class of grout indicated on the structural drawings. Refer to the Unit Masonry Specifications for mix design requirements.
- 2. The Testing Laboratory providing services for the CM shall review the submitted mix designs for conformance to the specifications and for suitability for use in the project.
- 3. Field Inspection and Testing: The Testing Laboratory providing services for the CM shall verify that the proportions of the grout comply with the submitted mix design and the specifications. This verification shall be done for each batch of grout from the beginning and continuously during masonry construction.

D. Hollow Concrete Masonry Units:

1. The Testing Laboratory providing services for the Contractor, acting in conjunction with the Contractor and his Masonry Subcontractor, shall provide testing services as required to assist the Contractor in verifying the compressive strength of hollow concrete masonry units prior to construction in accordance with the Specifications for each size of unit indicated on the drawings. Refer to the Unit Masonry Specifications for design requirements.
  2. Compressive Strength Test Method: Tests shall be run according to the requirements of ASTM C140.
  3. Field Testing: The Testing Laboratory providing services for the CM shall perform a compressive strength test on hollow concrete masonry units whenever masonry of a different production lot is used on the project. A strength test shall be defined as the average strength of three tested units.
- E. Experience Requirement: Field inspection of masonry construction by the Testing Laboratory providing services for the CM as herein described shall be performed by qualified technicians with a minimum of ten years' experience in masonry testing and inspection.
- F. Field Inspection Requirements: The duties and responsibilities of the Testing Laboratory Inspector in the field shall be as follows:
1. All Masonry Work
    - a. Review and become familiar with project drawings and specifications.
    - b. Review methods of storing and handling of masonry materials and accessories for conformance to project specifications.
    - c. Review the foundation to verify proper foundation construction tolerances, location, size and spacing of reinforcing dowels, and that foundation surfaces are properly prepared to accept the masonry.
    - d. Review all masonry materials used in the field for conformance to project specifications. This shall include masonry units, mortar, grout, portland cement, masonry cement, sand, lime, horizontal joint reinforcement, vertical reinforcement, ties, masonry anchoring devices to the structure, flashing, and control and expansion joint strips.
  2. Continuous Inspection: For Masonry work specified on the drawings or in the local building code as requiring continuous inspection, the field inspector shall continuously inspect the construction procedures of the following items for compliance with specifications:
    - a. Mortar proportions and batching.
    - b. Placing of Masonry units and construction of mortar joints.
    - c. Placing of horizontal joint reinforcement, lintel and bond-beam reinforcement, and vertical reinforcement.
    - d. Installation of flashing, weep holes, anchors, ties, construction joints, control joints, and wall vents.
    - e. Grout space.
    - f. Grout proportions and batching.

- g. Grouting operations.
- h. Gather specimens and perform tests on prisms and masonry units as specified above.

### 3.9 STRUCTURAL STEEL FRAMING

- A. Inspect all structural steel during fabrication and during and after erection for conformance with Contract Documents and shop drawings. Any cases of insufficient bracing or guying, or other unsafe conditions shall be immediately called to attention of the Contractor and reported to CM.
- B. Shop Inspection:
  - 1. Examination of all steel for straightness and alignment.
  - 2. Examination of all fabricated pieces and checking of it with erection plans and detail drawings.
  - 3. Visual examination of welding.
  - 4. Ultrasonic testing of all full penetration welds.
  - 5. Examination of galvanizing.
  - 6. Examination of installation of shop welded shear studs.
  - 7. Examination of shop painting.
- C. Field Inspection:
  - 1. Proper erection of all pieces.
  - 2. Proper installation of all bolts.
  - 3. Plumbness of structure and proper bracing.
  - 4. Proper field painting.
  - 5. Visual examination of all field welding.
  - 6. Inspect all shop-fabricated members, upon their arrival at the jobsite, for defects incurred during transit and handling.
- D. Qualifications of Welders: Fabricator and erector shall provide the testing laboratory with names of welders to be employed to work, together with certification that each of these welders has passed qualification tests within the last year using procedures covered in the American Welding Society "Structural Welding Code - Steel," D1.1, latest edition. Verify all welder qualifications.
- E. Inspections of shop and field welding shall be "verification inspection," in accordance with Section 6 of the AWS Structural Welding Code and as follows:
- F. Visually inspect the welding of all shop fabricated members and note the location of all cover plates, connectors, bearing stiffeners, splices, and fillet welds for proper return around ends and check for seams, folds and delaminations.
- G. Warped or out-of-plumb connectors shall be reported prior to any further welding.
- H. Ultrasonically test all penetration welds in accordance with ASTM E 164.

- I. Surfaces to be welded and all filler metal shall be carefully inspected. Surface preparations, fit-up and cleanliness of surface shall be noted. Electrodes shall be checked for size, type, and condition.
- J. Welds shall be sound, clean metal, free of slag inclusions and porosity. Filler metal shall be completely fused with base metal and shall completely penetrate the joint. Root passes shall be checked for penetration from the backside of joint. Welds showing inclusions, porosity, lack of fusion, incomplete penetration or uneven contour (sagging or overlaps) shall be ordered gouged out and rewelded. Welds showing any undercut shall have a small stringer bead ordered to be run in along the toe of undercut using a smaller diameter electrode than that which made the original weld. No craters shall be left in welds. Any welding defects, including porosity, fusion, and undercuts in excess of that allowed, shall be cause for rejection. Where craters occur, the inspector shall order them to be filled out with weld metal.
- K. The inspector shall check that all welds have been marked with the welder's symbol. The inspector shall mark the welds requiring repairs and shall make a reinspection. The inspector shall maintain a written record of all welds. Work completed and inspected shall receive an identification mark by the inspector. Unacceptable material and work shall be identified by word "reject" or "repair" marked directly on the material.
- L. The testing agency shall advise the CM of any shop and/or field conditions which, in its opinion, may require further tests and examination by means other than those specified. Such further tests and examinations shall be performed as authorized by the CM.
  - 1. The CM reserves the right to use ultrasonic or radiographic inspection to verify the adequacy of all welds. Testing procedures and acceptance criteria shall be as specified in AWS D1.1.
- M. Verify welding electrodes to be used.
- N. Inspect welding equipment for capacity, maintenance, and working condition.
- O. Unless otherwise specified, test a minimum of 10% of connections with fillet welds. Increase the testing rate for welders having a high rejection rate as required to ensure acceptable welds. Visual inspection is required for all welds. The costs of repairing all defective welds and the costs of retesting by the Testing Laboratory providing services for the CM shall be borne by the Contractor.
  - 1. Inspection of bolted construction shall be in accordance with AISC Specification for Structural Steel Buildings and as follows:
  - 2. All bolts shall be visually inspected to ensure that the plies have been brought into snug contact.

### 3.10 EXPANSION BOLT INSTALLATION

- A. Inspect the drilling of each hole and installation of each structural expansion bolt for compliance with the Contract Documents and shop drawings.
- B. Verify the installation torque for each expansion bolt for compliance with manufacturer's installation instructions.

### 3.11 STEEL JOIST FRAMING

- A. Scope: The Testing Laboratory providing services for the CM shall perform inspection of steel joists in the fabricating plant and in the field as herein described.
- B. Obtaining Manufacturer's Product Certification: The Testing Laboratory providing services for the Contractor shall obtain product certification for open web steel joists and joist girders as required by the Specifications.
- C. Inspection in the Fabrication Plant: Duties of Plant Inspector shall be as follows:
  - 1. Review Contract Drawings and Specifications for joist requirements.
  - 2. Verify welder certifications.
  - 3. Verify all welding operations with SJI requirements.
  - 4. Verify fabrication with Steel Joist Institute (SJI) requirements.
- D. Confirm proper welding of splices and location of splices in joist chord members as specified on the drawings.
- E. Verify camber of joists for dead load.
- F. Check size and length of joists.
- G. Review painting operations for conformance with project specifications.
- H. Inspection in the Field: The duties of the Field Inspector shall be as follows:
  - 1. Inspect joists for damage during shipment.
  - 2. Verify proper bearing of joist supports.
  - 3. Verify camber requirements of joists arriving in the field.
  - 4. Confirm bridging size and location.
  - 5. Confirm attachment of joists to supports (welding or bolting).
  - 6. Confirm bolting of joists to supports at column lines as required by OSHA requirements.
  - 7. Verify that no joists have been damaged during erection.

### 3.12 METAL DECKING

- A. Metal Floor Decking: Field inspection shall consist of the following:



1. Checking types, gauges, and finishes for conformance with Contract Documents and Shops Drawings.
2. Examination for proper erection of all metal deck, fastenings, reinforcing of holes, deck reinforcing, miscellaneous deck supports, hanger tabs, shear studs, deck closures, painting or other coating.
3. Certification of welders.
4. Field welded shear studs used to fasten metal floor decking to supporting steel shall be inspected and tested as described in the paragraph addressing structural steel.

B. Metal Roof Decking: Field inspection shall consist of the following:

1. Checking types, gauges, and finishes for conformance with Contract Documents and Shop Drawings.
2. Examination for proper erection of all metal deck, including fastenings at supports and side laps, reinforcing of holes, and miscellaneous deck supports.
3. Certification of welders.
4. Visual inspection of at least 25 percent of all welds.

### 3.13 APPLIED FIREPROOFING

A. Testing and inspecting of completed applications of sprayed fire-resistive material shall take place in successive stages, in areas of extent and using methods as follows. Do not proceed with application of sprayed fire-resistive material for the next area until test results for previously completed applications of sprayed fire-resistive material show compliance with requirements. Tested values must equal or exceed values indicated and required for approved fire-resistance design.

1. Thickness for Floor, Roof, and Wall Assemblies: For each 1000-sq. ft. area, or partial area, on each floor, from the average of 4 measurements from a 144-sq. in. sample area, with sample width of not less than 6 inches per ASTM E 605.
2. Thickness for Structural Frame Members: From a sample of 25 percent of structural members per floor, taking 9 measurements at a single cross section for structural frame beams or girders, 7 measurements of a single cross section for joists and trusses, and 12 measurements of a single cross section for columns per ASTM E 605.
3. Density for Floors, Roofs, Walls, and Structural Frame Members: At frequency and from sample size indicated for determining thickness of each type of construction and structural framing member, per ASTM E 605 or AWC Technical Manual 12-A, Section 5.4.5, "Displacement Method."
4. Bond Strength for Floors, Roofs, Walls, and Structural Framing Members: For each 10,000-sq. ft. area, or partial area, on each floor, cohesion and adhesion from one sample of size indicated for determining thickness of each type of construction and structural framing member, per ASTM E 736.
5. If testing finds applications of sprayed fire-resistive material are not in compliance with requirements, testing and inspecting agency will perform additional random testing to determine extent of noncompliance.

END OF SECTION 014529

## **SECTION 014533 - SPECIAL INSPECTION REQUIREMENTS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Provide the Work of this Section in accordance with requirements of the Contract Documents.
- B. This Section includes but is not limited to:
  - 1. Code-required special inspections in accordance with the Statement of Special Inspections and Schedule of Special Inspections.
  - 2. Testing services incidental to special inspections.
  - 3. Submittals.
  - 4. Manufacturers' field services.
  - 5. Fabricators' field services.
- C. Related Requirements
  - 1. Division 01 Section 013300 "Submittal Requirements", for submittal administrative requirements.
  - 2. Division 01 Section 014000 "Quality Requirements".
  - 3. Division 01 Section 016000 "Product Requirements" for material and product quality requirements.

#### **1.2 DEFINITIONS**

- A. International Building Code (IBC): Chapter 17 - Structural Tests and Special Inspections.
- B. Authority Having Jurisdiction (AHJ): Agency or individual officially empowered to enforce the building, fire and life safety code requirements of the permitting jurisdiction in which the Project is located.
- C. International Accreditation Service, Inc. (IAS).
- D. National Institute of Standards and Technology (NIST).
- E. Special Inspector: Independent inspection agent complying with ASTM E329 "Standard Specifications for Agencies Engaged in Construction Inspection, Testing, or Special Inspection", and approved by local authorities having jurisdiction to perform special inspection work and who is engaged by the CM to perform Code mandated independent third-party inspection.
  - 1. The special inspector shall confirm the extent and scope of inspection required for the project based on requirements of the local jurisdiction and project scope.

- F. Special Inspection: Special inspections are inspections and testing of materials, installation, fabrication, erection or placement of components and connections mandated by Chapter 17 of the Local Building Code. Special Inspections shall be provided by a qualified independent (third party) special Inspections and testing agency, complying with ASTM E329, and approved by the local AHJ as having the special expertise to conduct special inspections and testing of particular items to ensure compliance with Building Code requirements and approved Contract Documents.
1. Special inspections are separate from and in addition to inspections and testing:
    - a. Conducted by the CM or Contractor for the purposes of quality assurance and contract administration.
    - b. Inspection and testing required by the local jurisdiction
  2. Performing special Inspections does not waive the requirement for normal inspections conducted by the Building Inspections Department as listed on the building permit.
  3. The Contractor is responsible for scheduling all normal inspections with the Building Inspections Department in proper sequence and prior to concealment or proceeding with the work as required.
  4. The Contractor's role related to Special Inspections is detailed in part 3 of this Section.
- G. SIER: Special Inspections Engineer of Record

### 1.3 SPECIAL INSPECTION PRE-CONSTRUCTION MEETINGS

- A. After Statement of Special Inspections is submitted and Approved and the plan is approved by the permitting operations division and prior to issuance of a building permit and any construction activities, conduct a special inspection pre-construction meeting
1. Attendees: Require attendance by the Special Inspection Agency, the CM, the Owner's Commissioning Agent, the Architect/Engineer, the Contractor, subcontractor, material suppliers, fabricators and installers to be engaged for work to be inspected.
  2. Agenda: Review inspection requirements necessary to obtain a certificate of occupancy during the construction phase of the project, including
    - a. Statement of Special Inspections, defining the scope of special inspections, required and elective inspections
    - b. Roles and Responsibilities of each party.
    - c. Communications requirements between local jurisdictions, third party inspectors and the construction team
    - d. Phased Construction: requirements for phasing or separation of permits, certificates of completion and occupancy requirements.
    - e. Timely notification required by the Contractor to Inspectors when work is ready for inspections during the course of the work.

- f. Procedures to document, correct, re-inspect, and complete items found to be non-compliant or deficient
  - g. Identification of the Architect/Engineer of Record A/EOR designated to resolve field deviations and non-compliance items.
  - h. Contact information of parties involved in the project.
  - i. Proper submission and distribution of reports and supplemental information
  - j. Shop Drawing submittal, review and approval process
  - k. Coordination of work to be performed in accordance with Contract documents and that no changes shall be permitted unless authorized and approved in writing by CM for work in question.
  - l. On-site inspection log
  - m. Permits displayed onsite.
3. Written minutes of Pre-Construction Meeting will be taken by the Special Inspection Agent of record and be distributed with a list of attendees and topics discussed.

#### 1.4 REFERENCE STANDARDS

- A. American Society for Testing Materials (ASTM):
- 1. ASTM E329 "Standard Specification for Agencies Engaged in Construction Inspection and/or Testing".
- B. Building Code:
- 1. ICC (IBC) International Building Code, latest edition, amended by local jurisdictions.

#### 1.5 ACTION SUBMITTALS

- A. Special Inspection Reports:
- 1. After each special inspection, Special Inspector shall promptly submit three (3) copies of report; one to CM, Contractor and one to the AHJ. Include the following:
    - a. Date issued.
    - b. Project title and number.
    - c. Name of Special Inspector.
    - d. Date and time of special inspection.
    - e. Identification of product and specifications section.
    - f. Location in the Project.
    - g. Type of special inspection.
    - h. Date of special inspection.
    - i. Results of special inspection.
    - j. Conformance with Contract Documents.

2. Final Special Inspection Report: Document special inspections and correction of discrepancies prior to the start of the work.

B. Fabricator Special Inspection Reports:

1. After each special inspection of fabricated items at the Fabricator's facility, Special Inspector shall promptly submit three (3) copies of report; one to CM, Contractor and one to AHJ. Include the following:
  - a. Date issued.
  - b. Project title and number.
  - c. Name of
  - d. Date and time of special inspection.
  - e. Identification of fabricated item and specification section.
  - f. Location in the Project.
  - g. Results of special inspection.
  - h. Verification of fabrication and quality control procedures.
  - i. Conformance with Contract Documents.
  - j. Conformance to referenced standard(s).

C. Test Reports:

1. After each test or inspection, promptly submit two copies of report; one to CM and one to AHJ. Include the following:
  - a. Date issued.
  - b. Project title and number.
  - c. Name of inspector.
  - d. Date and time of sampling or inspection.
  - e. Identification of product and specifications section.
  - f. Location in the Project.
  - g. Type of test or inspection.
  - h. Date of test or inspection.
  - i. Results of test or inspection.
  - j. Conformance with Contract Documents.

D. Certificates: When specified in individual special inspection requirements, Special Inspector shall submit certification by the manufacturer, fabricator, and installation subcontractor to CM and AHJ, in quantities specified for Product Data.

1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
2. Certificates may be recent or previous test results on material or product, but must be acceptable to CM and AHJ.

E. Manufacturer's Field Reports: Submit reports to CM and AHJ.

1. Submit report in duplicate within 14 days of observation to CM for information.
2. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

F. Field Reports: Submit reports to CM and AHJ.

1. Submit report in duplicate within 14 days of observation to Architect/Engineer for information.
2. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

1.6 QUALITY ASSURANCE

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

1. Requirements for specialists shall not supersede building codes and similar regulations governing the Work, nor interfere with local trade jurisdiction settlements and similar conventions.

B. Testing and Inspecting Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E329 "Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection"; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
3. Each testing and inspection agency shall be authorized by the authorities having jurisdiction to perform testing and inspection services in the jurisdiction where Project is located.
4. The testing agency shall employ inspections and testing personnel who are certified by the following organizations for the material testing categories listed.
  - a. ACI (American Concrete Institute): Concrete and laboratory.
  - b. NICET (National Institute for Certification in Engineering Technology): Soils and concrete.
  - c. ASNT (American Society for Nondestructive Testing): Metal fabrications and architectural precast concrete connections.
  - d. AWS (American Welding Society): Metal fabrications and architectural precast concrete connections.

1.7 SPECIAL INSPECTION AGENCY

A. The Owner will engage services of an independent Special Inspection and Testing Agency approved by local AHJ to perform inspections and associated testing and sampling in accordance with ASTM E329 and required by the building code.

- B. The Owner's engagement of special inspection and testing agency in no way relieves Contractor of its obligation to perform work in accordance with requirements of Contract Documents.

## **PART 2 - PRODUCTS**

### **2.1 SPECIAL INSPECTIONS**

- A. General: The following items are subject to special inspection and testing of fabrication and installation defined in the building code and modified by local jurisdictions. Items referenced below have references to the International building code. While state, city and local building codes reference the IBC, local jurisdictions may modify requirements and alter numbering of referenced articles, modify inspection and testing requirements, modify frequency and loads required. Specific requirements unique to the project shall be stated in the Statement of Special Inspections and Schedule of Special Inspections prepared for the Project by the CM:

1. Steel Construction (IBC 1705.2)
  - a. Fabrication and Installation of Structural Steel Framing according to AISC 360
  - b. Welding procedures and certifications
  - c. Cold-Formed Steel
  - d. Reinforcing steel welding inspection and inspector qualifications according to AWS D1.4 and ACI 318.
  - e. Cold formed steel trusses spanning 60 ft. or more
2. Concrete Construction (IBC 1705.3) for periodic and continuous observation
  - a. Materials per ACI 318 as stipulated in Table 1704.3
  - b. Underpinning of party walls
3. Masonry Construction (IBC 1705.4)
  - a. Inspection and verification according to TMS 402/ACI 530/SCSE 5 and TMS 602/ACI 503.1/ASCE 6, except for empirically designed masonry, foundation walls constructed in accordance with IBC
  - b. Empirically designed masonry in Risk Category IV (Table 1604.5)
4. Wood Structural Elements (IBC 1705.5)
5. Soils (IBC Table 1705.6) for continuous or periodic observation.
6. Driven deep foundations (IBC Table 1705.7) for continuous or periodic structural observation.
7. Helical Pile Foundations: (IBC 1705.9)
8. Wind Resistance (IBC 1705.10)
  - a. Structural Wood (IBC 1705.10.1) continuous special inspection during field gluing
  - b. Structural Wood periodic special inspection for nailing, bolting and anchoring.



- c. Cold Formed Steel light frame construction (IBC 1705.10.2); periodic special inspection for screw attachment, bolting or anchoring
  - d. Wind Resisting Components (IBC 1705.10.3) periodic inspection for roof and wall cladding
- 9. Seismic Resistance (IBC 1705.11)
  - a. Structural Steel (IBC 1705.11.1)
  - b. Structural Wood (IBC 1705.11.2)
  - c. Cold-Formed Steel (IBC 1705.11.3)
  - d. Designed seismic systems (IBC 1705.11.4)
  - e. Architectural Components (IBC 1705.11.5)
  - f. Mechanical and Electrical Components (IBC 1705.12)
  - g. Storage Racks (IBC 1705.11.7)
  - h. Seismic Isolation Systems (IBC 1705.11.8)
- 10. Sprayed Fire Resistant Materials (IBC 1705.13)
  - a. Physical and Visual Tests (IBC 1705.13.1)
  - b. Structural Member Surface Conditions (IBC 1705.13.1)
  - c. Application (IBC 1705.13.3)
  - d. Thickness (IBC 1705.13.4)
    - 1) Structural Members
    - 2) Beams and Girders
    - 3) Joists and Trusses
    - 4) Wide Flanged Columns
    - 5) Hollow Structural Section and Pipe Columns
  - e. Density (IBC 1704.13.5)
  - f. Bond Strength (IBC 1705.13.60)
- 11. Mastic and Intumescent Fire-Resistant Coatings (IBC 1705.14)
- 12. Exterior Insulation and Finish Systems (EIFS) (IBC 1705.15)
- 13. Fire-Resistant Penetrations and Joints (IBC 1705.16)
- 14. Smoke Control (IBC 1705.17)
- 15. Special Items

### **PART 3 - EXECUTION**

#### **3.1 SCHEDULE OF SPECIAL INSPECTIONS, GENERAL**

- A. Frequency of Special Inspections: Special Inspections are indicated as continuous or periodic.
  - 1. Continuous Special Inspection: Special Inspection Agency shall be present in the area where the work is being performed and observe the work at all times the work is in progress.

2. Periodic Special Inspection: Special Inspection Agency shall be present in the area where work is being performed and observe the work part-time or intermittently and at the completion of the work.

### 3.2 SPECIAL INSPECTION AND TESTING AGENCY DUTIES AND RESPONSIBILITIES

#### A. Special Inspection and Testing Agency:

1. Verify and test samples submitted by Contractor comply with the referenced standards and the approved Contract Documents.
2. Provide qualified personnel at site, who will cooperate with CM and Contractor in performance of services.
3. Perform specified sampling and testing of products in accordance with specified reference standards.
4. Ascertain compliance of materials, products and mixes with requirements of Contract Documents.
5. Promptly notify CM and Contractor of observed irregularities or nonconformance of work or products.
6. Perform additional tests and inspections required by CM.
7. Attend preconstruction meetings and progress meetings when requested by Owner.
8. Submit reports of all tests or inspections specified.

#### B. Limits on Special Inspection Agency Authority:

1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
2. Agency may not approve or accept any portion of the work.
3. Agency may not assume any duties of Contractor.
4. Agency has no authority to stop the work.

#### C. Re-testing required because of non-conformance with specified requirements shall be performed by the same agency and shall be paid for by Contractor.

#### D. Special Inspections Engineer of Record (SIER): Responsible for performing, documenting, managing, and coordinating the Special Inspections of various Inspections Agents.

1. Individual Agents engaged by the Owner shall report to the SIER. The agents responsible for conducting inspections or tests shall be identified in the Statement of Special Inspections.
2. The SIER shall
  - a. Provide copies of inspection reports to the AEOR, Owner, Contractor and Building Official.
  - b. Report discrepancies observed to the Contractor for correction.
  - c. Report deviations from approved Contract Documents to the AEOR for resolution.
  - d. Report uncorrected work to the Building Official and AEOR.

- e. Conduct and certify special inspections of building components and testing of construction materials where special inspections and material tests are in accordance with the Statement of Special Inspections.

### 3.3 OWNER RESPONSIBILITIES

- A. Owner shall be responsible for remuneration, fees and costs related to Special Inspections Services. The Owner or their authorized agent shall sign the Statement of Special Inspections. The Owner shall also ensure that:
  - 1. Statement of Special Inspections is completely filled-out and submitted to the AHJ at time of plan submission.
  - 2. Special Inspections Agent is engaged and does not have any business relationship with the contractor or subcontractors.
  - 3. Special inspections agents have full authority to conduct special inspection required by the AHJ in accordance with approved plans
  - 4. Final Report of Special Inspections is completed by the Special Inspector, and that no exceptions are taken.
  - 5. Final Report is made available to the AHJ and third party inspector.

### 3.4 CONTRACTOR RESPONSIBILITIES

- A. The Contractor is responsible for construction of the Project in accordance with approved Construction Documents. In addition, the Contractor is responsible for controlling the quality of construction and providing the special inspections agency safe access to elements that require inspection or testing.
  - 1. Special Inspections process does not relieve the Contractor of responsibility for quality control or provision of work in accordance with requirements of the Contract Documents.
- B. In reference to the requirement for special inspections, the Contractor shall be responsible to:
  - 1. Coordinate construction related activities including scheduling and timely notification of the need for Special Inspections to Special Inspection Agencies and the CM.
  - 2. Make the Site available for special inspection and deliver samples for testing when needed
  - 3. Promptly respond when informed of non-conforming work.
- C. The Contractor's role includes:
  - 1. Attending pre-construction meeting specified on Division One "Project Management and Coordination" and review requirements for special inspections with major subcontractors whose work shall be subject to special inspection.
  - 2. Coordinating quality control activities to avoid delay and eliminate any need to uncover work for testing or inspection.

3. Ensuring that site address and building permits are visible, and records of approved Contract Documents, including but not limited to approved shop drawings, design drawings, specifications, design mixes for concrete, grout, and mortar, masonry product data, geotechnical reports and other pertinent documents are available at the construction site.
  - a. Maintaining revisions, including construction field revisions to the construction documents are approved by the AHJ before implementation of revision and provided to the Special Inspector
  - b. Retaining Special Inspections Reports at the project site and providing copies of these reports for review upon request.
  - c. Ensure final report is made available to the AHJ and Independent Inspection Agency.
4. Providing safe access to the Work to be inspected and assisting the inspection and testing agency in performance of their duties.
5. Notifying the Special Inspector, the CM, Commissioning Authority, not less than 48-hour notice prior to the time required for special inspections of Work required to be inspected.
6. Not enclosing work requiring special inspection until the special inspection has been completed. Removing construction, if items requiring special inspection have been inadvertently enclosed, at his own expense as required to provide to provide access necessary for performing inspection.
7. Removing and replacing work found to be defective or not complying with requirements of the Contract Documents, and Special Inspections, including the cost of retesting and reinspection, at no additional cost to the CM.
8. Constructing project in accordance with AHJ approved plans, specifications, and other applicable documents
9. Maintaining safe environment in accordance with approved construction documents and safety requirements.

### 3.5 CM RESPONSIBILITIES

- A. The CM shall be responsible for informing the Owner of the need to provide Special Inspections and assisting the Owner to retain the services of a Special Inspector to provide Special Inspections Services. The CM shall:
  1. Review and act upon conditions noted in interim special inspection reports.
  2. Supply the Independent Inspection Agent with copies of current Construction Documents and approved submittals, fabrication, and erection documents, including those revisions and change orders that affect work to be inspected or tested.
  3. Sign and seal the final report of special inspections.

### 3.6 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections, consistent with the specific requirements and reporting protocols of the local Authority Having Jurisdiction. Include the following as minimum reporting and documentation information:
  - 1. Date test or inspection was conducted.
  - 2. Description of the Work tested or inspected.
  - 3. Date test or inspection results were transmitted to CM.
  - 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for the Owner's, CM's, and Commissioning Authority's, reference during normal working hours.
  - 1. Submit log at Project closeout as part of Project Record Documents.

END OF SECTION 014533

## **SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS**

### **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 requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
  - 1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.
  - 2. Appendix 'E' – Mandatory Contractor Requirements" for additional requirements and Work restrictions.
  - 3. Section 013516 "Alteration Project Procedures" for requirements associated with projects primarily addressing interior and exterior alterations to existing buildings.
  - 4. Section 312319 "Dewatering" for disposal of ground water at Project site.
  - 5. Section 321216 "Asphalt Paving" for construction and maintenance of asphalt pavement for temporary roads and paved areas.
  - 6. Section 321313 "Concrete Paving" for construction and maintenance of cement concrete pavement for temporary roads and paved areas.

#### **1.3 DEFINITIONS**

- A. Permanent Enclosure: As determined by CM, permanent or temporary roofing is complete, insulated, and weathertight; exterior walls are insulated and weathertight; and openings are closed and fully protected.

#### **1.4 USE CHARGES**

- A. General: Contractor shall install and remove temporary utility facilities which shall be included in the Contract Sum including connection charges from the servicing utility companies. The CM will pay utility company charges for use of the temporary utilities. Allow other entities to use temporary services and facilities without cost, including, but not limited to, CM's construction forces, Architect, testing agencies, and authorities having jurisdiction.

- B. Sewer Service: CM will pay sewer-service use charges for sewer usage by all entities for construction operations.
- C. Water Service: CM will pay water-service use charges for water used by all entities for construction operations.
- D. Electric Power Service: CM will pay electric-power-service use charges for electricity used by all entities for construction operations.
- E. Contractor shall notify the CM in advance of any other temporary utilities which may be necessitated by the specific project.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Site Utilization Plan: Submit a site utilization plan indicating locations of construction fencing, temporary facilities, staging and lay-down areas, construction personnel vehicle parking, vehicular circulation, and construction site entrances. Show temporary utility lines and connections.
- B. Implementation and Termination Schedule: Within 15 working days of date established for submittal of Contractor's Construction Schedule, submit a schedule indicating implementation and termination of each temporary utility.
- C. Project Identification and Temporary Signs: Show fabrication and installation details for project identification and temporary signs, including plans, elevations, details, layouts, typestyles, graphic elements, message content, and lighting.
- D. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
- E. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- F. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage.
  - 1. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.
  - 2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
  - 3. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.

- G. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:
  - 1. Locations of dust-control partitions at each phase of work.
  - 2. HVAC system isolation schematic drawing.
  - 3. Location of proposed air-filtration system discharge.
  - 4. Waste handling procedures.
  - 5. Other dust-control measures.
- H. Use of permanent equipment for temporary HVAC and humidity control. See other Division 01 Sections for requirements and submit plan for CM's approval.

## 1.6 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
- C. Accessible Temporary Egress: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.
- D. Regulations: Comply with industry standards and 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 and Rescue Squad rules.
- E. Trade Jurisdictions: Assigned responsibilities for installation and operation of temporary utilities are not intended to interfere with trade regulations and union jurisdictions.

## 1.7 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.



## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. Chain-Link Fencing: Minimum 2-inch, 0.148-inch-thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch-OD line posts and 2-7/8-inch-OD corner and pull posts.
- B. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil minimum thickness, with flame-spread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2.
- C. Dust-Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches.
- D. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

### **2.2 TEMPORARY FACILITIES**

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
- B. Common-Use Field Office: Of sufficient size to accommodate needs of CM, Owner, Architect, and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as established with the CM as terms and conditions of the Contract For Construction.
- C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
  - 1. Store combustible materials apart from building.

### **2.3 EQUIPMENT**

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
  - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
  - 2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.

3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and remove at end of construction and clean HVAC system as required in Section 017700 "Closeout Procedures". Submit plan for Owner approval prior to use.
- C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION, GENERAL**

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
  1. Locate facilities to limit site disturbance as specified in Section 011000 "Summary."
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

### **3.2 PROTECTION OF UNDERGROUND FACILITIES**

- A. Contractor shall provide and maintain proper shoring and bracing for existing underground utilities, sewers, and building foundations, encountered during its excavation Work, to protect from collapse or movement, or other type of damage until such time as they are to be removed, incorporated into the Work or can be properly backfilled upon completion of Work.
- B. Utilities and/or other services which are shown, or not shown but encountered, shall be protected by the Contractor from any damage arising or resulting from Work, unless or until they are abandoned. If the utilities or services are damaged from Contractor's Work, Contractor shall immediately repair any damage and restore the utilities and services to an equal or better condition than that which existed prior to the damage. Contractor shall be responsible for all liabilities, expenses, lawsuits or claims arising or resulting from such damage and will defend, hold harmless and indemnify CM and Owner from any claims or lawsuits or other expenses.
- C. Contractor on behalf of itself and its Subordinate Parties shall be responsible for all damage to the Project including the existing building and grounds arising out of or resulting from their performance of the Work. Repair or replacement of damaged items shall be to the satisfaction of the CM.

### 3.3 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
  - 1. Arrange with utility company, CM, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
  - 1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.
- C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.
- D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- E. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
- F. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
  - 1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.
- G. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
  - 1. Install electric power service overhead unless otherwise indicated.
  - 2. Connect temporary service to Owner's existing power source, as directed by CM.
- H. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
  2. Install lighting for Project identification sign.
- I. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install telephone line(s) for each field office.
1. Provide additional telephone lines as determined in the contract for Construction with the CM.
  2. At each telephone, post a list of important telephone numbers.
    - a. Police and fire departments.
    - b. Ambulance service.
    - c. Contractor's home office.
    - d. Contractor's emergency after-hours telephone number.
    - e. Construction Manager's office.
    - f. Principal subcontractors' field and home offices.
  3. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.
- J. Electronic Communication Service: Provide Internet access via Wi-Fi with encoded access, password encoded, secured, and authorized for individual users. Provide other Electronic access and communications capabilities as agreed in the Contract for Construction.

### 3.4 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
  2. Maintain support facilities until CM schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to CM.
- B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas within construction limits indicated on Drawings.
1. Provide dust-control treatment that is nonpolluting and non-tracking. Reapply treatment as required to minimize dust.

- C. Temporary Use of Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.
  - 1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
  - 2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Section 312200 "Earthwork."
  - 3. Recondition base after temporary use, including removing contaminated material, regrading, proof-rolling, compacting, and testing.
  - 4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course according to Section 32 12 16 "Asphalt Paving."
- D. Traffic Controls: Comply with requirements of authorities having jurisdiction.
  - 1. Protect existing site improvements to remain including curbs, pavement, and utilities.
  - 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- E. Parking: Provide temporary parking areas for construction personnel. Submit plan for CM's approval.
- F. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
  - 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
  - 2. Remove snow and ice as required to minimize accumulations. Coordinate efforts with the CM.
- G. Project Identification and Temporary Signs: Provide Project identification signs in minimum 48 inches high by 96 inches wide, unless otherwise indicated. Install signs adjacent to entrance to Project site and at locations required to provide project information to the public and to persons seeking access to Site. Signs shall be acceptable to Owner and Construction Manager. Unauthorized signs will not be permitted.
  - 1. Support signs with a minimum of two 4-by-4 by 16'-0" treated wood posts embedded a minimum of 36 inches into ground. Provide 3/4 inch thick exterior grade MDO plywood sign faces with 2-by-4-inch treated wood framing spaced a maximum at 24 inches on center.
  - 2. Engage an experienced sign painter to apply graphics for Project identification signs. Comply with details indicated.

3. Provide temporary, directional signs for construction personnel and visitors.
  4. Maintain and touchup signs so they are legible for the duration of the Project.
- H. Waste Disposal Facilities: Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."
- I. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."
- J. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- K. Temporary Elevator Use (New and Renovated Facilities): Contractor may, subject to the approval of the CM, use the existing elevator(s) designated by the CM within the contract boundaries for movement of personnel and materials to a construction area. Contractor use of newly constructed elevator(s) is not allowed.
1. In those cases where an elevator is to be shared with CM services, the CM's employees and services take priority over construction activities. Contractor is responsible for proper conduct of its Subordinate Parties with regard to the use of the elevator. Any damage to the elevator due to oversize load, excess weight or other conditions is the Contractor's responsibility.
  2. Use of the elevator(s) at times other than normal working hours shall be coordinated with CM and shall be the subject of written authorization exercised by the CM and the Contractor.
- L. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.
- M. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

### 3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and

that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

1. Comply with work restrictions specified in Section 011000 "Summary."
  2. Document Storm Water Protection Plan to comply with state and local requirements.
- C. Temporary Erosion and Sedimentation Control: Comply with requirements of 2003 EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent and requirements specified in Section 311000 "Site Clearing" and Section 312200 "Earthwork."
- D. 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, according to erosion- and sedimentation-control Drawings, but not less than requirements of 2003 EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
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.
  3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
  4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- E. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- F. Tree and Plant Protection: Comply with requirements specified in Section 015639 "Temporary Tree and Plant Protection."
- G. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- H. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using environmentally safe materials.

- I. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates. Coordinate with Owner provided fencing and access controls.
  - 1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
  - 2. Maintain security by limiting number of keys and restricting distribution to authorized personnel, furnish one set of keys to CM.
- J. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.
- K. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting, including FAA required warning lights on cranes and hoisting equipment in temporary use by the Contractor
- L. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- M. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
  - 1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.
- N. Where new temporary partitions are established and located by the Contractor, all existing mechanical, fire protection, plumbing and electrical devices used for life safety purposes shall be relocated by the Contractor installing or relocating same to the new temporary partitions so as to be usable and visible to CM personnel and activities. Items such as, but not limited to, exit lights, fire protection systems, fire alarm systems, and similar items shall be relocated. In the event that a passageway is blocked or barricaded, visible rerouting directions for traffic flow shall be posted. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner and tenants from fumes and noise.
  - 1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant-treated plywood on construction operations side.
  - 2. Construct dustproof partitions with two layers of 6-mil polyethylene sheet on each side. Cover floor with two layers of 6-mil polyethylene sheet, extending sheets 18 inches up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant-treated plywood.



- a. Construct vestibule and airlock at each entrance through temporary partition with not less than 48 inches between doors. Maintain water-dampened foot mats in vestibule.
    - b. Follow Owner's requirements associated with infection control (IRCA) and protection of semi-finished areas or Owner occupied spaces as may be determined by the Owner.
  3. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
    - a. The Project is under the jurisdiction of the Indiana State Fire Marshal.
    - b. Partition construction shall provide a fire-resistant classification approved by the State - and/or Local Fire Marshal. Openings in such partitions shall be protected by fire doors consistent with the rating of the partition.
  4. Insulate partitions to control noise transmission to occupied areas.
  5. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
  6. Protect air-handling equipment.
  7. Provide walk-off mats at each entrance through temporary partition.
  8. To the greatest extent possible, seal construction perimeter and exhaust construction area to maintain a continuous negative (below atmospheric) pressure in construction work area through a HEPA (High Efficiency Particulate Accumulator) filter system rated at 95 percent capture of 0.3 microns including pollen, mold spores, and dust particles. Provide temporary seals in ductwork entering occupied spaces to prevent contaminations and dust migration into occupied areas.
  9. Comply with Owner's Infection Control Risk Assessment (ICRA) program.
- O. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
1. Prohibit smoking in construction areas.
  2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
  3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.
5. Provide fully functioning permanent fire suppression sprinkler system at earliest possible date, including modifications to existing systems where applicable.
6. Comply with Owner's Interior Life Safety Measures (ILSM) at all times.

### 3.6 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.
- B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
  1. Protect porous materials from water damage.
  2. Protect stored and installed material from flowing or standing water.
  3. Keep porous and organic materials from coming into prolonged contact with concrete.
  4. Remove standing water from decks.
  5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
  1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
  2. Keep interior spaces reasonably clean and protected from water damage.
  3. Periodically collect and remove waste containing cellulose or other organic matter.
  4. Discard or replace water-damaged material.
  5. Do not install material that is wet.
  6. Discard, replace, or clean stored or installed material that begins to grow mold.
  7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.
  8. Test (by a testing firm acceptable to the CM) wet materials prior to installation. Remove or replace materials found unacceptable by the CM, at no additional cost to the CM.

- D. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
  2. Use permanent HVAC system to control humidity. Submit plan to the Owner for approval prior to use of the system.
  3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
    - a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective.
    - b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to CM.
    - c. Remove materials that cannot be completely restored to their manufactured moisture level within 48 hours.

### 3.7 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Operate Project-identification-sign lighting daily from dusk until 12:00 midnight.
- D. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- E. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. CM reserves right to take possession of Project identification signs.
2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

ND OF SECTION 015000

## **SECTION 015639 - TEMPORARY TREE AND PLANT PROTECTION**

### **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 general protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.
- B. Related Requirements:
  - 1. Section 015000 "Temporary Facilities and Controls" for temporary site fencing.
  - 2. Section 311000 "Site Clearing" for removing existing trees and shrubs.
- C. The preservation of existing trees and other vegetation on the site to the maximum extent possible is extremely important. Trees in close proximity to the site work are to be preserved as indicated on the Drawings. Contractor shall plan its Work and instruct its Subordinate Parties to conduct operations to avoid damage to trees and vegetation (provide barriers as required).
  - 1. Indiscriminate driving about the site, disposing of waste, storage of materials upon or against trees or any other activity which is harmful to trees or vegetation that are to be preserved will not be tolerated.
  - 2. Parking areas, storage areas, and access to the buildings will be confined to areas designated and approved by the Owner.
  - 3. Any case of damage to any tree shall be reported to CM immediately so that professional repairs can be made.

- 1.3 The cost of such required repairs or treatment shall be charged to the Contractor. Willful disregard of the above will be grounds for requiring the offending person(s) to be removed from the Project and may subject the Contractor to termination under the Agreement.

#### **1.4 DEFINITIONS**

- A. Caliper: Diameter of a trunk measured by a diameter tape or the average of the smallest and largest diameters at a height 6 inches above the ground for trees up to and including 4-inch size at this height and as measured at a height of 12 inches above the ground for trees larger than 4-inch size.

- B. Caliper (DBH): Diameter breast height; diameter of a trunk as measured by a diameter tape or the average of the smallest and largest diameters at a height 54 inches above the ground line[ for trees with caliper of 8 inches or greater as measured at a height of 12 inches above the ground].
- C. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction and indicated on Drawings.
- D. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and defined by a circle concentric with each tree with a radius 12 times the tree's caliper size and with a minimum radius of 96 inches unless otherwise indicated.
- E. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

## 1.5 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
  - 1. Review methods and procedures related to temporary tree and plant protection including, but not limited to, the following:
    - a. Tree-service firm's personnel, and equipment needed to make progress and avoid delays.
    - b. Arborist's responsibilities.
    - c. Quality-control program.
    - d. Coordination of Work and equipment movement with the locations of protection zones.
    - e. Trenching by hand or with air spade within protection zones.
    - f. Field quality control.

## 1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings:
  - 1. Include plans, elevations, sections, and locations of protection-zone fencing and signage, showing relation of equipment-movement routes and material storage locations with protection zones.
  - 2. Detail fabrication and assembly of protection-zone fencing and signage.
  - 3. Indicate extent of trenching by hand or with air spade within protection zones.
- C. Samples: For each type of the following:
  - 1. Organic Mulch: 1-pint (0.5-L) volume of organic mulch; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch.

2. Protection-Zone Fencing: Assembled Samples of manufacturer's standard size made from full-size components.
3. Protection-Zone Signage: Full-size Samples of each size and text, ready for installation.
- D. Tree Pruning Schedule: Written schedule detailing scope and extent of pruning of trees to remain that interfere with or are affected by construction.
  1. Species and size of tree.
  2. Location on site plan. Include unique identifier for each.
  3. Reason for pruning.
  4. Description of pruning to be performed.
  5. Description of maintenance following pruning.

#### 1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For arborist and tree service firm.
- B. Certification: From arborist, certifying that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.
- C. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing the Work.
- D. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.
  1. Use sufficiently detailed photographs or video recordings.
  2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.
- E. Quality-control program.

#### 1.8 QUALITY ASSURANCE

- A. Arborist Qualifications: Certified Arborist as certified by ISA.
- B. Tree Service Firm Qualifications: An experienced tree service firm that has successfully completed temporary tree and plant protection work similar to that required for this Project and that will assign an experienced, qualified arborist to Project site during execution of the Work.
- C. Quality-Control Program: Prepare a written program to systematically demonstrate the ability of personnel to properly follow procedures and handle materials and equipment during the Work without damaging trees and plantings. Include dimensioned diagrams for placement of protection zone fencing and signage, the arborist's and tree-service firm's responsibilities, instructions given to workers on the use and care of protection zones, and enforcement of requirements for protection zones.

## 1.9 FIELD CONDITIONS

- A. The following practices are prohibited within protection zones:
  - 1. Storage of construction materials, debris, or excavated material.
  - 2. Moving or parking vehicles or equipment.
  - 3. Foot traffic.
  - 4. Erection of sheds or structures.
  - 5. Impoundment of water.
  - 6. Excavation or other digging unless otherwise indicated.
  - 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- B. Do not direct vehicle or equipment exhaust toward protection zones.
- C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Backfill Soil: Planting soil of suitable moisture content and granular texture for placing around tree; free of stones, roots, plants, sod, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth.
  - 1. Planting Soil: Planting soil as specified in Section 329113 "Soil Preparation."
- B. Organic Mulch: Free from deleterious materials and suitable as a top dressing for trees and shrubs, consisting of one of the following:
  - 1. Type: Shredded hardwood.
  - 2. Size Range: 3 inches maximum, 1/2 inch minimum.
  - 3. Color: Natural.
- C. Protection-Zone Fencing: Fencing fixed in position and meeting the following requirements:
  - 1. Chain-Link Protection-Zone Fencing: Galvanized-steel fencing fabricated from minimum 2-inch opening, 0.148-inch- diameter wire chain-link fabric; with pipe posts, minimum 2-3/8-inch- OD line posts, and 2-7/8-inch- OD corner and pull posts; with 1-5/8-inch-OD top rails; with 0.177-inch-diameter top tension wire and 0.177-inch- diameter bottom tension wire; with tie wires, hog ring ties, and other accessories for a complete fence system.
    - a. Height: 72 inches.



2. Gates: Single swing access gates matching material and appearance of fencing, to allow for maintenance activities within protection zones; leaf width 24 inches.
- D. Protection-Zone Signage: Shop-fabricated, rigid plastic or metal sheet with attachment holes pre-punched and reinforced; legibly printed with nonfading lettering and as follows:
  1. Size and Text: As shown on Drawings.
  2. Lettering: 3-inch- high minimum, white characters on red background.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- B. Prepare written report, endorsed by arborist, listing conditions detrimental to tree and plant protection.

#### 3.2 PREPARATION

- A. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated. Flag each tree trunk at 54 inches above the ground.
- B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.
- C. Tree-Protection Zones: Mulch areas inside tree-protection zones and other areas indicated. Do not exceed indicated thickness of mulch.
  1. Apply 4-inch uniform thickness of organic mulch unless otherwise indicated. Do not place mulch within 6 inches of tree trunks.

#### 3.3 PROTECTION ZONES

- A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones before materials or equipment are brought on the site and construction operations begin in a manner that will prevent people and animals from easily entering protected areas except by entrance gates. Construct fencing so as not to obstruct safe passage or visibility at vehicle intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.
  1. Chain-Link Fencing: Install to comply with ASTM F 567 and with manufacturer's written instructions.

2. Posts: Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing paving or concrete to remain, provide appropriate means of post support acceptable to Architect.
  3. Access Gates: Install where indicated; adjust to operate smoothly, easily, and quietly; free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.
- B. Protection-Zone Signage: Install protection-zone signage in visibly prominent locations in a manner approved by CM. Install one sign spaced approximately every 30 feet on protection-zone fencing, but no fewer than four signs with each facing a different direction.
- C. Maintain protection zones free of weeds and trash.
- D. Maintain protection-zone fencing and signage in good condition as acceptable to Architect and remove when construction operations are complete and equipment has been removed from the site.
1. Do not remove protection-zone fencing, even temporarily, to allow deliveries or equipment access through the protection zone.
  2. Temporary access is permitted subject to preapproval in writing by arborist if a root buffer effective against soil compaction is constructed as directed by arborist. Maintain root buffer so long as access is permitted.

### 3.4 EXCAVATION

- A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Section 312200 "Earthwork" unless otherwise indicated.
- B. Trenching within Protection Zones: Where utility trenches are required within protection zones, excavate under or around tree roots by hand or with air spade, or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots as required for root pruning. If excavating by hand, use narrow-tine spading forks to comb soil and expose roots.
- C. Redirect roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and redirect them without breaking. If encountered immediately adjacent to location of new construction and redirection is not practical, cut roots approximately 3 inches back from new construction and as required for root pruning.
- D. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

### 3.5 ROOT PRUNING

- A. Prune tree roots that are affected by temporary and permanent construction. Prune roots as follows:
  - 1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
  - 2. Cut Ends: Do not paint cut root ends. Roots over 1.5" should be cleanly cut by hand.
  - 3. Root pruning adjacent to specimen trees may require soil removal by supersonic air tool to minimize tree and root impacts.
  - 4. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
  - 5. Cover exposed roots with burlap and water regularly.
  - 6. Backfill as soon as possible according to requirements in Section 312200 "Earthwork."
- B. Root Pruning at Edge of Protection Zone: Prune tree roots 6 inches inside of the protection zone by cleanly cutting all roots to the depth of the required excavation.
- C. Root Pruning within Protection Zone: Clear and excavate by hand or with air spade to the depth of the required excavation to minimize damage to tree root systems. If excavating by hand, use narrow-tine spading forks to comb soil to expose roots. Cleanly cut roots as close to excavation as possible.

### 3.6 CROWN PRUNING

- A. Prune branches that are affected by temporary and permanent construction. Prune branches as directed by arborist.
  - 1. Prune to remove only injured, broken, dying, or dead branches unless otherwise indicated. Do not prune for shape unless otherwise indicated.
  - 2. Do not remove or reduce living branches to compensate for root loss caused by damaging or cutting root system.
  - 3. Pruning Standards: Prune trees according to ANSI A300 (Part 1) and as indicated on Drawings.
    - a. Type of Pruning: Cleaning, raising, reducing, and, thinning where indicated.
    - b. Specialty Pruning: Structural, restoration, and utility where indicated.
- B. Unless otherwise directed by arborist and acceptable to CM, do not cut tree leaders.
- C. Cut branches with sharp pruning instruments; do not break or chop.
- D. Do not paint or apply sealants to wounds.

- E. Provide subsequent maintenance pruning during Contract period as recommended by arborist.
- F. Chip removed branches and spread over areas identified by Architect.

### 3.7 RE-GRADING

- A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.
- B. Lowering Grade within Protection Zone: Where new finish grade is indicated below existing grade around trees, slope grade away from trees as recommended by arborist unless otherwise indicated.
  - 1. Root Pruning: Prune tree roots exposed by lowering the grade. Do not cut main lateral roots or taproots; cut only smaller roots. Cut roots as required for root pruning.
- C. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.
- D. Minor Fill within Protection Zone: Where existing grade is 2 inches or less below elevation of finish grade, fill with backfill soil. Place backfill soil in a single uncompacted layer and hand grade to required finish elevations.

### 3.8 FIELD QUALITY CONTROL

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

### 3.9 REPAIR AND REPLACEMENT

- A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or to be relocated that are damaged by construction operations, in a manner approved by Architect.
  - 1. Submit details of proposed pruning and repairs.
  - 2. Perform repairs of damaged trunks, branches, and roots within 24 hours according to arborist's written instructions.
  - 3. Replace trees and other plants that cannot be repaired and restored to full-growth status, as determined by CM.
- B. Trees: Remove and replace trees indicated to remain that are more than 25 percent dead or in an unhealthy condition before the end of the corrections period or are damaged during construction operations that Architect determines are incapable of restoring to normal growth pattern.
  - 1. Small Trees: Provide new trees of same size and species as those being replaced for each tree that measures 6 inches or smaller in caliper size.

2. Large Trees: Provide one new tree(s) of 4-inch caliper size for each tree being replaced that measures more than 6 inches in caliper size.
  - a. Species: As selected by Architect.
3. Plant and maintain new trees as specified in Section 329300 "Plants."
- C. Excess Mulch: Rake mulched area within protection zones, being careful not to injure roots. Rake to loosen and remove mulch that exceeds a 4-inch uniform thickness to remain.
- D. Soil Aeration: Where directed by CM, aerate surface soil compacted during construction. Aerate 10 feet beyond drip line and no closer than 36 inches to tree trunk. Drill 2-inch-diameter holes a minimum of 12 inches deep at 24 inches o.c. Backfill holes with an equal mix of augered soil and sand.

3.10 DISPOSAL OF SURPLUS AND WASTE MATERIALS

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

END OF SECTION 015639

## SECTION 016000 - PRODUCT REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Provide the work of this Section in accordance with requirements of the Contract Documents.
- B. This Section includes but is not limited to administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- C. Related Requirements:
  - 1. Division 01 Section 012100 "Allowances" for products selected under an allowance.
  - 2. Division 01 Section 012300 "Alternates" for products selected under an alternate.
  - 3. Division 01 Section 012500 "Substitution Procedures" for requests for substitutions.
  - 4. Division 01 Section 014200 "References" for applicable industry standards for products specified.

#### 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. Products salvaged or recycled from other projects are not considered new products.
  - 3. Comparable Product: Product that is demonstrated and approved through submittal process 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 specific manufacturer's product is named and accompanied by the words "basis-of-

design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

- C. Date Sensitive Compliance (Date Sensitive Compliant): Systems, equipment and component parts thereof which function in connection with or utilize computer systems and subsystems, hardware, software, firmware, including embedded chip systems and components which process, sequence, calculate or in some fashion are affected by or dependent upon date and date related or time and time related data, including the passage of time, shall properly function and continue to correctly process, sequence and utilize date and time related data for dates and times which occur during a reasonable life expectancy thereof, for all dates on and after date of Substantial Completion, including leap year calculations.

### 1.3 ACTION SUBMITTALS

- A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
  2. Construction Manager's Action: If necessary, CM will request additional information or documentation for evaluation within one week of receipt of a comparable product request. CM will notify Contractor of approval or rejection of proposed comparable product request within fifteen (15) working days of receipt of request, or seven (7) working days of receipt of additional information or documentation, whichever is later.
    - a. Form of Approval: As specified in Division 01 Section 013300 "Submittal Procedures."
    - b. Use product specified if CM does not issue a decision on use of a comparable product request within time allocated.
- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section 013300 "Submittal Procedures." Show compliance with requirements.

### 1.4 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.

2. If a dispute arises between contractors over concurrently selectable but incompatible products, CM will determine which products shall be used.
- B. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products or equipment which will be exposed to view in occupied spaces or on the exterior.
1. Labels: Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface that is not conspicuous.
  2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on accessible, but inconspicuous, surface in occupied spaces. The nameplate shall contain the following information and other essential operating data:
    - a. Name of product and manufacturer.
    - b. Model and serial number.
    - c. Capacity.
    - d. Speed.
    - e. Ratings.
- C. Reliability of Calculations by Date Sensitive Equipment, Systems and Components:
1. Date sensitive equipment, systems and components thereof shall individually and in combination properly function and continue to correctly process, sequence and utilize date and time related data, which occur during a reasonable life expectancy for said equipment, systems and components thereof.
  2. Correctly process, sequence, and calculate date and date related data for dates prior to, through and after date of Substantial Completion, including leap year calculations.
  3. Software products that process date or date related data shall recognize, store and transmit date data in a format which explicitly and unambiguously specifies the correct century.
  4. Contractor shall include this requirement in all sub-contracts and equipment orders for this Project.
  5. Submittals: Provide certification from suppliers and sub-contractors providing date sensitive equipment, systems, and software that the proposed equipment, components and systems comply with these requirements.



## 1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
  - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
  - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
  - 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
  - 4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.
- C. Storage:
  - 1. Store products to allow for inspection and measurement of quantity or counting of units.
  - 2. Store materials in a manner that will not endanger Project structure.
  - 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
  - 4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
  - 5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
  - 6. Protect stored products from damage and liquids from freezing.

## 1.6 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
  - 1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
  - 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
  - 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
  - 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
  - 3. See other Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Warranty Period: Unless otherwise specified, the Warranty Period shall be one year from date of Substantial Completion.
- D. Submittal Time: Comply with requirements in Division 01 Section 017700 "Closeout Procedures."

## **PART 2 - PRODUCTS**

### **2.1 PRODUCT SELECTION PROCEDURES**

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
- B. Provide materials and equipment that are of good quality and new, unless otherwise specified, are free from faults and defects not inherent in the quality required, that conform with requirements of Contract Documents, that are suitable for use and function intended, that are corresponding in quality to related materials in the absence of a complete specification, that are of quality appearance where exposed to view, that are of one manufacturer or source for the same specific purpose, with uniform appearance and physical properties, and that are identical and interchangeable when required in quantity
  - 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
  - 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
  - 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
  - 4. Where products are accompanied by the term "as selected," CM will make selection.
  - 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product. The Architect is solely responsible for evaluation of products and manufacturers submitted as "Or equal" to the specified product or manufacturer.
- C. Building systems, equipment, and software shall be "Date Sensitive Compliant" as defined by this Section.
- D. Product Selection Procedures:
  1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
  2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
  3. Products:
    - a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
    - b. Nonrestricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.
  4. Manufacturers:
    - a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
    - b. Nonrestricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.
  5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications

indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

- E. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
  - 1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Division 01 Section 012500 "Substitution Procedures" for proposal of product.
- F. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

## 2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration: CM will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
  - 1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
  - 2. Evidence that the proposed product will not cause additional cost in adjacent materials, systems or assemblies; that proposed product is compatible with adjacent materials, systems, and assemblies.
  - 3. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated, warranties and specific features and requirements indicated.
  - 4. Evidence that proposed product provides specified warranty.
  - 5. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
  - 6. Samples, where applicable or requested.
  - 7. Certificates and qualification data, where applicable or requested.
  - 8. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.

**PART 3 - EXECUTION (Not Used)**

END OF SECTION 016000

## SECTION 017300 - EXECUTION

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Provide the work of this Section in accordance with requirements of the Contract Document.
- B. This section includes, but is not limited to general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
  - 1. Construction layout.
  - 2. Field engineering and surveying.
  - 3. Installation of the Work.
  - 4. Coordination of Owner-installed products.
  - 5. Progress cleaning.
  - 6. Starting and adjusting.
  - 7. Protection of installed construction.
  - 8. Correction of the Work.
- C. Related Requirements:
  - 1. Division 01 Section 011000 "Summary" for limits on use of Project site.
  - 2. Division 01 Section 013100 "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
  - 3. Division 01 Section 013300 "Submittal Procedures" for submitting surveys.
  - 4. Division 01 Section 017329 "Cutting and Patching" for procedural requirements for cutting and patching necessary for the installation or performance of other components of the Work
  - 5. Division 01 Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of CM-accepted deviations from indicated lines and levels, and final cleaning.

#### 1.2 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For land surveyor and for professional engineers.
- B. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.

- C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept waste materials, for waste disposal.
- D. Certified Surveys: Submit two copies signed by land surveyor and in electronic format as determined by the CM.
- E. Final Property Survey: Submit 10 copies showing the Work performed and record survey data and in electronic format as determined by the CM.

### 1.3 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.
- B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated.
- C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
  - 1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for cleaning that comply with requirements in the following:
    - a. Division 01 Section 018115 "Sustainable Design Requirements - "SITES v2."
    - b. Division 01 Section 018114 "Sustainable Design Requirements – "LEED".

## PART 3 - EXECUTION

### 3.1 EXAMINATION

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

2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. 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.
  1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
  2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
  3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
  1. Description of the Work.
  2. List of detrimental conditions, including substrates.
  3. List of unacceptable installation tolerances.
  4. Recommended corrections.
- D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Construction Manager according to requirements in Division 01 Section 013100 "Project Management and Coordination."



### 3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Construction Manager promptly.
- B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
  - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
  - 2. Establish limits on use of Project site.
  - 3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
  - 4. Inform installers of lines and levels to which they must comply.
  - 5. Check the location, level and plumb, of every major element as the Work progresses.
  - 6. Notify Construction Manager when deviations from required lines and levels exceed allowable tolerances.
  - 7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Construction Manager.

### 3.4 FIELD ENGINEERING

- A. Identification: CM will identify existing benchmarks, control points, and property corners.
- B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

1. Do not change or relocate existing benchmarks or control points without prior written approval of Construction Manager. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Construction Manager before proceeding.
2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
  1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
  2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
  3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
- D. Certified Survey: On completion of excavations, foundation walls, structures, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.
- E. Final Property Survey: Engage a land surveyor to prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.
  1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.
  2. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

### 3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
  1. Make vertical work plumb and make horizontal work level.
  2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
  3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.

4. Maintain minimum headroom clearance of 96 inches in occupied and in unoccupied spaces.
- B. Except where more stringent requirements are specified, prepare, install, test, adjust and clean products, materials and equipment in accordance with manufacturer's printed instructions, recommendations and limitations for conditions indicated. Provide recommended accessory materials for a complete installation. If conflict exists between job conditions or specified requirements and with manufacturer's instructions, request written clarification from CM before proceeding.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Coordination of Space: Where space is limited, install components and systems to maximize space available for maintenance and ease of removal for replacement.
- F. Concealed Work: In finished areas, except as otherwise indicated, conceal pipes, ducts, and conduit and wiring in the finished construction. Coordinate locations of fixtures, outlets, annunciation devices, access panels, and similar items with finish elements. Provide escutcheon plates at penetrations through finished walls, ceilings and floors with finish appropriate to adjacent finished surface.
- G. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- H. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- I. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- J. 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 size and type of attachments are not indicated, verify size and type required for load conditions.
  1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
  2. Allow for building movement, including thermal expansion and contraction.
  3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves,

concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

- K. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- L. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

### 3.6 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction personnel.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.
  - 1. Construction Schedule: Inform CM of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify CM and Owner if changes to schedule are required due to differences in actual construction progress.
  - 2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

### 3.7 PROGRESS CLEANING

- A. Maintain building interior in a clean condition. See Section 013515 - "Infection Control Procedures" for requirements associated with preparation and modifications to existing buildings and those nearing completion of construction.
- B. General: Clean Project site and work areas on a regular, periodic basis as directed by the CM, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
  - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
  - 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
  - 3. Containerize unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
    - a. Use containers intended for holding waste materials of type to be stored.

- b. Hazardous materials shall be handled separately by the CM's abatement contractor in accordance with requirements specified in Demolition Sections
- 4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
- C. Site: Maintain Project site free of waste materials and debris.
- D. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
  - 1. Remove liquid spills promptly.
  - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- E. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- F. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- G. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- H. 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 Division 01 Section 017419 "Construction Waste Management and Disposal."
- I. 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.
- J. 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.
- K. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:
  - 1. Excessive static or dynamic loading.
  - 2. Excessive internal or external pressures.
  - 3. Excessively high or low temperatures.
  - 4. Excessive winds.
  - 5. Thermal shock.
  - 6. Excessively high or low humidity.
  - 7. Pollution and air contamination.

8. Water or ice.
9. Chemicals and solvents.
10. Light.
11. Radiation.
12. Puncture.
13. Abrasion.
14. Heavy traffic.
15. Soiling, staining, and corrosion.
16. Bacteria.
17. Rodent and insect infestation.
18. Combustion.
19. Electrical current.
20. High-speed operation.
21. Improper lubrication.
22. Unusual wear or other misuse.
23. Contact between incompatible materials.
24. Destructive testing.
25. Misalignment.
26. Excessive weathering.
27. Unprotected storage.
28. Improper shipping or handling.
29. Theft or vandalism.

### 3.8 STARTING AND ADJUSTING

- A. Coordinate startup and adjusting of equipment and operating components with requirements in Division 01 Section 019100 "Building Systems Commissioning" and Section 019119 "General Enclosure Commissioning Requirements."
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- E. Manufacturer's Field Service: Comply with qualification requirements in Division 01 Section "Quality Requirements."

### 3.9 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

- C. CM reserves the right to protect installed Work to prevent damage and deterioration if the Contractor fails to protect the installed Work in a proper manner. The costs incurred by the CM shall be paid by the Contractor.

### 3.10 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 01 Section 017329 "Cutting and Patching."
  - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 017300

## **SECTION 017320 – TESTING FOR INDOOR AIR QUALITY, BASELINE IAQ, AND MATERIALS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

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

#### **1.2 WORK INCLUDED**

- A. This Section includes requirements for Contractor's procedures for achieving acceptable indoor air quality within the interior areas of this Project during construction, and preventing contamination of ductwork, HVAC equipment, and other building materials to avoid future indoor air quality (IAQ) problems after occupancy. Work includes restrictions on the use of permanent building mechanical systems prior to Owner's Representative acceptance.
- B. See Also:
  - 1. Section 017323, "Sequence of Finish Installation."
  - 2. Section 017419, "Waste Materials Management and Recycling" for handling requirements of construction waste.
  - 3. Section 018114, "Sustainable Design Requirements."

#### **1.3 SUBMITTALS**

- A. IAQ Construction Management Plan. Submit 5 copies of plan within 30 days of date established for commencement of the Work.
  - 1. Update plan as required during the construction process to reflect Project conditions.
- B. Meeting Minutes: Submit minutes from Contractor meetings related to the execution and verification of the IAQ Construction Management Plan.
- C. Project Photographs: Submit to document IAQ measures implemented.
- D. Product Data: Submit cut sheets of filtration media proposed for use.
- E. IAQ Assessment:



1. Signed statement describing the building air flush-out procedures, including the dates when flush-out was begun and completed, calculations demonstrating required air volumes have been met, and statement that filtration media was replaced after flush-out.
2. Product data for filtration media used during flush-out and occupancy.
3. Report from testing and inspecting agency indicating results of IAQ testing and documentation showing compliance with IAQ testing procedures and requirements.

#### 1.4 QUALITY ASSURANCE

- A. Contractor's Plan shall meet or exceed the recommended design approaches of SMACNA's "IAQ Guidelines for Occupied Buildings Under Construction."
- B. IAQ Management Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."
  1. Review methods and procedures related to IAQ management during construction.
  2. Review IAQ management requirements for each trade.
- C. Contractor's plan shall provide testing and quality control provisions for compliance with OSHA requirements (OSHA regulation 1926.1153) for the control of respirable crystalline silica in construction activity on the Project site.
  1. Prevent the migration of the materials into the building HVAC system or on permanent building surfaces.

#### 1.5 IAQ CONSTRUCTION MANAGEMENT PLAN

- A. Contractor's IAQ Construction Management Plan shall include procedures to prevent indoor air quality problems resulting from the construction/renovation process in order to help sustain the comfort and well-being of construction workers and building occupants.
- B. Contractor's detailed plan shall be based on the particular characteristics of the Project, and include the items listed in this Section as a minimum.
- C. Contractor's detailed plan shall include a moisture control plan to protect stored on-site and installed absorptive materials from moisture damage. Include strategies for protecting the building from moisture intrusion and preventing occupants' exposure to mold spores.
- D. Contractor's detailed plan shall include a plan to measures to reduce noise and vibrations from construction equipment and other nonroad engines emissions in accordance with British Standard (BS 5228).

## **PART 2 - PRODUCTS (Not Used)**

## **PART 3 - EXECUTION**

### **3.1 PLAN IMPLEMENTATION**

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

### **3.2 HVAC PROTECTION**

- A. Seal off all louvers and air intake/discharge points to prevent construction dust and debris from entering.
- B. Seal off all ductwork openings and air outlets with plastic sheeting to protect the duct system from dust and debris. Do not re-open until the end of activities that produce dust or pollution, such as drywall sanding, concrete cutting, masonry work, wood sawing, and so forth.
- C. The return air system is required to be used during the construction phase. Install temporary filters (as determined by ASHRAE Standard 52.2-1999 and of type as used in the final installation, minimum MERV 8 rating) at each return air opening and provide frequent inspection and maintenance. If inspections by the Architect Testing Agency, or Owner's Representative reveal that the ductwork has become contaminated due to inadequate protection, the ductwork shall be cleaned professionally prior to occupancy, using procedures established in ACR 2005 published by the National Air Duct Cleaners Association. All filters shall be replaced immediately prior to occupancy.
- D. Under no circumstances shall air be returned from a construction area and recirculated through the permanent supply ductwork, unless and until the level of construction in the relevant area involves final finishes and trim and the construction has reached a point of completion with no sanding and is free from dust, debris, and contaminants.
- E. Do not use fan rooms to store construction or waste materials, and keep them clean and neat.

### **3.3 SOURCE CONTROL**

- A. Limit construction traffic and motor idling in the vicinity of air intake louvers of existing building when the HVAC systems are activated. Restrict motor vehicles to areas well-removed from air intakes, preventing emissions from being drawn into any building.
- B. Cycle equipment off when not being used or needed.

- C. Avoid the use of materials and products with high VOC and/or particulate levels. Use products and installation methods with low VOCs such as paints, sealers, insulation, adhesives, caulking and cleaners. Comply with the requirements in other specification Sections.
- D. Keep containers of wet products closed as much as possible. Cover and seal waste materials which can release odor or dust.
- E. Protect all materials, especially absorbent materials such as insulated ductwork, against moisture during delivery to and storage at the job site. Store materials inside the structure in a dry and clean environment pending installation. Store fuels, solvents, and other sources of VOCs separately from absorbent materials.
- F. Protect interior horizontal and vertical surfaces from contamination by dust, debris, pollutants and airborne contaminants resulting from selective demolition and construction activity utilizing sturdy polyethylene sheeting, secured and taped to prevent contamination.
- G. Smoking shall be prohibited within 25 feet of the building entrance, air intake louvers, or other open elements.
- H. All windows, doors and other openings inside and within 35' of the construction activity area shall remain closed, including those not within the Project. Affected buildings not managed by the Owner shall be notified in writing.

### 3.4 PATHWAY INTERRUPTION

- A. Use dust curtains or temporary enclosures to prevent dust from migrating to other areas. During construction, isolate areas of work to prevent contamination of clean or occupied areas.
- B. Keep pollutant sources as far away as possible from ductwork and areas occupied by workers when feasible.
- C. Isolate work areas and/or create pressure differentials to prevent the migration of contaminants.
- D. Use portable fan systems to exhaust contaminated air directly to the outside of the building, and discharge the air in a means to prevent it from re-entering.

### 3.5 HOUSEKEEPING

- A. General housekeeping and dust suppression programs shall include the use of wetting agents or sweeping compounds. Use efficient and effective dust collecting methods such as damp cloths, wet mops, and vacuums with particulate filters, or wet scrubbers. Institute cleaning activities of building areas on a daily basis, and of HVAC equipment as required.

- B. Keep all coils, air filters, dampers, fans, and ductwork clean during installation, and clean them as required prior to performing the testing, adjusting and balancing of the systems.
- C. Avoid accumulations of water inside the building, and promptly remove any that may occur. Especially protect porous materials such as insulation and ceiling tiles from exposure to moisture.

### 3.6 NOISE AND VIBRATION

- A. Construction equipment and other nonroad engines shall reduce noise emissions and vibrations by specifying low-noise emission design or the lowest decibel level available that meets performance requirements in the British Standard (BS 5228).
- B. Construction crews must wear ear protection in areas where sound levels exceed 85 dB for extended periods.

### 3.7 SCHEDULING

- A. Include a schedule of all IAQ-related construction activities in the IAQ Construction Management Plan submittal.
- B. Comply with the scheduling requirements of Section 017323, "Sequence of Finish Installation".
- C. To avoid potential contamination of porous or absorbent materials such as ceiling tiles, delay the installation of such until after the drywall, paint, and floor finishing is completed.
- D. Implement IAQ control measures in each affected area until construction in that area is complete. Do not allow contaminants from an area under construction to enter the HVAC ductwork systems or to migrate to completed areas.
- E. Install new filters, of types required in existing equipment for the final installation, at the central air handler or return air fan, immediately prior to occupancy for each respective area or zone.

### 3.8 MONITORING OF IAQ PLAN

- A. Hold weekly Contractor Site Coordination Meetings with the superintendents of all trade contractors. Review the appropriate components of the IAQ Construction Management Plan as a regular action topic at these meetings, and update the Plan as required. Document the implementation of the Plan in the meeting minutes. As a recording format, use SMACNA IAQ Guidelines Appendix C (Planning Checklist) and Appendix D (Inspection Checklist) as a guide.
- B. Take a specific series of record photographs at the appropriate stages to document adherence with the IAQ requirements. Submit at least 18 photographs

(six photos taken on three different occasions during construction) along with identification of the SMACNA approach featured by each photo.

### 3.9 IAQ ASSESSMENT

#### A. Flush-Out:

1. After construction ends, prior to occupancy and with all interior finishes installed, perform a building flush-out by supplying a total volume of **14,000 cu. ft.** of outdoor air per **sq. ft.** of floor area while maintaining an internal temperature of at least **55 deg F** and a relative humidity no higher than 60 percent.
2. If occupancy is desired prior to flush-out completion, the space may be occupied following delivery of a minimum of **3500 cu. ft.** of outdoor air per **sq. ft.** of floor area to the space. Once a space is occupied, it shall be ventilated at a minimum rate of **0.30 cfm per sq. ft.** of outside air or the design minimum outside-air rate, whichever is greater. During each day of the flush-out period, ventilation shall begin a minimum of three hours prior to occupancy and continue during occupancy. These conditions shall be maintained until a total of **14,000 cu. ft./sq. ft.** of outside air has been delivered to the space, with internal temperature of at least 55 deg F and no higher than 80 deg F and relative humidity at occupied controlled relative humidity level and no higher than 60%.
  - a. Begin flushout 3 hours before daily occupancy and continue throughout the occupied portion of the day. If part or all of Project is operational 24 hours per day then the flushout shall run continuously.
  - b. Volume: To be determined at LEED Conference.
  - c. Duration of flushout: To be determined at LEED Conference.
  - d. If permanent filters are in place, replace used HVAC filtration media with new media. Remove any temporary filters or duct coverings installed as part of the construction indoor air quality management plan.

#### B. Air-Quality Testing: Engage testing agency to perform the following:

1. Conduct baseline IAQ testing, after construction ends and prior to occupancy, using testing protocols consistent with the EPA's "Compendium of Methods for the Determination of Air Pollutants in Indoor Air," and as additionally detailed in the USGBC's "LEED Reference Guide for Building Design and Construction v4" and the USGBC's "LEED v4.1 Building Design and Construction: Getting Started Guide for Beta Participants."
2. Demonstrate that the particulate matter and inorganic gas maximum concentrations listed below are not exceeded:
  - a. Particulates (PM10): 20 micrograms/cu. m.
  - b. Particulates (PM2.5): 35 micrograms/cu. M.
  - c. Ozone: 0.07 ppm, according to ASTM D5149 – 02.
  - d. Carbon Monoxide: 9 ppm and no greater than 2 ppm above outdoor levels, according to ISO 4224 or EPA Compendium Method IP-3.

3. Demonstrate that the volatile organic compound maximum concentrations listed below are not exceeded, using one of the following test methods unless otherwise noted: ISO 16000-6, EPA IP-1, EPA TO-17, EPA TO-15, ISO 16017-1, 2, or ASTM D6196-15.
  - a. Total Volatile Organic Compounds (TVOC): 500 micrograms/cu. m., according to ISO 16000-6, EPA TO-17, or EPA TO-15.
  - b. Formaldehyde: 20 micrograms/cu. m., according to EPA TO-11a, EPA comp. IP-6A, or ASTM D5197-16.
  - c. Acetaldehyde 75-07-0: 140 micrograms/cu. m., according to ASTM D6196-15.
  - d. Benzene 71-43-2: 3 micrograms/cu. m.
  - e. Hexane (n-) 110-54-3: 7,000 micrograms/cu. m.
  - f. Naphthalene 91-20-3: 9 micrograms/cu. m.
  - g. Phenol 108-95-2: 200 micrograms/cu. m.
  - h. Styrene 100-42-5: 900 micrograms/cu. m.
  - i. Tetrachloroethylene 127-18-4: 35 micrograms/cu. m.
  - j. Toluene 108-88-3: 300 micrograms/cu. m.
  - k. Vinyl acetate 108-05-4: 200 micrograms/cu. m.
  - l. Dichlorobenzene (1,4-) 106-46-7: 800 micrograms/cu. m.
  - m. Xylenes-total 108-38-3, 95-47-6, and 106-42-3: 700 micrograms/cu. m.
4. If the TVOC If the TVOC levels exceed 500 µg/m<sup>3</sup>, investigate for potential issues by comparing the individual VOC levels from the GC/MS results to associated cognizant authority health-based limits. Correct any identified issues and re-test if necessary.
5. For each sampling point where the maximum concentration limits are exceeded, conduct additional flush-out with outdoor air and retest the specific parameter(s) exceeded to indicate the requirements are achieved. Repeat procedure until requirements have been met. When retesting noncomplying building areas, take samples from same locations as in the initial test. Take corrective action until requirements have been met. All testing shall be complete prior to occupancy.
6. Air-sample testing shall be conducted as follows:
  - a. All measurements shall be conducted prior to occupancy but during normal occupied hours, and with 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.
  - b. Building shall have all interior finishes installed, including, but not limited to, millwork, doors, paint, carpet, and acoustic tiles. Nonfixed furnishings, such as workstations and partitions, are encouraged, but not required, to be in place for the testing.
  - c. Number of sampling locations varies depending on the size of building and number of ventilation systems. For each portion of building served by a separate ventilation system, the number of sampling points shall not be less than one per 5000 sq. ft. (465 sq. m). For large open spaces, one sampling point per 50,000 sq. ft. (4654 sq. m) may be used.

- C. Air samples shall be collected between **3 and 6 feet** from the floor to represent the breathing zone of occupants, and over a minimum four-hour period.

END OF SECTION 017320

**SECTION 017323 - SEQUENCE OF FINISH INSTALLATION****PART 1 - GENERAL****1.1 RELATED DOCUMENTS:**

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to this Section.

**1.2 WORK INCLUDED:**

- A. General: Project schedule shall address construction scheduling/sequencing requirements and procedures necessary to optimize Indoor Air Quality (IAQ) levels for the completed Project.
  - 1. Scheduling: Contractor's Project Schedule for finish applications shall allow for:
    - a. Dissipation of emissions from finish materials that off-gas deleterious materials during curing.
    - b. Separation of adsorptive finishes from any potential contaminants during material storage and installation.
    - c. Sequencing installation of materials to comply with IAQ requirements of this Section.
  - 2. Procedures: Special procedures involve provision of ventilation during construction.
- B. Temporary Ventilation During Construction: Contractor shall follow procedures specified.
  - 1. When Contractor's "Project Schedule" requires less than optimal sequencing of finish installation, related to IAQ, provide supplemental "fresh air" ventilation of work areas during construction and restrict/control the use of permanent building mechanical systems prior to Owner acceptance of building to prevent contamination of systems by construction wastes and other deleterious substances.
    - a. Comply with additional restrictions on the use of permanent building mechanical systems prior to Owner acceptance as specified in Division 01 Section 017320 "Testing for Indoor Air Quality, Baseline IAQ and Materials."
- C. Materials Emissions/Manufacturer Testing:



1. Materials specified by the Architect have been evaluated for IAQ impact. Contractor proposed substitutions shall provide necessary manufacturer's information to allow evaluation of product emissions and the impact on IAQ.
  2. Emissions data for substitutions are required in order to determine that their installation and use will not cause specified indoor air pollutant limits to be exceeded. Indoor air pollutant limits are specified in the table "Maximum Indoor Air Concentrations Standards" in Part 3 of this Section.
  3. Where manufacturer's published data is not available or is insufficient to evaluate a material or product, substitution may be rejected, at Construction manager's and/or Architect's discretion.
- D. Duct Cleaning: Contractor shall provide duct cleaning as specified in this Section.

### 1.3 DEFINITIONS:

- A. Type 1 Finishes: Materials and finishes which have a potential for short-term levels of off gassing from chemicals inherent in their manufacturing process installation techniques, or which are applied in a form requiring vehicles or carriers for spreading which release a high level of particulate matter in the process of installation and/or curing. Type 1 Finishes include, but are not limited to the following:
1. Adhesives, sealants, and glazing compounds, specifically those with petrochemical vehicles or carriers.
  2. Control and/or expansion joint fillers.
  3. Solid surfacing materials requiring adhesive installation.
  4. Cement plastering and associated finish processes.
- B. Type 2 Finishes: Absorbent materials and finishes which are woven, fibrous, or porous in nature and tend to adsorb chemicals off-gassed by Type 1 Finishes or may be adversely affected by particulates. Type 2 Finishes include, but are not limited to the following:
1. Insulation exposed to the airstream.
- C. Materials that can be categorized as both Type 1 and Type 2 Finishes shall be treated as Type 1 Finishes.
- D. Materials that are categorized as neither Type 1 nor Type 2 are not bound by the requirements of this Section.

#### 1.4 SUBMITTALS:

- A. **Supplementary Construction Schedule:** Submit a schedule of construction showing compliance with requirements of this section as a supplement to the schedule required by Division 1 Section 013200 "Construction Schedule and Progress Documentation."
  - 1. Show sequence of finishes applications and allowances for curing times. Within each air zone identify finishes, indicating their type classifications.
    - a. An air zone is that part of any floor area served by a single air handling unit. Contractor's schedule must address controls in each air zone.
    - b. Indicate and schedule types and durations of temporary ventilations proposed. Show schedule for equipment start-up procedures and all temporary usages of building mechanical systems, identifying types of filtration used and schedule of filter replacement.
- B. **Material Safety Data Sheets (MSDSs):** Refer to submittal requirements specified under section 013300 – "Submittal Procedures". Submit directly to the CM.
- C. **Substitutions:** Provide the following data only for Contractor proposed substitution of materials not specified or listed in Product Schedule.
  - 1. **Product Emissions Test Reports:** Submit a report for each material emissions test performed. Include in test report all data specified below.
    - a. **Testing:** All material tests shall be performed by a certified ASTM testing laboratory in accordance with ASTM D 5116, "Standard Guide for Small Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products" (1990). Report results in accordance with ASTM Guide and include verification of laboratory qualifications.
    - b. **Materials Safety Data Sheets (MSDS):** Review all MSDS of materials to be submitted for testing as well as MSDS for other products where specifically requested in this Project Manual and identify those classified as "Prohibited Materials".
    - c. **Compliance:** Demonstrate through testing and MSDS review that proposed substitution meets all requirements of Division 1 "Environmental Impact of Materials" Section and all other applicable Sections in this Project Manual.

#### 1.5 QUALITY ASSURANCE:

- A. **General:** Perform the work of this Section as a supplement to and in accordance with applicable requirements of Division 1 Section 014000 "Quality Requirements."

- B. Finishes Installation Scheduling: As part of the Coordination Meetings, discuss the Supplementary Construction Schedule required under this Section. The purpose of this agenda item is to assure understanding of the importance of sequencing of finishes to the overall Indoor Air Quality of the facility and to secure preliminary approval of the CM for scheduling and installation

## **PART 2 - PRODUCTS (Not Applicable)**

## **PART 3 - EXECUTION**

### **3.1 PREPARATION:**

- A. Certify in writing to the CM that interior environmental control has been implemented as specified below and that required conditions are being maintained, and obtain the CM approval before starting installation of interior finishes.
- B. Coordination: The Contractor is responsible to schedule and coordinate the work of all finishes installers to assure compliance with the requirements of this specification section.

### **3.2 SEQUENCING FINISH INSTALLATION**

- A. Material Storage: Finish materials that are stored prior to installation shall be stored in such a manner that air-borne chemical and/or particulate contaminants cannot be transferred from Type 1 Finishes to Type 2 Finishes.
- B. Exemptions: Substrate materials which must be in-place in order to install any Type 1 Finish are exempt from sequencing requirements defined below. Ventilation requirements are not exempt for this condition.
- C. Type 1 Finishes: Install Type 1 Finishes in a manner compliant with the following:
  - 1. Allow wet-applied Type 1 Finishes to fully cure prior to commencing installation of adsorbent materials, whether Type 1 or Type 2.

Install all Type 1 Finishes prior to commencing installation of Type 2 Finishes.

- 2. Allow Type 1 materials that are known to off-gas deleterious vapors, whether due to manufacturing processes or installation techniques, to fully cure prior to installation of
- D. Type 2 Finishes:
  - 1. Remove particulate matter from interior space (whether air-borne or on a surface) prior to installation of Type 2 Finishes.

2. Comply with all ventilation requirements as required by this Section and identified below.
- E. Type 2 Finishes: Install Type 2 Finishes in a manner compliant with the following:
1. Do not install Type 2 Finishes until installation of Type 1 Finishes is complete and Flushout has been performed.
  2. Protect Type 2 Finishes from contamination by chemical off-gassing and/or air-borne particulates during and subsequent to installation.
  3. Avoid installation of Type 1 Finishes during Type 2 Finish installation period. (Refer to ventilation requirements if this condition is unavoidable.)
  4. Comply with all ventilation requirements as required by this Section and identified below.
- F. Ventilation: Provide ventilation of interior space during finish installation as follows, at a minimum:
1. Ventilation shall comply with Article "Interior Environmental Control" of this Section and all other ventilation requirements outlined in this Project Manual.
  2. Provide ventilation for the entire duration of installation and curing of wet-applied Type 1 Finishes.
  3. Provide ventilation for the entire duration of all periods in which Type 2 Finishes are present during installation of Type 1 materials.
  4. Provide ventilation at any time when it is desired to dissipate chemical off-gassing emissions and/or air-borne particulates out of the interior environment.
  5. Provide ventilation during all periods in which chemical off-gassing and/or air-borne particulate matter pose a health risk to any persons present.
- G. If Contractor's Project Schedule requires sequencing of finish installation that does not comply with this Section, provide the following for such period of construction during which sequencing is non-compliant:
1. Provide supplemental ventilation of work areas as described in Article "Interior Environmental Control" of this Section.
  2. Restrict/control the use of permanent building mechanical systems.

### 3.3 INTERIOR ENVIRONMENTAL CONTROL:

- A. Provide and maintain controlled interior environment prior to and during installation of interior finish materials as required by this Section.

- B. Comply with SMACNA's "SMACNA IAQ Guideline for Occupied Buildings under Construction."
1. If Owner authorizes use of permanent heating, cooling, and ventilating systems during construction period as specified in Division 01 Section "Temporary Facilities and Controls," install filter media of types required and specified for the final installation according to ASHRAE 52.2 at each return-air inlet for the air-handling system used during construction.
  2. Replace all air filters immediately prior to occupancy. Replacement air filter shall be of types required and specified for the final installation and according to ASHRAE 52.2

END OF SECTION 01732

## **SECTION 017329 – CUTTING AND PATCHING**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Provide the work of this Section in accordance with requirements of the Contract Documents.
- B. This Section includes but is not limited to general administrative and procedural requirements governing cutting and patching.
- C. Related Requirements:
  - 1. Division 01 Section 013300 "Submittal Procedures" for work plans.
  - 2. Division 02 Section 024111 "Demolition" for demolition and removal of selected portions of the building.
  - 3. Division 07 Section 078413 "Penetration Firestopping" for patching penetrations in fire-rated construction.

#### **1.2 DEFINITIONS**

- A. Cutting: Removal of existing or in-place and completed construction necessary to permit installation or performance of other work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

#### **1.3 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For professional engineer.
- B. Cutting and Patching Plan: Submit plan describing procedures at least 10 working days prior to the time cutting and patching will be performed. Include the following information:
  - 1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
  - 2. 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.
  - 3. Products: List products to be used for patching and firms or entities that will perform patching work.
  - 4. Dates: Indicate when cutting and patching will be performed.

#### 1.4 QUALITY ASSURANCE

- A. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated.
- B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
  - 1. Structural Elements: When cutting and patching structural elements, notify Construction Manager of locations and details of cutting and await directions from CM 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.
  - 2. 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:
    - a. Primary operational systems and equipment.
    - b. Fire separation assemblies.
    - c. Air or smoke barriers.
    - d. Fire-suppression systems.
    - e. Mechanical systems piping and ducts.
    - f. Control systems.
    - g. Communication systems.
    - h. Fire-detection and -alarm systems.
    - i. Conveying systems.
    - j. Electrical wiring systems.
    - k. Operating systems of special construction.
    - l. Electronic security systems.
    - m. Other systems designated by the CM.
  - 3. 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. Other construction elements include but are not limited to the following:
    - a. Water, moisture, or vapor barriers.
    - b. Membranes and flashings.
    - c. Exterior windows, entrances, and storefronts.
    - d. Exterior curtain-wall construction.
    - e. Sprayed fire-resistive material.
    - f. Equipment supports.
    - g. Piping, ductwork, vessels, and equipment.
    - h. Noise- and vibration-control elements and systems.

4. 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 Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner. Visual elements include the following:
  - a. Processed concrete finishes.
  - b. Stone panel cladding.
  - c. Ornamental metal.
  - d. Matched-veneer woodwork.
  - e. Preformed metal panels.
  - f. Roofing.
  - g. Firestopping.
  - h. Window system.
  - i. Carpeting.
  - j. Fluid-applied flooring.
  - k. Wall covering.
  - l. HVAC enclosures, cabinets, or covers.
  - m. Other elements designated by the Architect
- C. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

## 1.5 WARRANTY

- A. Effect on Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void warranties.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
  1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with requirements in the following:
    - a. Division 01 Section 018115 "Sustainable Design Requirements - SITES V2."
    - b. Division 01 Section 018114 "Sustainable Design Requirements – LEED".
- B. 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.



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

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
  1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
  2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Existing Utility Services and Mechanical/Electrical Systems: Where in-place services/systems are required to be removed, relocated, modified or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.

### **3.3 CUTTING AND PATCHING**

- A. 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.
  1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. 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.
- C. Temporary Support: Provide temporary support of work to be cut.
- D. 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.

- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Division 01 Section 011000"Summary."
- F. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
  - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
  - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
  - 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
  - 4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
  - 5. Proceed with patching after construction operations requiring cutting are complete.
- G. 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. Provide materials and comply with installation requirements specified in other Sections, where applicable.
  - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
  - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
    - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    - b. Restore damaged pipe covering to its original condition.
  - 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
    - a. Where patching occurs in a painted surface, 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. Provide additional coats until patch blends with adjacent surfaces.

4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
  5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
- H. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

END OF SECTION 017329

## **SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Provide the work of this Section in accordance with requirements of the Contract Documents.
- B. This Section includes, but is not limited to administrative and procedural requirements for the following:
  - 1. Recycling nonhazardous demolition and construction waste.
  - 2. Disposing of nonhazardous demolition and construction waste.
- C. Related Requirements:
  - 1. Division 02 Section 024111 "Demolition" for disposition of waste resulting from demolition of buildings, structures, and site improvements.
  - 2. Division 04 Section 042200 "Concrete Unit Masonry" for disposal requirements for masonry waste.
  - 3. Division 31 Section 311000 "Site Clearing" for disposition of waste resulting from site clearing and removal of above- and below-grade improvements.

#### **1.2 DEFINITIONS**

- A. Alternative Daily Cover: Material other than earthen material placed on the surface of the active face of a municipal solid waste landfill at the end of each operating day to control vectors, fires, odors, blowing litter, and scavenging.
- B. Co-mingled Waste: Building waste streams that are combined on the project site and hauled away for sorting into recyclable streams. Also known as single-stream recycling.
- C. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- D. Demolition Waste: Building and site improvement materials resulting from demolition operations.
- E. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- F. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

### 1.3 PERFORMANCE REQUIREMENTS

- A. General: Achieve end-of-Project rates for salvage/recycling of 85 percent by weight of total non-hazardous solid waste generated by the Work. 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, including the following:
1. Construction Waste:
    - a. Masonry and CMU.
    - b. Lumber.
    - c. Wood sheet materials.
    - d. Wood trim.
    - e. Metals.
    - f. Roofing.
    - g. Insulation.
    - h. Carpet and pad.
    - i. Gypsum board.
    - j. Piping.
    - k. Electrical conduit.
    - l. Packaging: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following uncontaminated packaging materials:
      - 1) Paper.
      - 2) Cardboard.
      - 3) Boxes.
      - 4) Plastic sheet and film.
      - 5) Polystyrene packaging.
      - 6) Wood crates.
      - 7) Plastic pails.
- B. Divert a minimum of three waste streams.
- C. Single stream recycling shall be implemented for the following materials at a minimum:
1. Masonry and CMU.
  2. Metals.
  3. Gypsum board.
- D. Comingled recycling, if collected, shall be sent to offsite sorting facilities certified by the Recycling Certification Institute.
- E. All fluorescent lamps, HID lamps and mercury-containing thermostats removed from the site shall be recycled.

### 1.4 ACTION SUBMITTALS

- A. Waste Management Plan: Submit plan within 30 working days of date established for the Notice to Proceed.

## 1.5 INFORMATIONAL SUBMITTALS

- A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Use Form CWM-5 for construction waste. Include the following information:
  - 1. Material category.
  - 2. Generation point of waste.
  - 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 in tons.
  - 7. Total quantity of waste recovered as a percentage of total waste.
- B. Waste Reduction Calculations: Before request for Substantial Completion, submit calculated end-of-Project rates for salvage, recycling, waste diversion and disposal as a percentage of total waste generated by the Work, to demonstrate compliance with required overall Diversion rate percentage set forth in this Section.
  - 1. Waste diverted as alternative daily cover at landfills is not tabulated as recycled.
  - 2. Land clearing debris, excavated soil and hazardous materials are excluded from this calculation.
- C. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
- D. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
- E. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- F. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- G. LEED Submittal: LEED calculator for Construction and Demolition Waste Management, 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.
- H. Qualification Data: For waste management coordinator and refrigerant recovery technician.
- I. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

## 1.6 QUALITY ASSURANCE

- A. Waste Management Officer Qualifications: Experienced firm, with a record of successful waste management coordination of projects with similar requirements, that employs a LEED-Accredited Professional, certified by the USGBC, as waste management coordinator. Waste management coordinator may also serve as LEED Compliance Officer.
- B. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.
- C. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
- D. Waste Management Coordination Conferences: Conduct conference at Project site to comply with requirements in Division 01 Section 013100 "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:
  - 1. Review and discuss waste management plan including responsibilities of waste management coordinator.
  - 2. Review requirements for documenting quantities of each type of waste and its disposition.
  - 3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
  - 4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
  - 5. Review waste management requirements for each trade.

## 1.7 WASTE MANAGEMENT PLAN

- A. General: Develop a Construction Waste Management Plan (CWMP) according to ASTM E1609, LEED, and requirements in this Section. Plan shall consist of waste identification, and waste reduction work plan. Distinguish between demolition and construction waste. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.
- B. Waste Identification: Indicate anticipated types and quantities of demolition site-clearing and construction waste generated by the Work. Use Form CWM-1 for construction waste and Form CWM-2 for demolition waste. Include estimated quantities and assumptions for estimates.
- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Use Form CWM-3 for construction waste. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
  - 1. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.

2. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
3. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
4. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.
5. Waste Streams: Include management plan and schedule for diverting multiple waste streams through the duration of demolition and construction.

## **PART 2 - Not Used**

## **PART 3 - EXECUTION**

### **3.1 PLAN IMPLEMENTATION**

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
  1. Comply with operation, termination, and removal requirements in Division 01 Section 015000 "Temporary Facilities and Controls."
- B. Waste Management Officer: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan. Coordinator shall be present at Project site full time for duration of Project.
- C. 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 three working days of submittal return.
  2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
  1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.



2. Comply with Division 01 Section 015000 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

### 3.2 RECYCLING CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Web Resources (Information only; no warranty or endorsement is implied.)
  1. [www.usgbc.org](http://www.usgbc.org) Site of the United States Green Building Council, with a description of the LEED certification process and requirements for C&D waste recycling
  2. <http://www.epa.gov/epaoswer/non-hw/debris-new> Site of the U.S. Environmental Protection Agency that discusses construction and demolition waste issues, and links to other resources.
  3. <https://www.recyclingcertification.org/> Recycling Certification Institute that oversees the national certification program to ensure integrity, transparency, accuracy and reliability in the recovery/recycling reports of participating C&D recycling facilities.
- C. Recycling Receivers and Processors: List below is provided for information only; available recycling receivers and processors include, but are not limited to, the following:
  1. Provide names and telephone numbers of local recycling receivers and processors of recyclable materials.
- D. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.
- E. 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 process.
- F. 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 Project site. Include list of acceptable and unacceptable materials at each container and bin.
    - a. Inspect containers and bins for contamination and remove contaminated materials if found.
  2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
  3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
  4. Store components off the ground and protect from the weather.

5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor.

### 3.3 RECYCLING CONSTRUCTION WASTE

#### A. Packaging:

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

#### B. Site-Clearing Wastes: Comply with requirements in Division 32 Section 0311000 "Site Clearing" for handling tree and plant wastes.

#### C. 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.

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

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

### 3.4 DISPOSAL OF WASTE

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

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

#### B. Burning: Do not burn waste materials.

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

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

### 3.5 ATTACHMENTS

#### A. Form CWM-1 for construction waste identification.

#### B. Form CWM-3 for construction waste reduction work plan.

- C. Form CWM-5 for construction waste
- D. Form CWM-7 cost/revenue analysis of construction waste reduction work plan.

END OF SECTION 017419

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**CONSTRUCTION WASTE IDENTIFICATION - FORM CWM-1**

<b>MATERIAL CATEGORY</b>	<b>GENERATION POINT</b>	<b>EST. QUANTITY OF MATERIALS RECEIVED* (A)</b>	<b>EST. WASTE - % (B)</b>	<b>TOTAL EST. QUANTITY OF WASTE* (C = A x B)</b>	<b>EST. VOLUME CY (CM)</b>	<b>EST. WEIGHT TONS (TONNES)</b>	<b>REMARKS AND ASSUMPTIONS</b>
Packaging: Cardboard							
Packaging: Boxes							
Packaging: Plastic Sheet or Film							
Packaging: Polystyrene							
Packaging: Pallets or Skids							
Packaging: Crates							
Packaging: Paint Cans							
Packaging: Plastic Pails							
Site-Clearing Waste							
Masonry or CMU							
Lumber: Cut-Offs							
Lumber: Warped Pieces							
Plywood or OSB (scraps)							
Wood Forms							
Wood Waste Chutes							
Wood Trim (cut-offs)							
Metals							
Insulation							
Roofing							
Joint Sealant Tubes							
Gypsum Board (scraps)							
Carpet and Pad (scraps)							
Piping							
Electrical Conduit							
Other:							

\* Insert units of measure.

2023-02-01 – 100% DD Issue

Applied Engineering Project 21-154

CONSTRUCTION WASTE REDUCTION WORK PLAN - FORM CWM-3						
MATERIAL CATEGORY	GENERATION POINT	TOTAL EST. QUANTITY OF WASTE TONS (TONNES)	DISPOSAL METHOD AND QUANTITY			HANDLING AND TRANSPORTION PROCEDURES
			EST. AMOUNT SALVAGED TONS (TONNES)	EST. AMOUNT RECYCLED TONS (TONNES)	EST. AMOUNT DISPOSED TO LANDFILL TONS (TONNES)	
Packaging: Cardboard						
Packaging: Boxes						
Packaging: Plastic Sheet or Film						
Packaging: Polystyrene						
Packaging: Pallets or Skids						
Packaging: Crates						
Packaging: Paint Cans						
Packaging: Plastic Pails						
Site-Clearing Waste						
Brick						
Concrete Masonry Units						
Lumber: Cut-Offs						
Lumber: Warped Pieces						
Plywood or OSB (scraps)						
Wood Forms						
Wood Waste Chutes						
Wood Trim (cut-offs)						
Metals						
Insulation						
Roofing						
Joint Sealant Tubes						
Gypsum Board (scraps)						
Carpet and Pad (scraps)						
Piping						
Electrical Conduit						
Other:						

2023-02-01 – 100% DD Issue

Applied Engineering Project 21-154

CONSTRUCTION WASTE REDUCTION PROGRESS REPORT - FORM CWM-5								
MATERIAL CATEGORY	GENERATION POINT	TOTAL QUANTITY OF WASTE TONS (TONNES) (A)	QUANTITY OF WASTE SALVAGED		QUANTITY OF WASTE RECYCLED		TOTAL QUANTITY OF WASTE RECOVERED TONS (TONNES) (D = B + C)	TOTAL QUANTITY OF WASTE RECOVERED % (D / A x 100)
			ESTIMATED TONS (TONNES)	ACTUAL TONS (TONNES) (B)	ESTIMATED TONS (TONNES)	ACTUAL TONS (TONNES) (C)		
Packaging: Cardboard								
Packaging: Boxes								
Packaging: Plastic Sheet or Film								
Packaging: Polystyrene								
Packaging: Pallets or Skids								
Packaging: Crates								
Packaging: Paint Cans								
Packaging: Plastic Pails								
Site-Clearing Waste								
Brick								
Concrete Masonry Units								
Lumber: Cut-Offs								
Lumber: Warped Pieces								
Plywood or OSB (scraps)								
Wood Forms								
Wood Waste Chutes								
Wood Trim (cut-offs)								
Metals								
Insulation								
Roofing								
Joint Sealant Tubes								
Gypsum Board (scraps)								
Carpet and Pad (scraps)								
Piping								
Electrical Conduit								
Other:								

2023-02-01 – 100% DD Issue

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<b>COST/REVENUE ANALYSIS OF CONSTRUCTION WASTE REDUCTION WORK PLAN - FORM CWM-7</b>								
<b>MATERIALS</b>	<b>TOTAL QUANTITY OF MATERIALS (VOL. OR WEIGHT) (A)</b>	<b>EST. COST OF DISPOSAL (B)</b>	<b>TOTAL EST. COST OF DISPOSAL (C = A x B)</b>	<b>REVENUE FROM SALVAGED MATERIALS (D)</b>	<b>REVENUE FROM RECYCLED MATERIALS (E)</b>	<b>LANDFILL TIPPING FEES AVOIDED (F)</b>	<b>HANDLING AND TRANSPORTATION COSTS AVOIDED (G)</b>	<b>NET COST SAVINGS OF WORK PLAN (H = D+E+F+G)</b>
Packaging: Cardboard								
Packaging: Boxes								
Packaging: Plastic Sheet or Film								
Packaging: Polystyrene								
Packaging: Pallets or Skids								
Packaging: Crates								
Packaging: Paint Cans								
Packaging: Plastic Pails								
Site-Clearing Waste								
Masonry or CMU								
Lumber: Cut-Offs								
Lumber: Warped Pieces								
Plywood or OSB (scraps)								
Wood Forms								
Wood Waste Chutes								
Wood Trim (cut-offs)								
Metals								
Insulation								
Roofing								
Joint Sealant Tubes								
Gypsum Board (scraps)								
Carpet and Pad (scraps)								
Piping								
Electrical Conduit								
Other:								

## SECTION 017423 - FINAL CLEANING

### **PART 1 - GENERAL**

#### 1.0 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

#### 1.1 SUMMARY

- A. Work includes:
  - 1. Final cleaning of all finishes after completion of Punchlist items and prior to turnover to Construction Manager and Owner.
  - 2. Temporary and final waxing of vinyl composition flooring (VCT) and other sheet vinyl flooring products.
  - 3. Waxing shall be EXCLUSIVE of electrically conductive and electro-static dissipating flooring types which are not to be waxed, except as approved by the CM utilizing specialty coatings specifically designed for type of flooring.
  - 4. Carpet vacuuming.
- B. Related work specified elsewhere
  - 1. See specific requirements in other Sections of the specification.

#### 1.2 CLEANING MATERIALS

- A. Use only products and methods recommended by manufacturer for cleaning surfaces for which the CM has given approval, so that cleaning and coating products are consistent with the facility management techniques.

#### 1.3 GENERAL

- A. Do not allow accumulations of scrap, debris, waste material and other items not required for the Work.
- B. Provide all material, supervision, labor, equipment, safety gear, hoisting and scaffolds, as needed, to safely complete this work.
- C. Segregate and identify those areas with a Project which have been cleaned from non-cleaned areas. Communicate with the CM the cleaned areas.
- D. Clarify whether areas cleaned areas have been accomplished prior to or after completion of punch list items remedial work.



## 1.4 FINAL CLEANING

### A. Upon completion of a work category:

1. Remove grease, dust, dirt, stains, labels (except where required by codes), applied tape, fingerprints, etc., from exposed finished surfaces.
2. Remove equipment tools, packaging, scaffolding, surplus materials and all debris resulting from the work.
3. Remove temporary signage.
4. Remove temporary protective strippable films from surfaces.
5. Glass: Clean inside and outside. Clean all mirrors.
6. Wipe down walls, wall base, hard ceilings, light fixtures, diffusers/grilles, window stools, casework/ledges/counters to remove marking, fingerprints, accumulated dust and grime.
7. Lockers: Clean lockers inside and outside. Also wipe down benches.
8. Site:
  - a. Broom clean pavements.
  - b. Remove debris.
9. VCT Floor Wax: Provide 3 coats of protective wax to VCT flooring to prevent scratches. (Note that this needs to be performed immediately after VCT has cured.) Prior to CM turn-over, protective wax will need to be stripped off, and floor will require buffing, polishing, and 3 coats minimum of wax. Wax product must be submitted to the CM for approval.
  - a. Coordinate all wax products with the CM to use the same, or approved products acceptable to the CM.
10. Carpeting: Vacuum
11. Additional Flooring (i.e.: wood, sealed concrete, resinous, sports flooring, etc.) will required wet mopping without leaving residue.
12. Showers/Restrooms: Clean all mirrors, plumbing fixtures, toilet accessories/partitions, floors and walls.
13. Labs: Wipe down all lab tops, casework, fume hoods and other equipment.
14. Display Cases/Casework/Trim: Wipe down inside and outside.
15. Glass Surfaces: Door, viewing, wall surfaces, lean with products which do not leave a residue, do not damage sealants and rubberized setting gaskets.
16. Miscellaneous: Clean all other horizontal/vertical surfaces exposed to view.

**PART 2 - (Not Applicable)**

**PART 3 - (Not Applicable)**

END OF SECTION 017423

## **SECTION 017700 - CLOSEOUT PROCEDURES**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Provide the work of this Section in accordance with requirements of the Contract Documents.
- B. This Section includes but is not limited to administrative and procedural requirements for contract closeout, including, but not limited to, the following:
  - 1. Substantial Completion procedures.
  - 2. Final completion procedures.
  - 3. Warranties.
  - 4. Final cleaning.
  - 5. Repair of the Work.
- C. Related Requirements:
  - 1. Division 01 Section 013233 "Photographic Documentation" for submitting final completion construction photographic documentation.
  - 2. Division 01 Section 013300 "Submittal Procedures" for administrative submittal requirements and electronic submittal requirements.
  - 3. Division 01 Section 017300 "Execution" for progress cleaning of Project site.
  - 4. Division 01 Section 017836 "Operation and Maintenance Data" for operation and maintenance manual requirements.
  - 5. Division 01 Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
  - 6. Division 01 Section 017900 "Demonstration and Training" for requirements for instructing Owner's personnel.
  - 7. Sections of Divisions 21, 22, 23, and 26 for specific closeout requirements relate to mechanical, electrical and plumbing systems.

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For cleaning agents.

- B. Contractor's List of Incomplete Items (Punch List): Initial submittal at Substantial Completion.
- C. Certified List of Incomplete Items (Punch List): Final submittal at Final Completion.

### 1.3 CLOSEOUT SUBMITTALS

- A. Certificates of Release: Certificate of Occupancy from authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage. Construction Manager and/or Owner will assume coverage after Substantial Completion. Contractor will identify to the CM when Construction Insurance coverage is terminating.
- C. Field Report: For pest control inspection.

### 1.4 MAINTENANCE MATERIAL SUBMITTALS

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

### 1.5 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's Punch List), indicating the value of each item on the list and reasons why the Work is incomplete. Punch List shall be prepared using the CM's Site Observation web-based database application. The web based application can be accessed by Contractor and CM personnel.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 working days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
  - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
  - 2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, surveys, final shop drawings, final substitution records, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property and similar final records information.

3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by the Construction Manager. Label with manufacturer's name and model number
    - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Construction Manager's signature for receipt of submittals.
  4. Submit test/adjust/balance records.
  5. Submit sustainable design submittals required in Division 01 Section 018144 "Sustainable Design Requirements – LEED" and in individual Sections.
  6. Submit sustainable design submittals required in Division 01 Section 018115 "Sustainable Design Requirements – SITES v2" and in individual Sections.
  7. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 working days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Advise CM of pending insurance changeover requirements.
  2. Make final changeover of permanent locks and securely deliver keys to CM and Owner. Advise CM's personnel of changeover in security provisions.
  3. Complete startup and testing of systems and equipment.
  4. Complete commissioning procedures, reporting and start-up tasks.
  5. Perform preventive maintenance on equipment used prior to Substantial Completion.
  6. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Division 01 Section 017900 "Demonstration and Training."
  7. Advise CM and Owner of changeover in utility services.
  8. Participate with Cm and Owner in conducting inspection and walkthrough with local emergency responders.

9. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
  10. Complete final cleaning requirements, including touchup painting.
  11. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 working days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Construction Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. CM and/or Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of Punch List items, either on Contractor's list or additional items identified by CM and/or Architect, that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
  2. Upon acknowledgement that the Work is substantially complete, the Construction Manager and/or Architect will:
    - a. Prepare a Certificate of Substantial Completion on AIA Form G704, accompanied by Contractor's list of items to be completed or corrected, as verified and amended by the Construction Manager.
    - b. Submit the Certificate to Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate, including time limits for completion and correction of Work.
      - 1) Failure to include any item in the Punch List does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.
  3. The Construction Manager, Architect, and Owner may review and amend the list of items to be completed or corrected and append the Punch List of the Certificate of Substantial Completion at any time before Contractor's final Notice of Completion.
  4. Results of completed inspection will form the basis of requirements for final completion.

## 1.6 FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:
1. Submit a final Application for Payment according to Division 01 Section 012900 "Payment Procedures."

2. Certified List of Incomplete Items: Submit certified copy of CM's Substantial Completion inspection list of items to be completed or corrected (Punch List), endorsed and dated by CM and/or Architect. Final version of the Punch List shall state that each item has been completed or otherwise resolved for acceptance.
  3. Submit required Project Record Drawings; Affidavit of Payment of Debts and Claims.; Affidavit of Release of Liens; Consent of Surety to Final Payment, and Consent of Surety to Reduction in or Partial Release of Retainage.
  4. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
  5. Submit pest-control final inspection report.
- B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 working days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect and Construction Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. CM will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

#### 1.7 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. To assist the Construction Manager in providing the punch list required by the Agreement, prepare a list of incomplete items in the CM's Site Observation Report or on the website.
- B. Prior to the CM's preparation of a Project Punch List, the Contractor shall prepare and keep his own punch list on the job for use by his employees and subcontractors and for use by other contractors and for use by the CM to facilitate completion of the work.
- C. The Contractor's inspection shall be as thorough as possible, in accordance with its desire to provide first-class workmanship and maintain good reputation, and shall include work under its contract, including that of its subcontractors.
- D. The Construction Manager and/or Architect shall observe the work, providing work on the Contractor's punch list has been completed, and prepare the Project Punch List for use by the Contractor and their subcontractors to expedite proper completion of the work.
- E. The time fixed by the CM, for the completion of all items on the list accompanying the Certificate of Substantial Completion shall not be greater than 21 days. The Contractor shall complete items on the list within such 21

day period. The Contractor shall begin completion and correction activities within 7 days of receipt of the lists and complete all activities within the 21 day period specified. If the Contractor fails to do so, the CM in its discretion may perform the work by itself or others and the cost thereof shall be charged against the Contractor. If more than one inspection by the CM and/or Architect for the purpose of evaluating corrected work is required by the subject list of items to be completed or corrected, it will be performed at the Contractor's expense.

1. At the time the CM commences the Substantial Completion Inspection, if the CM discovers excessive additional items requiring completion or correction, the CM may decline to continue the inspection, instructing the Contractor as to the general classification of deficiencies which must be corrected before the CM will resume the Substantial Completion Inspection. If the Contractor fails to pursue the Work so as to make it ready for Substantial Completion Inspection in a timely fashion, the CM shall, after notifying the Contractor, conduct inspections and develop a list of items to be completed or corrected.
  - a. The CM will furnish a list of items to the Contractor who shall proceed to correct such items within 21 days.
  - b. The CM will conduct additional inspections as required to determine that the work is ready for Substantial Completion Inspection.
2. The CM will invoice the Contractor for 1.) The cost of inspections between the termination of the initial Substantial Completion Inspection and the commencement of the satisfactory Substantial Completion Inspection, 2.) The cost of inspection or review after the 21 day period established for the completion of the list by the Contractor. The Contractor shall reimburse the CM for such cost, including amounts payable to the Architect for such services from the amounts due the Contractor under the Contract Documents.

F. Organization of Punch List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction, in form indicated by use by the CM.

1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:
  - a. Project name.
  - b. Date.
  - c. Name of Construction Manager.



- d. Name of Contractor.
- e. Page number.
- 4. Submit list of incomplete items in the following format:
  - a. PDF electronic file. Construction Manager, will return annotated file.

#### 1.8 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Construction Manager for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Partial Occupancy: Submit properly executed warranties within 15 working days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
  - 1. Designate specific warranties that will be included in operation and maintenance manuals.

#### 1.9 CORRECTION OF WORK PERIOD (WARRANTY)

- A. Prior to the expiration of the one year correction of work period (general warranty), the CM will check to see if additional work by the Contractor(s) is needed to make good on the warranties. An itemized list will be furnished to the Contractor for corrective or replacement work.
- B. This work shall be completed immediately by the Contractor(s) after receiving notification.

#### 1.10 CERTIFICATION OF CODE COMPLIANCE

- A. Prior to final payment, the contractors indicated below shall submit to the Contractor (in duplicate) letters of certification of code compliance as follows:
  - 1. The Contractor for Division 22 thru 25 Work shall submit letter certifying mechanical installations comply with UMC current applicable editions.

2. The Contractor for Division 26 thru 28 Work shall submit letters certifying that electrical wiring complies with NEC current applicable editions.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
  1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

## **PART 3 - EXECUTION**

### **3.1 FINAL CLEANING**

- A. General: Prior to Substantial Completion inspection and the Owner's occupancy of the Work, clean all areas of the building and Project Site. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
  1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
    - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
    - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    - e. Remove snow and ice to provide safe access to building.

- f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
  - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
  - h. Sweep concrete floors broom clean in unoccupied spaces.
  - i. Clean ceramic tile walls and floors.
  - j. Clean, buff and wax resilient floors.
  - k. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
  - l. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
  - m. Remove labels that are not permanent.
  - n. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
  - o. Clean plumbing fixtures, accessories, and trim to a sanitary condition, free of stains, including stains resulting from water exposure.
  - p. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
  - q. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
    - 1) Clean HVAC system in compliance with NADCA Standard 1992-01. Provide written report on completion of cleaning.
  - r. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
  - s. Leave Project clean and ready for occupancy.
- C. Pest Control: Comply with pest control requirements in Division 01 Section 015000 "Temporary Facilities and Controls." Prepare written report.
- D. Construction Waste Disposal: Comply with waste disposal requirements in Division 01 Section 015000 "Temporary Facilities and Controls" and Division 01 Section 017419 "Construction Waste Management and Disposal."

### 3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion. Prior to performing any repairs, submit a description of repair work and procedures for approval.
- B. Repair or remove and replace defective construction at no additional cost to the CM and/or Owner. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
  - 1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
  - 2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that already show evidence of repair or restoration.
    - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
  - 3. Immediately prior to Owner occupancy, replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
  - 4. Immediately prior to Owner occupancy, replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 017700

## **SECTION 017823 - OPERATION AND MAINTENANCE DATA**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Provide the work of this Section in accordance with requirements of the Contract Documents.
- B. This section includes but is not limited to administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
  - 1. Operation and maintenance documentation directory.
  - 2. Emergency manuals.
  - 3. Operation manuals for systems, subsystems, and equipment.
  - 4. Product maintenance manuals.
  - 5. Systems and equipment maintenance manuals.
- C. Related Requirements:
  - 1. Division 01 Section 013300 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
  - 2. Division 01 Section 019100 "Building Systems Commissioning" for verification and compilation of data into operation and maintenance manuals.

#### **1.2 DEFINITIONS**

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

#### **1.3 CLOSEOUT SUBMITTALS**

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

1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to CM.
  - a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
  - b. Enable inserted reviewer comments on draft submittals.
- C. Initial Manual Submittal: Submit electronic draft copy of each manual at least 30 working days before commencing demonstration and training. CM and Commissioning Authority will comment on whether general scope and content of manual are acceptable.
- D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 working days before commencing demonstration and training. CM and Commissioning Authority will return copy with comments.
  1. Correct or revise each manual to comply with CM's and Commissioning Authority's comments. Submit copies of each corrected manual within 15 working days of receipt of CM's and Commissioning Authority's comments and prior to commencing demonstration and training.

## **PART 2 - PRODUCTS**

### **2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY**

- A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information. Include a section in the directory for each of the following:
  1. List of documents.
  2. List of systems.
  3. List of equipment.
  4. Table of contents.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no

designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

## 2.2 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. Organization: Manuals shall be in all-electronic format. Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
  - 1. Title page.
  - 2. Table of contents.
  - 3. Manual contents.
- B. Title Page: Include the following information:
  - 1. Subject matter included in manual.
  - 2. Name and address of Project.
  - 3. Name and address of Owner.
  - 4. Date of submittal.
  - 5. Name and contact information for Contractor.
  - 6. Name and contact information for Construction Manager.
  - 7. Name and contact information for Architect.
  - 8. Name and contact information for Commissioning Authority.
  - 9. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
  - 10. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in electronic manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
- D. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
  - 1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
  - 2. File Names and Bookmarks: Enable bookmarking of individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so

that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

## 2.3 EMERGENCY MANUALS

- A. Content: Organize manual into a separate section for each of the following:
  - 1. Type of emergency.
  - 2. Emergency instructions.
  - 3. Emergency procedures.
- B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
  - 1. Fire.
  - 2. Flood.
  - 3. Gas leak.
  - 4. Water leak.
  - 5. Power failure.
  - 6. Water outage.
  - 7. System, subsystem, or equipment failure.
  - 8. Chemical release or spill.
- C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- D. Emergency Procedures: Include the following, as applicable:
  - 1. Instructions on stopping.
  - 2. Shutdown instructions for each type of emergency.
  - 3. Operating instructions for conditions outside normal operating limits.
  - 4. Required sequences for electric or electronic systems.
  - 5. Special operating instructions and procedures.

## 2.4 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
  - 1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.



2. Performance and design criteria if Contractor has delegated design responsibility.
  3. Operating standards.
  4. Operating procedures.
  5. Operating logs.
  6. Wiring diagrams.
  7. Control diagrams.
  8. Piped system diagrams.
  9. Precautions against improper use.
  10. License requirements including inspection and renewal dates.
- B. Descriptions: Include the following:
1. Product name and model number. Use designations for products indicated on Contract Documents.
  2. Manufacturer's name.
  3. Equipment identification with serial number of each component.
  4. Equipment function.
  5. Operating characteristics.
  6. Limiting conditions.
  7. Performance curves.
  8. Engineering data and tests.
  9. Complete nomenclature and number of replacement parts.
- C. Operating Procedures: Include the following, as applicable:
1. Startup procedures.
  2. Equipment or system break-in procedures.
  3. Routine and normal operating instructions.
  4. Regulation and control procedures.
  5. Instructions on stopping.
  6. Normal shutdown instructions.
  7. Seasonal and weekend operating instructions.
  8. Required sequences for electric or electronic systems.
  9. Special operating instructions and procedures.
- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

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

## 2.5 PRODUCT MAINTENANCE MANUALS

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Product Information: Include the following, as applicable:
  - 1. Product name and model number.
  - 2. Manufacturer's name address and phone number.
  - 3. Color, pattern, and texture.
  - 4. Material and chemical composition.
  - 5. Reordering information for specially manufactured products.
  - 6. Schedule of finish materials and commodities:
    - a. Masonry materials, including decorative block, brick, and stone.
    - b. Finishes for exposed woodwork.
    - c. Plastic laminate.
    - d. Finish door and cabinet hardware.
    - e. Glass and glazing.
    - f. Flooring materials including, stone and ceramic tile, terrazzo, wood flooring, resilient flooring and base, and carpeting.
    - g. Acoustical ceilings.
    - h. Acoustical wall treatments.
    - i. Special coatings, paints, and wall coverings.
    - j. Toilet accessories.
  - 7. Schedule of specialties and equipment:
    - a. Signage and visual display surfaces
    - b. Toilet and bath compartments.
    - c. Postal specialties.
    - d. Fire extinguishers and cabinets.

- e. Metal and wood lockers.
  - f. Fixed auditorium seating.
  - g. Window treatments including blinds, shades and draperies.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
  - 1. Inspection procedures.
  - 2. Types of cleaning agents to be used and methods of cleaning.
  - 3. List of cleaning agents and methods of cleaning detrimental to product.
  - 4. Schedule for routine cleaning and maintenance.
  - 5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
  - 1. Include procedures to follow and required notifications for warranty claims.

## 2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
  - 1. Standard maintenance instructions and bulletins.
  - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
  - 3. Identification and nomenclature of parts and components.
  - 4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
  2. Troubleshooting guide.
  3. Precautions against improper maintenance.
  4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  5. Aligning, adjusting, and checking instructions.
  6. Demonstration and training video recording, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
  2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.

## **PART 3 - EXECUTION**

### **3.1 MANUAL PREPARATION**

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.
- B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

- D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
  - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
  - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
  - 1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
  - 1. Do not use original project record documents as part of operation and maintenance manuals.
  - 2. Comply with requirements of newly prepared record Drawings in Section 017839 "Project Record Documents."
- G. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 017823

## **SECTION 017836 - WARRANTIES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

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

#### **1.2 SUMMARY**

- A. This Section includes administrative and procedural requirements for warranties required by the Contract Documents, including manufacturers' standard warranties on products and special warranties.
  - 1. Refer to the General Conditions for terms of the Contractor's period for correction of the Work.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 1 Section 013300 "Submittal Procedures" specifies procedures for submitting warranties.
  - 2. Division 1 Section 017700 "Closeout Procedures" specifies contract closeout procedures.
  - 3. Divisions 02 through 48 Sections for specific requirements for warranties on products and installations specified to be warranted.
  - 4. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.
- C. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.
- D. The warranties specified in the individual specification sections are in addition to, and not a limitation of other rights the Owner may have against the Contractor under the Contract Documents.

### 1.3 WARRANTY REQUIREMENTS

- A. Related Damages and Losses: When correcting failed or damaged warranted construction, remove and replace construction that has been damaged as a result of such failure or must be removed and replaced to provide access for correction of warranted construction.
- B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.
- D. Owner's Recourse: Expressed warranties made to the Owner are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available under the law. Expressed warranty periods shall not be interpreted as limitations on the time in which the Owner can enforce such other duties, obligations, rights, or remedies.
  - 1. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
- E. Where the Contract Documents require a special warranty, or similar commitment on the Work or part of the Work, the Owner reserves the right to refuse to accept the Work, until the Contractor presents evidence that entities required to countersign such commitments are willing to do so.
- F. Where equipment and/or systems are specified to be used for temporary purpose during the construction period, the applicable warranties will commence on the date of the Project Substantial Completion.

### 1.4 SUBMITTALS

- A. Submit written warranties to the Construction Manager prior to the date certified for Substantial Completion. If the CM's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the CM.
  - 1. When a designated portion of the Work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the CM within 15 days of completion of that designated portion of the Work.

- B. When the Contract Documents require the Contractor, or the Contractor and a subcontractor, supplier or manufacturer to execute a special warranty, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the CM for approval prior to final execution.
1. Refer to Divisions 02 through 48 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Form of Submittal: At Final Completion compile 2 copies of each required warranty properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual. All warranties shall reference the Project Owner, be signed, and contain the start and end date of the warranty.
- D. Bind warranties and bonds in heavy-duty, commercial-quality, durable 3-ring, vinyl-covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address, and telephone number of the Installer.
2. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project title or name, and name of the Contractor.
3. When warranted construction requires operation and maintenance manuals, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

**PART 2 - PRODUCTS (Not Applicable)****PART 3 - EXECUTION (Not Applicable)**

END OF SECTION 017836



## **SECTION 017839 - PROJECT RECORD DOCUMENTS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Provide the work of this Section in accordance with requirements of the Contract Documents.
- B. This section includes but is not limited to administrative and procedural requirements for project record documents, including the following:
  - 1. Record Drawings.
  - 2. Record Specifications.
  - 3. Record Product Data.
  - 4. Miscellaneous record submittals.
- C. Related Requirements:
  - 1. Division 01 Section 013300 "Submittal Procedures" for electronic submittal requirements.
  - 2. Division 01 Section 017300 "Execution" for final property survey.
  - 3. Division 01 Section 017700 "Closeout Procedures" for general closeout procedures.
  - 4. Division 01 Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.
  - 5. Sections 02 through 49 Sections for specific requirements for project record documents of the Work in those Sections.

#### **1.2 CLOSEOUT SUBMITTALS**

- A. Record Drawings: Comply with the following:
  - 1. Submit PDF electronic files of scanned record documents to the Construction Manager. Include all documents, whether changes were made or not.
  - 2. Number of Copies: Submit copies of record Drawings as follows:
    - a. Initial Submittal: Submit PDF electronic files of scanned record prints and one of file prints.
    - b. Final Submittal: Submit PDF electronic files of scanned record prints, including drawings with no changes.

- B. Record Specifications: Submit annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.
- D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of submittals including, but not limited to, the following:
- E. Reports: Submit written weekly reports indicating items incorporated into project record documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

## **PART 2 - PRODUCTS**

### **2.1 ELECTRONIC DATA**

- A. Electronic Data: Electronic digital data files of the Contract Drawings and Specifications will not be provided by CM and/or Architect for Contractor's use in preparing project record documents without a properly executed "Electronic Data Transfer Agreement" included at the end of this Section.

### **2.2 RECORD DRAWINGS**

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
  - 1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
    - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    - b. Accurately record information in an acceptable drawing technique.
    - c. Record data as soon as possible after obtaining it.
    - d. Record and check the markup before enclosing concealed installations.
    - e. Cross-reference record prints to corresponding archive photographic documentation.
  - 2. Content: Types of items requiring marking include, but are not limited to, the following:

- a. Dimensional changes to Drawings.
- b. Revisions to details shown on Drawings.
- c. Depths of foundations below first floor.
- d. Locations and depths of underground utilities.
- e. Revisions to routing of piping and conduits.
- f. Revisions to electrical circuitry.
- g. Actual equipment locations.
- h. Duct size and routing.
- i. Locations of concealed internal utilities.
- j. Changes made by Change Order or Construction Change Authorization.
- k. Changes made following CM's written orders.
- l. Details not on the original Contract Drawings.
- m. Field records for variable and concealed conditions.
- n. Record information on the Work that is shown only schematically.
3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Authorization numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Construction Manager. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
  1. Format: Annotated PDF electronic file.
  2. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
  3. Refer instances of uncertainty to Construction Manager for resolution.
  4. Architect will furnish Contractor one set of digital data files of the Contract Drawings for use in recording information.

- a. Subject to completion of a "Electronic Data Transfer Agreement" Architect will provide electronic data to Contractor for use in preparation of Record Document submittals.
  - b. Architect will provide data file layer information. Record markups in separate layers.
- C. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing record Drawings where CM determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.
  - 1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
  - 2. Consult Construction Manager for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared record Drawings into record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.
- D. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
  - 1. Record Prints: Organize record prints and newly prepared record Drawings into manageable data files.
  - 2. Format: Annotated PDF electronic file.
  - 3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
  - 4. Identification: As follows:
    - a. Project name.
    - b. Date.
    - c. Designation "PROJECT RECORD DRAWINGS."
    - d. Name of Construction Manager.
    - e. Name of Contractor.

## 2.3 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
  - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
  3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
  4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
  5. Note related Change Orders, record Product Data, and record Drawings where applicable.
- B. Format: Submit record Specifications as annotated PDF electronic file or scanned PDF electronic file(s) of marked-up paper copy of Specifications.

## 2.4 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
  3. Note related Change Orders, record Specifications, and record Drawings where applicable.
- B. Format: Submit record Product Data as annotated PDF electronic file or scanned PDF electronic file(s) of marked-up paper copy of Product Data.
1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

## 2.5 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- B. Format: Submit miscellaneous record submittals as PDF electronic file or scanned PDF electronic file(s) of marked-up miscellaneous record submittals.
1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

## **PART 3 - EXECUTION**

### **3.1 RECORDING AND MAINTENANCE**

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.
- B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Construction Manager's reference during normal working hours.

END OF SECTION 017839

## **SECTION 017900 - DEMONSTRATION AND TRAINING**

### **PART 1 - GENERAL**

#### **1.1 DESCRIPTION**

- A. The Contractor shall train Owner's personnel in the operation and maintenance (O&M) of systems and equipment listed in this Section and as mentioned in other Sections. Where applicable, Contractors shall coordinate with the Construction Manager and Owner for developing the hours of instruction and scope of material to be covered. Training of Owner's personnel shall not begin until Owner has approved the final submittal copy of the operation and maintenance manuals and training programs, and the building systems and equipment are complete and operational.
- B. Schedule Submittal. The proposed scope of training, training materials and instruction schedule shall be submitted for review and approval approximately 30 days before the scheduled completion of the work for which training is to occur. Mutually agreeable dates for training shall be arranged with Construction Manager and Owner, but the training shall be completed after the Final Functional Procedures. Training shall not begin until the Contractor's proposed training plan and schedule have been approved by the Cm and Owner.
- C. The required training/demonstration indicated in the technical sections of the specifications is supplemental or in addition to the training required in this Section (where not a duplication).

#### **1.2 SUMMARY**

- A. Provide the work of this Section in accordance with requirements of the Contract Documents.
- B. This Section includes but is not limited to administrative and procedural requirements for instructing Owner's personnel, including the following:
  - 1. Demonstration of operation of systems, subsystems, and equipment.
  - 2. Training in operation and maintenance of systems, subsystems, and equipment.
  - 3. Demonstration and training video recordings.
- C. Instruction Time: Length of instruction time will be measured by actual time spent performing demonstration and training in required location. No payment will be made for time spent assembling educational materials, setting up, or cleaning up.

#### **1.3 COORDINATED EFFORT**

- A. The Contractor or contractors providing professional training firm shall work closely with CM's and Owner's personnel in the development and implementation of the training program. This includes preliminary meetings to map out the direction the training will take and development, with Owner's approval, of the written training materials.
- B. All training scheduling shall coordinated with the Owner's O&M staff and approved by the Owner in advance to assure attendance.
- C. The Owner may provide sample training session guidelines and agendas for use by the Contractors in developing their training programs where applicable.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
  - 1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.
- B. Qualification Data: For facilitator, instructor, videographer.
- C. Attendance Record: For each training module, submit list of participants and length of instruction time.
- D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Demonstration and Training Video Recordings: Submit two copies within seven days of end of each training module.
  - 1. Identification: On each copy, provide an applied label with the following information:
    - a. Name of Project.
    - b. Name and address of videographer.
    - c. Name of Architect.
    - d. Name of Construction Manager.
    - e. Name of Contractor.
    - f. Date of video recording.
  - 2. Transcript: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project and date of video recording on each page.
  - 3. At completion of training, submit complete training manual(s) for Owner's use in PDF electronic file format on compact disc.



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1.6 QUALITY ASSURANCE

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 01 Section 014000 "Quality Requirements," experienced in operation and maintenance procedures and training.
- C. Videographer Qualifications: A professional videographer who is experienced photographing demonstration and training events similar to those required.
- D. Pre-instruction Conference: Conduct conference at Project site to comply with requirements in Division 01 Section 013100 "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:
  - 1. Inspect and discuss locations and other facilities required for instruction.
  - 2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
  - 3. Review required content of instruction.
  - 4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

## 1.7 COORDINATION

- A. Coordinate instruction schedule with CM's and Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by CM.

**PART 2 - PRODUCTS**

## 2.1 SCOPE OF TRAINING

- A. Training must include both classroom and on-the-job (hands-on) instruction by qualified manufacturer's representatives, vendors, installation/service technicians and operation personnel having the necessary knowledge, experience, and teaching skills.
- B. The training shall provide comprehensive instruction on the operation and maintenance of building components, equipment, controls, and systems including procedures for startup, shutdown, normal operation, abnormal

operation, preventive maintenance, troubleshooting, and corrective maintenance.

- C. The classroom portion of each training session shall be based on the information contained in the approved O&M Manuals and will use copies of these manuals for reference. This shall include the following items as applicable:
1. Content and organization of appropriate O&M Manual materials
  2. Overall equipment / system layout and configuration
  3. Locations and tag numbers of major components
  4. Theory of Operation / Design Intent
  5. Startup and Shutdown Procedures
  6. Normal Operating Procedures
  7. Non-normal Operating Procedures (unoccupied, seasonal operation, etc.)
  8. Emergency procedures
  9. Health and Safety issues (both to O&M personnel and Building occupants)
  10. Energy Efficiency Issues
  11. Occupant Comfort and IAQ Issues
  12. Control System Sequence of Operation
  13. Preventive Maintenance Procedures
  14. Diagnostic & Troubleshooting Procedures
  15. Corrective Maintenance & Repair Procedures
- D. The field portion of each training session shall at a minimum cover the following items as applicable:
1. Walk-down of covered equipment and systems
  2. Demonstration of startup, shutdown and operating procedures
  3. Demonstration of diagnostic, service, maintenance and repair procedures
- E. All training sessions will be videotaped by the Contractor and two (2) copies of the recording provided to Owner at the conclusion of the training session. Format for submitted video recording shall be determined by Owner.
- F. Follow-up or post-occupancy training, where specified, shall be planned, scheduled and conducted per the requirements of this specification. This training will focus on seasonal issues that could not be addressed during the initial training and on addressing operational and maintenance issues identified by the Owner since turnover.

## 2.2 LEVEL OF EXPERTISE OF INSTRUCTORS

- A. Contractor may use professional training firms.

- B. Credentials of training instructors are subject to review and approval by Owner.
1. Instructors must have knowledge and experience with the equipment on which they are providing training
  2. Instructors must be factory trained and authorized for the training on each type of equipment/system being trained upon.
  3. Instructors must be familiar with the organization and content of Operation and Maintenance Data Manuals for the equipment on which they are providing training.
  4. Instructors for controls must be knowledgeable and familiar with the specific controls equipment, project applications, and specific sequences of operation for this Project.

## 2.3 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections including, but not limited to, the following:
1. Motorized doors, including overhead coiling doors, overhead coiling grilles, and automatic entrance doors.
  2. Equipment, including stage equipment, projection screens, loading dock equipment, waste compactors, food-service equipment, residential appliances, and laboratory fume hoods.
  3. Fire-protection systems, including fire alarm and annunciation, fire pumps, and fire-extinguishing systems.
  4. Intrusion detection systems.
  5. Conveying systems, including elevators, wheelchair lifts, escalators, and cranes.
  6. Medical equipment, including medical gas equipment and piping.
  7. Laboratory equipment, including laboratory air, and vacuum equipment and piping.
  8. Heat generation, including boilers, feedwater equipment, pumps, steam distribution piping, and water distribution piping.
  9. Refrigeration systems, including chillers, cooling towers, condensers, pumps and distribution piping.
  10. HVAC systems, including air-handling equipment, air distribution systems, and terminal equipment and devices.
  11. HVAC instrumentation and controls.
  12. Electrical service and distribution, including transformers, switchboards panelboards, uninterruptible power supplies, and motor controls.
  13. Packaged engine generators, including transfer switches.

14. Lighting equipment and controls.
15. Communication systems, including intercommunication, surveillance, clocks and programming voice and data and television equipment.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:
  1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
    - a. System, subsystem, and equipment descriptions.
    - b. Performance and design criteria if Contractor is delegated design responsibility.
    - c. Operating standards.
    - d. Regulatory requirements.
    - e. Equipment function.
    - f. Operating characteristics.
    - g. Limiting conditions.
    - h. Performance curves.
  2. Documentation: Review the following items in detail:
    - a. Emergency manuals.
    - b. Operations manuals.
    - c. Maintenance manuals.
    - d. Project record documents.
    - e. Identification systems.
    - f. Warranties and bonds.
    - g. Maintenance service agreements and similar continuing commitments.
  3. Emergencies: Include the following, as applicable:
    - a. Instructions on meaning of warnings, trouble indications, and error messages.
    - b. Instructions on stopping.
    - c. Shutdown instructions for each type of emergency.
    - d. Operating instructions for conditions outside of normal operating limits.
    - e. Sequences for electric or electronic systems.
    - f. Special operating instructions and procedures.

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4. Operations: Include the following, as applicable:
    - a. Startup procedures.
    - b. Equipment or system break-in procedures.
    - c. Routine and normal operating instructions.
    - d. Regulation and control procedures.
    - e. Control sequences.
    - f. Safety procedures.
    - g. Instructions on stopping.
    - h. Normal shutdown instructions.
    - i. Operating procedures for emergencies.
    - j. Operating procedures for system, subsystem, or equipment failure.
    - k. Seasonal and weekend operating instructions.
    - l. Required sequences for electric or electronic systems.
    - m. Special operating instructions and procedures.
  5. Adjustments: Include the following:
    - a. Alignments.
    - b. Checking adjustments.
    - c. Noise and vibration adjustments.
    - d. Economy and efficiency adjustments.
  6. Troubleshooting: Include the following:
    - a. Diagnostic instructions.
    - b. Test and inspection procedures.
  7. Maintenance: Include the following:
    - a. Inspection procedures.
    - b. Types of cleaning agents to be used and methods of cleaning.
    - c. List of cleaning agents and methods of cleaning detrimental to product.
    - d. Procedures for routine cleaning
    - e. Procedures for preventive maintenance.
    - f. Procedures for routine maintenance.
    - g. Instruction on use of special tools.
  8. Repairs: Include the following:
    - a. Diagnosis instructions.

- b. Repair instructions.
- c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
- d. Instructions for identifying parts and components.
- e. Review of spare parts needed for operation and maintenance.

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Division 01 Section 017823 "Operation and Maintenance Data."
- B. Set up instructional equipment at instruction location.

### **3.2 INSTRUCTION**

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
  - 1. Architect/Engineer will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
  - 2. Owner will furnish an instructor to describe Owner's operational philosophy.
  - 3. Owner will furnish Contractor with names and positions of participants.
- C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
  - 1. Schedule training with Owner, through Construction Manager, with at least seven working days' advance notice.
- D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.
- E. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a written performance-based test.
- F. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

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3.3 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

- A. General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
  - 1. At beginning of each training module, record each chart containing learning objective and lesson outline.
- B. Video: Provide minimum 640 x 480 video resolution converted to format file type acceptable to Owner, on electronic media.
  - 1. Electronic Media: Read-only format compact disc acceptable to Owner, with commercial-grade graphic label.
  - 2. File Hierarchy: Organize folder structure and file locations according to project manual table of contents. Provide complete screen-based menu.
  - 3. File Names: Utilize file names based upon name of equipment generally described in video segment, as identified in Project specifications.
  - 4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the Equipment Demonstration and Training DVD that describes the following for each Contractor involved on the Project, arranged according to Project table of contents:
    - a. Name of Contractor/Installer.
    - b. Business address.
    - c. Business phone number.
    - d. Point of contact.
    - e. E-mail address.
- C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.
  - 1. Film training session(s) in segments not to exceed 15 minutes.
    - a. Produce segments to present a single significant piece of equipment per segment.
    - b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.
    - c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.
- D. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.
  - 1. Furnish additional portable lighting as required.

- E. Narration: Describe scenes on video recording by audio narration by microphone while or by dubbing audio narration off-site after video recording is recorded. Include description of items being viewed.
- F. Transcript: Provide a transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.
- G. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

### 3.4 TIME PERIOD OF TRAINING

- A. There shall be a mandatory pre-scheduling, coordination and content review meeting set up with the Owner, through the CM.
- B. The minimum specific hours of training time provided for each category of major equipment and systems shall be in accordance with the specification sections pertaining to this equipment or systems.
- C. Owner retains the option of redistributing training time, subject to the total time specified. This may include repetition of selected training sessions or provision for follow-up training sessions after occupancy.
- D. Training must be presented on an 8-hour per day, 5-day per week schedule, with all reading assignments and review to be within this period. (Note: eight (8) hour training days include 1/2 hour lunch and travel time.)
- E. Specific schedules for all training sessions must be coordinated in advance with Owner.

#### F. MINIMUM TRAINING DURATIONS FOR SPECIFIC EQUIPMENT AND SYSTEMS

- 1. Chillers / Cooling Towers – 40 Hours
- 2. Chilled Water / Condenser Water Pumping / Piping Systems / Chemical Treatment- 24 Hours
- 3. Boilers- 24 Hours
- 4. Heating Piping /Pumping Systems / Chemical Treatment- 16 Hours
- 5. Air Handling Units / Terminal Units/Fire/Smoke Dampers- 24 Hours
- 6. Refrigerant Exhaust/ Exhaust Systems – 8 Hours
- 7. CRAC Units /Split Systems- 4 Hours
- 8. Terminal units/ Air Flow Control Valves – 4 Hours
- 9. TAB – 8 Hours
- 10. BAS System/ DDC control Training – 60 hours
- 11. Plumbing Systems- Pump/ Domestic Water Heating/ Water Softening- 8 hours
- 12. Variable Frequency Controllers- 8 Hours



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13. Fire Protection – Pumps, Wet/Pre-action/ Clean Agent Systems – 16 Hours
14. Electrical – Emergency Generation/ Paralleling Gear/ Automatic Transfer/Fuel Oil- 40 Hours
15. Electrical- Switchgear / Medium Voltage Distribution – 48 Hours
16. Electrical- Low Voltage Distribution / Isolated power systems – 24 Hours
17. Lighting Control System and Devices – 8 Hours
18. Electronic Security General Requirements - 4 Hours
19. Access Control – Devices and Interfaces, Programming / Card Mgmt. - 4 Hours
20. Video Surveillance System and Devices – 4 Hours
21. Fire Alarm and Emergency Communications Systems – 8 Hours

END OF SECTION 017900

## **SECTION 018114 - SUSTAINABLE DESIGN REQUIREMENTS - LEED**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Provide the work of this Section in accordance with requirements of the Contract Documents.
- B. Section includes but is not limited to general requirements and procedures for compliance with certain prerequisites and credits needed for Project to obtain "LEED Version 4 for Building Design and Construction: Healthcare" (LEED v4 HC) Gold certification based on USGBC's LEED v4 HC.
  - 1. Specific requirements for LEED and ASHRAE 189.3 are also included in other Sections.
  - 2. Some LEED prerequisites and credits needed to obtain LEED certification depend on product selections and may not be specifically identified as LEED requirements. Compliance with requirements needed to obtain LEED prerequisites and credits may be used as one criterion to evaluate substitution requests and comparable product requests.
  - 3. Some LEEDv4 credits may be substituted for LEEDv4.1 credit criteria. These have been identified in the checklist, and language has been incorporated throughout the documents to reflect the revised criteria for those specific credit substitutions.
  - 4. A copy of the LEED Project checklist is attached at the end of this Section for information only.
    - a. Some LEED prerequisites and credits needed to obtain the indicated LEED certification depend on Architect's design and other aspects of Project that are not part of the Work of the Contract.
  - 5. Compliance with ASHRAE 189.3-2017: Design, Construction, and Operation of Sustainable High-Performance Health Care Facilities (ASHRAE 189.3) where the requirements are not met by project requirements for LEED Certification described above.
    - a. Some ASHRAE 189.3 Mandatory Provisions, Prescriptive Options and Performance Options depend on product selections and may not be specifically identified as ASHRAE 189.3 requirements. Compliance with requirements needed to meet ASHRAE 189.3 requirements may be used as one criterion to evaluate substitution requests and comparable product requests.
- C. Related Sections:

1. Division 01 Section 017419 "Construction Waste Management" for diversion of demolition and construction waste from landfill into recycling.
2. Division 01 Section 015000 "Temporary Facilities and Controls" for maintenance of indoor air quality, mitigation of pollution from demolition and construction waste in temporary facilities.
3. Division 01 Section 017320 "Testing for Indoor Air Quality, Baseline IAQ, and Materials" for indoor air quality management.
4. Division 01 Section 019100 "General Commissioning Requirements" for commissioning building systems to assure sustainability targets are met.
5. Division 01 through 49 Sections for sustainable requirements specific to the Work of each of these Sections.

## 1.2 DEFINITIONS

- A. LEED: USGBC's "LEED Version 4 for Building Design and Construction: Healthcare."
  1. Definitions that are a part of "LEED Version 4 for Building Design and Construction: Healthcare" (LEED v4 HC) apply to this Section.
- B. ASHRAE 189.3: ANSI/ASHRAE/ASHE Standard 189.3-2017: Design, Construction, and Operation of Sustainable High-Performance Health Care Facilities (ASHRAE 189.3).
  1. Definitions that are a part ASHRAE 189.3 apply to this Section.
- C. Chain of Custody (CoC): The path taken by raw materials, processed materials, finished products, and co-products from the forest to the consumer, including each successive stage of processing, transformation, manufacturing and distribution.
- D. Chain-of-Custody Certificates: Certificates signed by manufacturers certifying that wood used to make products was obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001. Certificates shall include evidence that manufacturer is certified for chain of custody by an FSC-accredited certification body. A chain-of-custody certificate number on invoices for nonlabelled products indicates that the certifier's guidelines for product accounting have been followed. A chain-of- custody certification is not required by distributors of a product that is individually labeled with the Forest Stewardship Council logo and manufacturer's chain of custody number. CoC certification requirements are determined by Forest Stewardship Council Chain of Custody Standard 40-004 v2-1.
- E. C2C: Cradle to Cradle certification program.
- F. Composite Wood: a product consisting of wood or plant particle or fibers bound together by a synthetic resin or binder.
- G. "Declare" product label: a publicly available reporting format in which product manufacturer can report compliance with the emissions testing criteria of the California Department of Public Health Standard Method V1.1-2010, product ingredients per

LEED Credit: Low Emitting Materials, and other environmental criteria. "Declare" does not contain the same information as an EPD and cannot be substituted for it.

- H. Environmental Product Declaration (EPD): A standardized document communicating the environmental effects associated with a product or system's raw material extraction, energy use, chemical makeup, waste generation, and emissions to air, soil, and water. Must include the name of the declaration hold or producer of the material, program operator, contact information, product type, product name, product description, product category rule, certification period, declaration number, summary of impact categories, functional unit, standards met, and verification body.
- I. General Emissions Evaluation (aka VOC Emissions Evaluation): Building products must be tested and determined compliant in accordance with California Department of Public Health (CDPH) Standard Method v1.2–2017, using the applicable exposure scenario. Additionally, the range of total VOCs after 14 days (336 hours) was measured and is reported. The statement of product compliance must include the exposure scenario(s) used, the amount of wet-applied product applied in mass per surface area (if applicable), the range of total VOCs.
- J. Health Product Declaration: an open standard for reporting product ingredients and their associated health hazards. Provides the nonproprietary information for every ingredient, its role or function, amount, and known health hazards. Ingredients must be disclosed to the 1,000-ppm level.
- K. Inherently non-emitting sources: Products that are inherently nonemitting sources of VOCs (stone, ceramic, powder-coated metals, plated or anodized metal, glass, concrete, clay brick, and unfinished or untreated solid wood) are considered fully compliant without any VOC emissions testing if they do not include integral organic-based surface coatings, binders, or sealants.
- L. Product: A product includes the physical components and services needed to serve the intended function. If there are similar products within a specification, each contributes as a separate product. For example, wallboard, gypsum, and binder are all required for a single assemble "product" and cannot count individually. However, metal studs, wallboard, and concrete masonry units are examples of separate products. Different gloss levels of paints are considered separate products, but different colors of the same paint from the same manufacturer can only be counted once as a single product.
- M. Recycled Content: The recycled content value of a material assembly shall be determined by weight. The recycled fraction of the assembly is then multiplied by the cost of assembly to determine the recycled content value.
  - 1. "Postconsumer" material is defined as waste material generated by end users (households, or commercial, industrial, and institutional facilities) of a product, which can no longer be used for its intended purpose that is recycled into raw material for a new product.
  - 2. "Preconsumer" material is defined as material diverted from the waste stream during the manufacturing process. Excluded is reutilization of materials, such as

rework, regrind, or scrap, generated in a process and capable of being reclaimed within the same process that generated it.

- N. Regional Materials: Materials that have been extracted, harvested, or recovered, as well as manufactured, within a specific distance of Project site. If only a fraction of a product or material is extracted/harvested/recovered and manufactured locally, then only that percentage (by weight) shall contribute to the regional value.
1. LEED defines regional materials as within 100 miles of Project site.
  2. ASHRAE 189.3 defines regional materials as within 500 miles of Project site.
  3. Distance is measured by straight line, not by travel route.
- O. South Coast Air Quality Management District (SCAQMD) Rule 1113: Architectural Coatings and rule 1168: Adhesives and Sealant.
- P. Total Materials Cost: Total Materials Cost includes costs for all permanently installed material on the project and any furniture in the project scope. This typically includes all products from Divisions 3-10, Division 12, Division 31 (Sections 31.6x.xx) and Division 32 (Sections 32.1x.xx, 32.3x.xx and 32.9x.xx) where 'x' indicates all individual sections with the same first three numerals. Total cost can include "passive" portions of the MEP systems (not active equipment), such as ductwork, pipes, etc. at the project team's discretion.
1. All MEP items are excluded.
  2. Special equipment such as elevators, escalators, process equipment, and fire suppression systems are excluded.
  3. Temporary materials are excluded.
- Q. Volatile Organic Compounds (VOC's): A carbon compound that vaporizes at normal room temperatures. VOC's contribute to air pollution directly and through atmospheric photochemical reactions (excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides and carbonates, and ammonium carbonate) to produce secondary air pollutants, principally ozone and peroxyacetyl nitrate."
- R. Urea-formaldehyde: A combination of urea and formaldehyde used in some glues and adhesives, particularly in composite wood products. At room temperature, urea-formaldehyde emits formaldehyde, a toxic and possibly carcinogenic gas."

### 1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site. Review LEED requirements and action plans for meeting requirements.

### 1.4 ADMINISTRATIVE REQUIREMENTS

- A. LEED Project Administrator: Responsible for administration of LEED Certification Application.
1. Construction Manager.

B. Contractor's Responsibilities:

1. Submit and maintain documentation to USGBC through LEED Credits Online, and respond to questions and requests from USGBC regarding LEED credits that are the responsibility of the Contractor, that depend on product selection or product qualities, or that depend on Contractor's procedures until the USGBC has made its determination on the Project's LEED certification application.
  - a. Document correspondence with USGBC as informational submittals.

C. LEED Status Meetings:

1. LEED Project Manager and Owner's Representative will conduct regularly scheduled meetings to review Project Status. These may be conducted concurrently with other Project Meetings required by Division 01 Section 013100 "Project Management and Coordination."

1.5 ACTION SUBMITTALS

A. General: Refer to the LEED scorecard, technical sections of the Specifications and this Section for responsibilities regarding documentation. The Construction Manager and/or Architect will review documentation before it is submitted to LEED online.

1. The Contractor and other LEED team members are responsible for online documentation of construction related information required for LEED compliance.
2. Submit additional sustainable design submittals required by other Specification Sections.
3. Maintain copies of LEED compliance submittals for confirmation of compliance at Project completion.

B. Sustainable design submittals are in addition to other submittals, but shall be processed at the same time as other submittals are processed.

1. If submitted item(s) are identical to those submitted to comply with other requirements, include separate, additional copy(ies) with other submittal as a record copy of compliance with indicated LEED requirements instead of separate sustainable design submittal. Mark additional copy "Sustainable design submittal."

C. Sustainable Design Documentation Submittals: Review technical sections of the specifications and provide the following documentation pertinent to their work:

1. Environmental Product Declarations complying with LEED requirements.
2. Documentation for products that comply with LEED requirements for multi-attribute optimization.
  - a. Include documentation for regional materials, indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material and costs of regional materials.

3. Sustainability reports for products that comply with LEED requirements for raw material and source extraction reporting.
4. Documentation for products that comply with LEED requirements for leadership extraction practices. Include the following:
  - a. Product data and certification letter from product manufacturers, indicating participation in an extended producer responsibility program and statement of costs.
  - b. Product data and certification for bio-based materials, indicating that they comply with requirements. Include statement of costs.
  - c. Product data and chain-of-custody certificates for products containing certified wood. Include statement of costs.
  - d. Receipts for salvaged and refurbished materials used for Project, indicating sources and costs.
  - e. Product data and certification letter from product manufacturers, indicating percentages by weight of postconsumer and preconsumer recycled content for products having recycled content. Include statement of costs.
  - f. Documentation for regional materials, indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material and costs of regional materials.
5. Material ingredient reports for products that comply with LEED requirements for material ingredient reporting.
6. Documentation for products that comply with LEED requirements for material ingredient optimization.
7. Documentation for products that comply with LEED requirements for product manufacturer supply chain optimization.
  - a. Include documentation for regional materials, indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material and costs of regional materials.
  - b. Include invoices for all FSC certified wood indicating project address, costs, and FSC percentage.
8. Documentation complying with Division 01 Section 017419 "Construction Waste Management and Disposal."
9. Documentation complying with Division 01 Section 017320 "Testing for Indoor Air Quality, Baseline IAQ, and Materials."
10. Product data for lamps indicating compliance with low-mercury requirements.
11. Product data for solder, flux, pipes, pipe fittings, plumbing fittings, faucets, roofing, flashing, electrical wire, cable, interior paints, and exterior indicating compliance with lead requirements.
12. Product data for interior and exterior paints indicating compliance with cadmium requirements.
13. Product data for copper joint systems indicating compliance with copper requirements.

14. Product data for all freestanding furniture, medical furnishings and window treatments that are part of the Work of the Contract indicating compliance with furniture and medical furnishings requirements.
15. Product data for adhesives and sealants used inside the weatherproofing system, indicating VOC content and laboratory test reports showing compliance with requirements for low-emitting materials.
16. Product data for paints and coatings used inside the weatherproofing system, indicating VOC content and laboratory test reports showing compliance with requirements for low-emitting materials.
17. Laboratory test reports for flooring, indicating compliance with requirements for low-emitting materials.
18. Laboratory test reports for products containing composite wood or agrifiber products or wood glues, indicating compliance with requirements for low-emitting materials.
19. Laboratory test reports for ceilings, walls, and thermal insulation, indicating compliance with requirements for low-emitting materials.
20. Laboratory test reports for furniture, indicating compliance with requirements for low-emitting materials.
21. Documentation complying with Division 01 Section 017320 "Testing for Indoor Air Quality, Baseline IAQ, and Materials."

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For LEED Compliance Officer.
- B. Project Materials Cost Data: Provide statement indicating total cost for materials used for Project and cost items that comply with sustainable requirements specified, for work included under technical sections of the work. Costs exclude labor, overhead, and profit. Include breakout of costs for the following categories of items:
  1. Plumbing.
  2. Mechanical.
  3. Electrical.
  4. Specialty items, such as elevators and equipment.
  5. Wood-based construction materials excluding components of mechanical, electrical, plumbing or specialty items such as elevators and equipment. Include statement indicating total material cost for all new, permanently-installed wood-based materials used for Project. Material costs exclude labor, equipment, overhead, and profit.
- C. Sustainable Design Action Plans: Provide preliminary submittals within 14 days of date established for the Notice to Proceed for products to be incorporated in the work of this project, that comply with the following requirements, indicating how the following requirements will be met:
  1. List of proposed products with Environmental Product Declarations.
  2. List of proposed products complying with requirements for multi-attribute optimization.



3. List of proposed products complying with requirements for responsible sourcing of raw materials.
4. List of proposed products complying with requirements for material ingredient reporting.
5. List of proposed products complying with requirements for material ingredient optimization.
6. List of proposed products complying with requirements for product manufacturer supply chain optimization.
7. List of proposed products complying with requirements for PBT source reduction-mercury.
8. List of proposed products complying with requirements for PBT source reduction-lead, cadmium and copper.
9. List of proposed products complying with requirements for furniture and medical furnishings, for materials that are part of the Work of the Contract.
10. List of products that comply with diversion goals specified in the Waste management plan complying with Division 01 Section "Construction Waste Management and Disposal."
11. List of products that are required to comply with the Construction IAQ management plan.

- D. Sustainable Design Progress Reports: Concurrent with each Application for Payment, submit reports comparing actual construction and purchasing activities with sustainable design action plans.
- E. Life Cycle Assessment: Submit source life cycle assessment, location and quantity information for all permanently installed materials in the building structure and envelope.

## 1.7 QUALITY ASSURANCE

- A. Sustainable Design Program: The Contractor shall be responsible for implementing processes, programs, means and methods required to insure compliance with sustainable design requirements and objectives of the Contract Documents, including but not limited to the following:
1. Reviewing and vetting submittals for technical sections with respect to compliance with Sustainable Design Requirements.
  2. Product and Execution requirements specified in various sections of the project specifications.
  3. Proposed LEED points that specifically address construction execution issues material reporting requirements and indoor air quality testing requirements.
- B. LEED Compliance Officer: Engage an experienced LEED-accredited professional to coordinate LEED requirements.
1. Qualifications: The LEED Compliance shall have experience with sustainable design issues related to the design and construction of projects of equal size and scope to this one, with at least two years of experience implementing the LEED rating system on other projects.

2. Other Duties: The LEED Compliance Officer shall be assigned to manage construction administration of the Sustainable Design program, and may also manage the Waste Management and Construction Indoor Air Quality Programs.
- C. Responsibilities of Subcontractors: Each subcontractor shall coordinate LEED submittal requirements and process delivery of certifications and LEED substantiation documents through the Contractor's LEED Compliance Officer, who in turn will coordinate with the Construction Manager Team.
- D. Responsibilities of the LEED Compliance Officer: The LEED Compliance Officer shall perform the following services:
1. General: Take primary responsibility for organizing and managing the process of compiling requirements of the construction-related LEED Points for which each Subcontractor is responsible, including collecting and organizing the documentation required for the CM's submission to the USGBC upon completion of the project.
  2. IAQ Program: Develop appropriate and comprehensive Construction Indoor Air Quality (IAQ) Management Plan, as required under the LEED Construction Indoor Air Quality Management Credit. The LEED Compliance Officer shall be responsible for implementing construction activity pollution prevention, verifying compliance, enforcing, and documenting implementation of the Construction IAQ Management Plan. Each Subcontractor shall comply with the requirements of this program.
  3. Construction Waste Management: Develop a Construction Waste Management Plan, as required under the LEED Construction Waste Management credit for diversion of waste from landfill. The Contractor shall be responsible for verifying compliance, enforcing and documenting implementation of the Construction Waste Management Plan.
  4. LEED Compliant Materials: Assist the Subcontractors in identifying and obtaining supporting documentation for products that satisfy the specified sustainable design and specified product requirements (for example, low VOC sealants and adhesives; recycled content; regionally extracted and manufactured materials, and other items listed in this Section). Each Subcontractor shall coordinate with the LEED Compliance officer and provide documentation in a timely manner as required for filing by the A/E team.
  5. LEED Progress Meetings: Assist the Construction Manager in scheduling, conducting and distributing minutes of record the CM takes at regularly scheduled LEED progress meetings consisting of members of the CM, Contractor, Subcontractors, Architect/Engineer, Commissioning Agent and the Owner.
  6. Schedules and Tracking: Prepare schedules and tracking documentation for circulation to construction contracting team members for the purposes of organizing the sustainable design compliance responsibilities of each team member.
  7. Observation and Inspection: Perform periodic on-site observations and inspections of the work in progress in order to verify conformance with all required sustainable design requirements. These observations shall occur not less than once per week.

8. Documentation: Provide documentation content for the CM's formal LEED submission documentation, as required by the US Green Building Council (USGBC) to verify conformance with the LEED rating system. Upload documentation to the LEED Online website. Respond to questions and communication from USGBC pertaining to LEED submission documentation.
- E. The services described above (by the LEED Compliance Officer) shall not preclude nor substitute for the requirements of other dedicated sustainable design related services that the project may require, (such as an industrial hygienist that may be required to satisfy specific LEED point requirements for construction indoor air quality control), or general construction supervision required on a full or part-time basis to verify.

## **PART 2 - PRODUCTS**

### **2.1 SUSTAINABLE DESIGN - PERFORMANCE CRITERIA:**

- A. Performance criteria listed below represent overall project wide criteria. Individual sections of the Specifications contain specific thresholds selected by the Architect/Engineer in order to comply with LEED credits targeted to achieve the LEED Gold certification level. The Contractor can vary from individually targeted percentages and thresholds stated in individual sections of the specifications, as long as the overall percentages for the LEED credit is achieved as required to provide a LEED v4 BD+C Gold certification level.
- B. Specific performance criteria for individual products and systems are listed in each of the technical sections. If product specific performance criteria cannot be met, the CONTRACTOR shall be responsible for providing alternative products which ensure that the overall project wide performance will still be achieved. All product substitutions must comply with requirements of Division 01 Section "Substitution Procedures".

### **2.2 MATERIALS**

- A. Provide products and procedures necessary to obtain LEED credits required in this Section. Although other Sections may specify some requirements that contribute to these LEED credits, the Contractor shall provide additional materials and procedures necessary to obtain LEED credits indicated.
- B. At least 40 different products from at least five different manufacturers shall have Environmental Product Declarations (EPDs) that comply with LEED v4.1 requirements. Documentation meets one of the following disclosure criteria:
  1. Life-cycle Assessment (LCA) and Environmental Product Declarations: Products with publicly available, critically reviewed LCA that conform to ISO 14044 that have at least a cradle to gate scope.
  2. Environmental Product Declarations:

- a. Product specific Type III EPD Internally Reviewed – internally reviewed LCA in accordance with ISO 14071. OR conform to ISO 14025, EN 15084, or ISO 21930 with least a cradle to grave scope.
  - b. Industry-wide (generic) EPD – products with third-party certification (Type III), including external verification, in which the manufacturer is explicitly recognized as a participant. OR products with industry wide EPDs which conform to ISO 14025, EN 15084, or ISO 21930 with at least cradle to grave scope.
  - c. Product-Specific Type III EPD – products with third-party certification (Type III), including external verification and external critical review. Counts for 1.5 products.
- C. At least 10 products from three manufacturers of the permanently installed products for the Project shall comply with LEED v4.1 requirements for multi-attribute optimization That document their optimization using the paths below.
- 1. Life Cycle Impact Reduction Action Plan (value at ½ product).
  - 2. Life cycle impact reductions in embodied carbon, demonstrated a with current third-party EPD or verified LCA that conforms to the comparability requirements of ISO 14025 and ISO 21930.
- D. At least 20 different products from at least five different manufacturers shall comply with LEED v4.1 requirements for material ingredient reporting that document their material ingredient disclosure using the paths below. Chemical inventory must be disclosed to at least 0.1% (1000 ppm).
- 1. Material Ingredient Screening and Optimization Action Plan – products valued at 50% by cost or ½ product. Must address chemical content of product to at least 1,000 ppm and provide publicly accessible inventory. Plan to include description of screening or assessment platform, identification of green chemistry principles to be implemented, specific steps of implementation, and timeline for completion of all steps described in action plan.
  - 2. Products to have third party verified Declare label or be Cradle to Cradle certified under v3 at the Bronze level or higher. Declare labels must be designated as Red List Free, Declared or LBC compliant.
  - 3. Health Product Declaration. The end use product has a published and complete Health Product Declaration with full disclosure of known hazards in compliance with the Health Product Declaration open Standard.
  - 4. Product Lens Certification
  - 5. Any compliant reports with third-party verification that includes verification of content inventory are worth 1.5 products for achievement calculations.
- E. At least 10 products from three manufacturers of the permanently installed products for the Project shall comply with LEED v4.1 requirements for material ingredient optimization that document their material ingredient optimization using the paths below.
- 1. Material Ingredient Screening and Optimization Action Plan (value at ½ product).
  - 2. Advanced Inventory & Assessment (value at 1 product).

3. Material Ingredient Optimization (value at 1.5 products).
  4. USGBC approved program.
- F. At least 40 percent, by cost, of the permanently installed products for the Project shall comply with LEED requirements for responsible sourcing of raw materials, documented with one of the following paths:
1. Extended producer responsibility.
  2. Bio-based materials.
  3. FSC certified wood products.
  4. Materials reuse.
  5. Recycled content.
  6. USGBC approved program.
  7. Products or parts of products sourced (extracted, manufactured, purchased) within 100 miles (160 km) of the project site shall be valued at twice their base contributing cost
- G. Recycled Content: Building materials shall have recycled content such that postconsumer recycled content plus one-half of preconsumer recycled content for Project constitutes a minimum of 20% percent of cost of materials used for Project.
1. Cost of postconsumer recycled content plus one-half of preconsumer recycled content of an item shall be determined by dividing weight of postconsumer recycled content plus one-half of preconsumer recycled content in the item by total weight of the item and multiplying by cost of the item.
  2. Do not include plumbing, mechanical and electrical components, and specialty items, such as elevators and equipment, in the calculation.
  3. Recycled (Recovered) Material Content Requirements: Unless otherwise specified, the following are minimum recovered material content requirements for products listed.
- H. Table: Recommended Recycled (Recovered) Material Content Requirements

Div	Material Category	Minimum Recycled (Recovered) Content (by weight)	Ref #
05	Framing steel, made using EAF (electric arc furnace)	97% total; 64% post-consumer	2
	Steel sheet metal, made using BOF (basic oxygen furnace)	30% total; 17% post-consumer	2
06	Laminated paperboard (sheathing, underlayment, subflooring)	100%	1
	Countertops, solid-surface plastic	100% post-consumer	6
	Plastic lumber, non-structural	100%	1
07	Building insulation, mineral wool batt or board	75%	1
	Building insulation, fiberglass batt or board	25%	1

Div	Material Category	Minimum Recycled (Recovered) Content (by weight)	Ref #
	Building insulation, polyisocyanurate, polyurethane	9%	1
	Building insulation, foam-in-place rigid foam	5%	1
	Building insulation, phenolic rigid foam	5%	1
	Building insulation, perlite composite board	75% post-consumer paper	1
	Building insulation, cotton and/or polyester batt	100%	6
	Building insulation, plastic non-woven batt	100% recovered plastic	1
	Building insulation, cellulose, loose-fill or spray-in	95% post-consumer	6
	Applied fireproofing	100%	6
	Roofing, steel	100% total; 67% post-consumer	5
	Roofing, aluminum	95%	5
	Roofing, fiber (felt)	100%	5
	Roofing, rubber	100%	5
	Roofing, plastic or plastic/rubber composite	100%	5
	Roofing, wood/plastic composite	100%	5
09	Gypsum board gypsum core	98% recycled or synthetic gypsum	7
	Gypsum board facing paper	100% post-consumer newsprint	6
	Steel studs, runners, and channels	30%	2
	Acoustic ceiling tiles	65%	7
	Ceiling suspension system, steel	30%	2
	Ceramic tile	50%	6
	Rubber flooring	95%	1
	Carpet, polyester face fiber	100% PET (Polyethylene Terephthalate)	1
	Carpet, nylon face fiber	25%	5
	Carpet backing, vinyl	100%	5
	Carpet cushion, bonded polyurethane	50%	1
	Carpet cushion, jute	40% burlap	1
	Carpet cushion, synthetic fiber	100% carpet fabrication scrap	1
	Carpet cushion, rubber	90%	1
	Fabric wrapped tack panel core	100% post-consumer paper	6
10	Shower and restroom partitions, plastic	100%	1
	Restroom partitions, metal	100%	1

Div	Material Category	Minimum Recycled (Recovered) Content (by weight)	Ref #
	Signage, plastic	100%	1
	Signage, aluminum	25%	1
	Signage, steel	30%	1
11	Loading dock bumpers, rubber	100%	6
12	Entrance mats, rubber	100%	6
	Office furniture, PET fabric	100%	5
22	Non-pressure pipe, steel	100% total; 67% post-consumer	5
	Non-pressure pipe, HDPE	100%	5
	Non-pressure pipe, PVC	100%	5
32	Geotextile, synthetic	100%	6
	Hydromulch	100% post-consumer paper	1
	Unit pavers, rubber and/or plastic	95%	1
	Paving, grass- or gravel-filled structural grid system	100%	6
	Paving, asphalt	50% RAP (reclaimed asphalt paving)	5
	Paving, rubber modified (RMA)	25%	5
	Paving, "glassphalt"	10% recycled glass cullet aggregate	5
	Drip irrigation hose	70%	1
	Parking appurtenances, concrete	70%	1
	Parking appurtenances, plastic and/or rubber	100%	1

Table A References for Minimum Recovered Material Content Requirements:

1. US EPA "Wastes - Resource Conservation - Comprehensive Procurement Guidelines" (<http://www.epa.gov/epawaste/conserve/tools/cpg/>) (latest update as of October 2007).
2. This standard references Steel Recycling Institute (<http://www.recycle-steel.org>) published industry averages for recycled steel content. Meeting these criteria ensures that products meet or exceed the industry trends for recycling.
3. Green Seal Standard "Watering Hoses (GC-01)", Second Edition, April 4, 1994
4. EPA Recovered Materials Advisory Notice (RMAN), August 28, 2001 TxDOT (<http://www.dot.state.tx.us>) recommendations for recycled content in asphalt. Contact TxDOT for additional information.
5. Products that meet this standard are widely available throughout North America.
6. No standard is cited for this requirement.

#### I. PBT Source Reduction – Mercury

1. No mercury containing equipment to be used in the project.

2. The use of T-9, T-10, or T-12 fluorescents or mercury vapor high-intensity discharge (HID) lamps in the project are strictly prohibited.
3. Do not use probe start metal halide lamps.
4. Lamps installed shall not exceed the following Mercury content values:
  - a. Illuminated Exit Signs: 0 mg of mercury, and use less than 5 watts of electricity
  - b. T-8 Fluorescent, 8' in length: 10 mg
    - 1) Lamp Life Standard: 24,000 rated hours on instant start ballasts or program start ballasts (3 hour starts)
    - 2) Lamp Life High Output: 18,000 rated hours on instant start ballasts or program start ballasts (3 hour starts)
  - c. T-8 Fluorescent, 4' in length: 3.5 mg
    - 1) Lamp Life Standard or High Output: 30,000 rated hours on instant start ballasts or 36,000 rated hours on program start ballasts (3 hour starts)
  - d. T-8 Fluorescent, 2-3' in length: 3.5 mg
    - 1) Lamp Life: 24,000 rated hours on instant start ballasts or program start ballasts (3 hour starts)
  - e. T-8 Fluorescent, U-bent: 6 mg
    - 1) Lamp Life: 18,000 rated hours on instant start ballasts or 24,000 rated hours on program start ballasts (3 hour starts)
  - f. T-5 Fluorescent, linear: 2.5 mg
    - 1) Lamp Life Standard or High Output: 25,000 rated hours on program start ballasts
  - g. T-5 Fluorescent, Circular: Prohibited
  - h. Compact Fluorescent, Nonintegral Ballast: 3.5 mg
    - 1) Lamp Life: 12,000 rated hours
  - i. Compact Fluorescent, Integral Ballast: 3.5 mg, ENERGY STAR Qualified
    - 1) Lamp Life, Bare Bulb: 10,000 rated hours
    - 2) Lamp Life, Covered models such as globes, reflectors, A-19s: 8,000 rated hours
  - j. High-Pressure Sodium, up to 400 watts: 10 mg
    - 1) Lamp Life: Use non-cycling type or replace with LED lamps or induction lamps.
  - k. High-Pressure Sodium, above 400 watts: 32 mg
    - 1) Lamp Life: Use non-cycling type or replace with LED lamps or induction lamps.

J. PBT Source Reduction – Lead, Cadmium and Copper



1. Lead

- a. For water intended for human consumption, use solder and flux to connect plumbing pipe on site that meets the California AB1953 standard. Solder shall not contain more than 0.2% lead, and flux not more than a weighted average of 0.25% lead for wetted surfaces. The “lead free” label as defined by the Safe Drinking Water Act (SDWA) does not provide adequate screening for the purposes of this credit because the SDWA defines “lead free” as solders and flux containing 0.2% lead or less.
- b. For water intended for human consumption, use pipes, pipe fittings, plumbing fittings, and faucets that meet the California law AB1953 of a weighted average lead content of the wetted surface area of not more than 0.25% lead.
- c. Roofing and flashing shall be lead-free.
- d. Electrical wire and cable shall have a lead content less than 300 parts per million.
- e. Paints shall not contain lead.
- f. For renovation projects, ensure the removal and appropriate disposal of disconnected wires with lead stabilizers, consistent with the 2002 National Electric Code requirements.
- g. Lead used for radiation shielding and copper used for MRI shielding are exempt.

2. Cadmium

- a. The use of paint containing cadmium is prohibited.

3. Copper

- a. For copper pipe applications, reduce or eliminate joint-related sources of copper corrosion:
  - 1) Use mechanically crimped copper joint systems, or
  - 2) Joints are soldered according to ASTM B828 2002, and ASTM B813 2010 for flux.

K. Furniture and Medical Furnishings: At least 40% of freestanding furniture and medical furnishings for the Project shall comply with LEED v4.1 requirements that document their material ingredient optimization using the paths below.

- 1. Option 1. Minimal Chemical Content: All components that constitute at least 5%, by weight, of a furniture or medical furnishing assembly, including textiles, finishes, and dyes, shall contain less than 100 parts per million (ppm) of at least four of the five following chemical groups:
  - a. Urea formaldehyde;
  - b. Heavy metals, including mercury, cadmium, lead, and antimony;

- c. Hexavalent chromium in plated finishes consistent with the European Union Directive on the Restriction of the Use of Certain Hazardous Substances (EU RoHS);
  - d. Stain and nonstick treatments derived from perfluorinated compounds (PFCs), including perfluorooctanoic acid (PFOA); and
  - e. Added antimicrobial treatments.
- 2. Option 2. Testing and Modeling of Chemical Content: Products that demonstrate both of the following:
  - a. All components of a furniture or medical furnishing assembly, including textiles, finishes, and dyes, shall contain less than 100 parts per million (ppm) of at least two of the five chemicals or materials listed in Option 1.
  - b. New furniture or medical furnishing assemblies shall document emissions testing in accordance with ANSI/BIFMA Standard Method M7.1–2011. Comply with ANSI/BIFMA e3-2010 Furniture Sustainability Standard, Sections 7.6.1 and 7.6.2, using either the concentration modeling approach or the emissions factor approach.
- 3. Option 3. Multi-Attribute Assessment of Products: Products have Environmental Product Declarations (EPDs) that comply with LEED v4.1 requirements. Documentation meets one of the following disclosure criteria:
  - a. Life-cycle Assessment (LCA) and Environmental Product Declarations: Products with publicly available, critically reviewed LCA that conform to ISO 14044 that have at least a cradle to gate scope.
  - b. Environmental Product Declarations:
    - 1) Product specific Type III EPD Internally Reviewed – internally reviewed LCA in accordance with ISO 14071. OR conform to ISO 14025, EN 15084, or ISO 21930 with least a cradle to grave scope.
    - 2) Industry-wide (generic) EPD – products with third-party certification (Type III), including external verification, in which the manufacturer is explicitly recognized as a participant. OR products with industry wide EPDs which conform to ISO 14025, EN 15804, or ISO 21930 with at least cradle to grave scope.
  - c. Product-Specific Type III EPD – products with third-party certification (Type III), including external verification and external critical review. Counts for 1.5 products.

## 2.3 LOW-EMITTING MATERIALS

- A. Paints and Coatings: For field applications that are inside the weatherproofing system, paints and coatings shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:
  - 1. Flat Paints and Coatings: 50 g/L.
  - 2. Nonflat Paints and Coatings: 50 g/L.

3. Dry-Fog Coatings: 150 g/L.
  4. Primers, Sealers, and Undercoaters: 100 g/L.
  5. Rust-Preventive Coatings: 100 g/L.
  6. Zinc-Rich Industrial Maintenance Primers: 100 g/L.
  7. Pretreatment Wash Primers: 420 g/L.
  8. Clear Wood Finishes, Varnishes: 275 g/L.
  9. Clear Wood Finishes, Lacquers: 275 g/L.
  10. Floor Coatings: 50 g/L.
  11. Shellacs, Clear: 730 g/L.
  12. Shellacs, Pigmented: 550 g/L.
  13. Stains: 100 g/L.
- B. Paints and Coatings: For field applications that are inside the weatherproofing system, 100 percent of paints and coatings by volume for emissions and 100% VOC content shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- C. Adhesives and Sealants: For field applications that are inside the weatherproofing system, adhesives and sealants shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:
1. Wood Glues: 30 g/L.
  2. Metal-to-Metal Adhesives: 30 g/L.
  3. Adhesives for Porous Materials (Except Wood): 50 g/L.
  4. Subfloor Adhesives: 50 g/L.
  5. Plastic Foam Adhesives: 50 g/L.
  6. Carpet Adhesives: 50 g/L.
  7. Carpet Pad Adhesives: 50 g/L.
  8. VCT and Asphalt Tile Adhesives: 50 g/L.
  9. Cove Base Adhesives: 50 g/L.
  10. Gypsum Board and Panel Adhesives: 50 g/L.
  11. Rubber Floor Adhesives: 60 g/L.
  12. Ceramic Tile Adhesives: 65 g/L.
  13. Multipurpose Construction Adhesives: 70 g/L.
  14. Fiberglass Adhesives: 80 g/L.
  15. Contact Adhesives: 80 g/L.
  16. Structural Glazing Adhesives: 100 g/L.
  17. Wood Flooring Adhesives: 100 g/L.
  18. Structural Wood Member Adhesives: 140 g/L.
  19. Single-Ply Roof Membrane Adhesives: 250 g/L.
  20. Special-Purpose Contact Adhesives (That Are Used to Bond Melamine-Covered Board, Metal, Unsupported Vinyl, Rubber, or Wood Veneer 1/16 Inch or Less in Thickness to Any Surface): 250 g/L.
  21. Top and Trim Adhesives: 250 g/L.
  22. Plastic Cement Welding Compounds: 250 g/L.
  23. ABS Welding Compounds: 325 g/L.
  24. CPVC Welding Compounds: 490 g/L.
  25. PVC Welding Compounds: 510 g/L.

26. Adhesive Primer for Plastic: 550 g/L.
  27. Sheet-Applied Rubber Lining Adhesives: 850 g/L.
  28. Aerosol Adhesive, General-Purpose Mist Spray: 65 percent by weight.
  29. Aerosol Adhesive, General-Purpose Web Spray: 55 percent by weight.
  30. Special-Purpose Aerosol Adhesives (All Types): 70 percent by weight.
  31. Other Adhesives: 250 g/L.
  32. Architectural Sealants: 250 g/L.
  33. Nonmembrane Roof Sealants: 300 g/L.
  34. Single-Ply Roof Membrane Sealants: 450 g/L.
  35. Other Sealants: 420 g/L.
  36. Sealant Primers for Nonporous Substrates: 250 g/L.
  37. Sealant Primers for Porous Substrates: 775 g/L.
  38. Modified Bituminous Sealant Primers: 500 g/L.
  39. Other Sealant Primers: 750 g/L.
- D. Adhesives and Sealants: For field applications that are inside the weatherproofing system, 100 percent of adhesives and sealants (by volume) shall comply with the emissions requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- E. Flooring: 100% of Flooring shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- F. Composite Wood: Composite wood, agrifiber products, and adhesives shall be made using ultra-low-emitting formaldehyde (ULEF) resins as defined in the California Air Resources Board's (CARB) "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products" to meet the CARB ATCM for formaldehyde requirements of Ultra-low emitting formaldehyde (ULEF) resins or shall be made with no added formaldehyde.
- G. Ceilings, Walls, and Thermal Insulation: Ceilings, walls, and thermal insulation shall comply with the requirements of the California Department of Public Health's (CDPH) "Standard Method v1.1-2010/v1.2-2017 for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers", using the applicable exposure scenario.
1. Manufacturer or 3rd party certification shall state the exposure scenario used to determine compliance.
  2. Claims of compliance for wet applied products shall state the amount applied in mass per surface area, also state the range of total VOCs after 14 days measured as specified in CDPH Standard:
    - a. 0.5mg/cubic meter or less;
    - b. Between 0.5 and 5 mg/cubic meter; or
    - c. 5 mg/cu meter or more.

- H. Office furniture and seating: New office furniture and seating shall comply with the following:
  - 1. A minimum of 95% of the total number of furniture units shall comply with ANSI/BIFMA e3-2010 Furniture Sustainability Standard, Sections 7.6.1.
  - 2. A minimum of 50% of the total number of furniture units shall comply with ANSI/BIFMA e3-2010 Furniture Sustainability Standard, Sections 7.6.2.

### **PART 3 - EXECUTION**

#### **3.1 NONSMOKING BUILDING**

- A. Smoking is not permitted within the building or within **25 feet (8 m)** of entrances, operable windows, or outdoor-air intakes.

#### **3.2 CONSTRUCTION WASTE MANAGEMENT**

- A. Comply with Division 01 Section "Construction Waste Management and Disposal."

#### **3.3 CONSTRUCTION IAQ MANAGEMENT**

- A. Comply with Division 01 Section "Testing for Indoor Air Quality, Baseline IAQ, and Materials."."

END OF SECTION 018114

## SECTION 018115 - SUSTAINABLE DESIGN REQUIREMENTS – SITES v2

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Provide the work of this Section in accordance with requirements of the Contract Documents.
- B. Section includes general requirements and procedures for compliance with certain prerequisites and credits needed for Project to obtain "Sustainable Sites Initiative" (SITES v2) (**DESIGNATE LEVEL HERE**) certification based on the *SITES v2 Reference Guide: For Sustainable Land Design and Development*. SITES is the Green Business Certification Inc's (GBCI's) comprehensive rating system for developing sustainable landscapes.
  - 1. Specific requirements for SITES are also included in other Sections.
  - 2. Some SITES prerequisites and credits needed to obtain SITES certification depend on product selections and may not be specifically identified as SITES requirements. Compliance with requirements needed to obtain SITES prerequisites and credits may be used as one criterion to evaluate substitution requests and comparable product requests.
  - 3. A copy of the SITES Project checklist is attached at the end of this Section for information only.
    - a. Some SITES prerequisites and credits needed to obtain the indicated SITES certification depend on the Landscape Architect's design and other aspects of Project that are not part of the Work of the Contract.
- C. Related Sections:
  - 1. Division 01 "Sustainable Design Requirements – LEED v4 BD+C" for diversion of demolition and construction waste from landfill into recycling.
  - 2. Division 01 "Construction Waste Management" for diversion of demolition and construction waste from landfill into recycling.
  - 3. Division 01 "Temporary Facilities and Controls" for maintenance of indoor air quality, mitigation of pollution from demolition and construction waste in temporary facilities.
  - 4. Division 01 "General Commissioning Requirements" for commissioning building systems to assure sustainability targets are met.
  - 5. Division 01 through 49 Sections for sustainable requirements specific to the Work of each of these Sections.

#### 1.2 DEFINITIONS

- A. SITES: "The Sustainable Sites Initiative™ (SITES™)"



LEED v4 BD+C: New Construction  
Project Checklist

Project Name: IUHMCC Central Utility Plant (CUP)  
Date: 1/27/2023

YES - Required/Compliant	YES - Pursuing	MAYBE - with Assessment	MAYBE - with Cost	NO	Campus Credit (Y/?/N)*	Total Credits Available	LEED Submission Phase	<b>Notations:</b> P = Prerequisite D = Design Phase Submission C = Construction Phase Submission		Std-189.3 Aligned Section	Std-189.3 via LEED?	
								<b>Campus Credit:</b> * Pending credit achieved via Campus Master Site (verify)				
PI Category: 0							Project Documents				Credit Lead (bold) / Support / (Resource)	Comments
						0	D	PD	Project Information	-	Leslie North Hall, Heather	Project Boundary, Building Info (dwgs, narrative, data), Occupancy, ETC

IP Category:						1	Integrative Process				Responsibility	Comments
	1					1	D	IPc1	Integrative Process		Leslie North Hall, Heather	Utilize OPR/BOD as starting basis; Add subsequent IP from project team--Heather to review 2nd draft
0	1	0	0	0	0							

LT Category:						16	Location and Transportation				Responsibility	Comments
	1					1	D	LTc2	Sensitive Land Protection	5.3.1	Leslie/ Heather	Opt 1: Previously developed land - Looking to Pursue as Campus, but eitherway, this should be earned by the project
	2				Y	2	D	LTc3	High Priority Site	5.3.1	Chris Reinhart/(August Mack)	Opt 3: Brownfield Path (coord w/August-Mack via Campus - MAYBE status)
	3			2		5	D	LTc4	Surrounding Density and Diverse Uses	5.3.1.1	Leslie Campus Heather	v4.1 Option 3: Use Walk Score (Showing about 62 points) for 2 of 5 Points
	3					5	D	LTc5	Access to Quality Transit	5.3.1.1 5.3.7.1	Leslie Campus Heather	Add additional walking path graphic.
	1				Y	1	D	LTc6	Bicycle Facilities (v4.1)	5.3.7.2	Madeline Smith / Chris Reinhart	Coord. bike storage + Shower/Change areas. Requirement could be easy due to low occupancy?
				1	Y	1	D	LTc7	Reduced Parking Footprint		Not Pursuing	Not recommended
	1				Y	1	D	LTc8	Green Vehicles (Electric Vehicles, v4.1, April 2019 addenda)	5.3.7.3	Madeline Smith / Harmon-Walsh /VS-Context	v4.1 (April 2019) Opt. 2: 6% EV Ready. Regs need to be met in all campus parking areas for campus credit
0	11	0	0	0	1							

SS Category:						7	Sustainable Sites				Responsibility	Comments
P						0	C	SSp1	Construction Activity Pollution Prevention	10.3.1.3	Leslie & CM / Chris Wiseman	Civil to complete ESC plan and SWPPP--likely completed in March
	1				Y	1	D	SSc1	Site Assessment	5.3.2	VS-Context / Chris Reinhart	Guidon to set draft of template, then distribute to teams for comments.
		1			Y	1	D	SSc2	Site Development - Protect or Restore Habitat	5.3.1, 6.3.1.1	VS-Context / (Chris Reinhart)	Restore 30% of master site sf, coordinate with Open Space credit requirements
	1				Y	1	D	SSc3	Open Space	5.3.1	VS-Context / (Chris Reinhart)	Review calc. details with VS-Context 25% veg. of the 30% (regardless of total %).
		2			Y	2	D	SSc4	Rainwater Management	5.3.4.2 5.3.4.3	VS-Context /	v4.1 sub: Retain runoff from 80th percentile (1pt) or 85th (2pts) of rainfall events.
	1				Y	1	D	SSc5	Heat Island Reduction	5.3.5	VS-Context / (Chris Reinhart)	Opt. 1: Roof and nonroof-3 yr aged SRI of 64+ for roof, SR of 0.28+ for paving; vegetated surfaces. Opt 2: Parking under Cover-min 75% of spaces under cover. EP avail. For both Options and 100% parking under cover.
	1				Y	1	D	SSc6	Light Pollution Reduction	5.3.6	VS-Context / (Chris Reinhart)	No BUG ratings for IUSM outdoor fixtures. Need to pursue Opt. 2? Discuss with VS-Context. There will need to be coordination between CUP and SITE team for any Exterior Building Lights
1	4	3	0	0	**NOTE: SITES Gold certification earns all SS credits. Lower certification level would likely earn several SS credits, but not automatically all.							

WE Category:						11	Water Efficiency				Responsibility	Comments
P					Y	0	D	WEp1	Outdoor Water Use Reduction	6.3.1 6.4.1	VS-Context	No irrigation or min. 30% reduction from baseline
P						0	D	WEp2	Indoor Water Use Reduction	6.3.2	Justin Merriman/ Mike/ Leslie	Reduce 20% baseline-Use WaterSense fixtures.
P						0	D	WEp3	Building-Level Water Metering	6.3.3	Justin Merriman/ Mike/ Leslie	Meter total potable water use for building. IUH will provide sharing commitment letter.
	1			1	Y	2	D	WEc1	Outdoor Water Use Reduction	6.3.1 6.4.1	VS-Context	IUSM 100%CD docs complete. Coordination with VS-Context.
	5			1		6	D	WEc2	Indoor Water Use Reduction	6.3.2	Justin Merriman/ Mike/ Leslie	Target 35% reduction for 3pts (for 1-pt RP); Currently showing 49% reduction with "waterless" urinal.
	2				Y	2	D	WEc3	Cooling Tower Water Use	6.3.2.3 6.4.2.1	John Yoder / IUH	Once water analysis report is received the design team will analyze if V4 or V4.1 should be used to achieve this credit.
	1					1	D	WEc4	Water Metering	6.3.3	Justin Merriman/ Mike/ Leslie	Process water use will be metered as well domestic hot water. Design team will coordinate with IUH O&M to provide additional meters if necessary.
3	9	2	1	1								

EA Category:						33	Energy and Atmosphere				Responsibility	Comments
P						0	C	EAp1	Fundamental Commissioning and Verification	10.3.1.2	Justin Merriman/ (Laura H/IUH)/ Leslie	Engage CxA NLT end of DD; follow ASHRAE guidelines
P						0	D	EAp2	Minimum Energy Performance	7.3	Justin Merriman / Leslie	ASHRAE 90.1-2010, Min 5% redux v. baseline. (BOD/189.3 ref std is 90.1-2019)
P						0	D	EAp3	Building-Level Energy Metering	7.3.3	Justin Merriman / Leslie	Meter total building energy consumption and commit to share w/USGBC (5-years min)
P					Y	0	D	EAp4	Fundamental Refrigerant Management	9.3.3	Chris Reinhart	No CFCs



Project Name: IUHMCC Central Utility Plant (CUP)  
Date: 1/27/2023

	6					6	C	EAc1	Enhanced Commissioning			Justin Merriman / (SSR/K-H/IUH) / Leslie	Determine scope from Enhanced (3pts), Monitoring (+1pt), & Envelope (+2pts)
	9	4	5	2		18	D	EAc2	Optimize Energy Performance	7.3		Justin Merriman / Leslie	Target 22% above baseline? EM excludes process equipment for DES function
			1			1	D	EAc3	Advanced Energy Metering	7.3.3		Justin Merriman / Leslie	Need analysis of metering opportunities and usefulness to IUH
				2		2	C	EAc4	Demand Response	NR-189.3		Guidon/IUH	Not desired. Would require coordination w/AES (utility)
			3			3	D	EAc5	Renewable Energy Production	7.3.2 7.4.1		Justin Merriman / Leslie	For a District (CUP) Energy Model, any included site-based RE can be apportioned to buildings; Std-189 requires building w/solar-ready capacity per formula/roof* area.
	1					1	D	EAc6	Enhanced Refrigerant Management	11.3.1.1		Justin Merriman / Leslie	Follow District (CUP) Energy System variation. Calculations done via opt 2 show compliance.
			2			2	C	EAc7	Green Power and Carbon Offsets	10.3.2		Guidon / IUH	Purchase energy-use and/or carbon offsets (50%=1pt, 100%=2pts). of energy use.
4	16	6	12	4									

MR Category:					13	Materials and Resources						Responsibility	Comments
P					Y	0	D	MRp1	Storage and Collection of Recyclables	9.3.4		Guidon coordinate w/IUH	Still investigating if Campus path is appropriate or if project-by-project
P						0	C	MRp2	Construction and Demo Waste Management Planning	10.3.1		Mike Davis /CM/Leslie	Establish CWM Plan and Specs. Evaluate impact of any modular construction?
	1	1	1	3		5	C	MRc1	Building Life-Cycle Impact Reduction	9.5.1		Mike Davis / Consultant?	v4.1 sub: create LCA base model =1pt: +1pt for 5% design case redux, or +2 pts for 10%.
	1	1				2	C	MRc2	BPDO - Environmental Product Declarations	9.4.1		Mike Davis / CM/Leslie	v4.1 sub: Opt-1: 20 EPDs=1pt; Opt-2 (multi-attribute optimize, track cost)=1pt. Pursue both?
		2				2	C	MRc3	BPDO - Sourcing of Raw Materials	9.4.1		Mike Davis / CM/Leslie	v4.1 sub: Opt-2: Extraction Practices - 20% by cost =1pt, 40% by cost =2pts
		1	1			2	C	MRc4	BPDO - Material Ingredients	9.4.1		Mike Davis / CM/Leslie	v4.1 sub: Opt-1: 20 HPDs=1pt; Opt-2,3 (mat'l / supply-chain optimize, track cost)=1pt. Both?
	2					2	C	MRc5	Construction and Demolition Waste Management	9.3.1 (189.3) 10.3.1.8		CM/Leslie	v4.1 sub; pursuit of opt-1 (50%+) and opt-2 (<7.5#/sf) with prefab/modular waste reduction
2	3	5	2	3									

IEQ Category:						16	Indoor Environmental Quality						Responsibility		Comments	
P							0	D	EQp1	Minimum Indoor Air Quality Performance	8.3.1		Justin Merriman / Leslie		CUP scope appropriate to meet ASHRAE 62 requirements (non-healthcare)	
P						Y	0	D	EQp2	Environmental Tobacco Smoke Control	8.3.1.4		Chris Reinhart / IUH / IUSM		Coordinate w signage package, campus, and IUSM	
	2						2	D	EQc1	Enhanced Indoor Air Quality Strategies	8.3.1		Justin Merriman/ Mike / Leslie		Opt-1 (IAQ Strategies) =1pt; Opt-2 (Add'l IAQ Strategies--Increased Ventilation) =1pt	
	2	1					3	D	EQc2	Low-Emitting Materials	8.4.2		Mike Davis / CM/Leslie		v4.1 sub; pursue 3 to 4 category compliance (5 for Exemplary Performance?)	
	1						1	C	EQc3	Construction Indoor Air Quality Management Plan	10.3.1.4		Mike Davis / CM/Leslie		Develop and implement IAQ mgmt plan for construction/preoccupancy	
	2						2	C	EQc4	Indoor Air Quality Assessment	8.3.1		Mike Davis/ CM/Leslie		Pursue via Opt-2 =2pts (Air testing); Opt-1 =1pt (Flush out) not be feasible for CUP?	
	1						1	D	EQc5	Thermal Comfort	8.3.2		Justin Merriman / Mike/ Leslie		Ashrase 55 calculations will be performed to show compliance with occupied space. Each space will have individual controls.	
	2						2	D	EQc6	Interior Lighting	8.3.5		Mike Davis /Applied/Leslie		v4.1 sub: meet 1 strategy =1pt; 3 =2pts (strategies: Glare/CRI/Indiv Control/Surf Reflectivity)	
		2		1			3	D	EQe7	Daylight	8.4.1		Mike Davis /Applied/Leslie		May be achievable for limited program? (simulation better option 2)	
		1					1	D	EQc8	Quality Views			Mike Davis /Applied/Leslie		May be achievable for limited program?	
				1			1	D	EQc9	Acoustic Performance	8.3.3		Justin Merriman / Leslie		Unlikely due to type of facility? Verify applicability	
2	10	4	0	2												

ID Category: 6							Innovation in Design				Responsibility	Comments
	1			Y	1	D	INpc-1	Pilot: SSpc158: Onsite Carbon Sequestration Through Plantings			VS Context / ?	LEED Pilot credit with full substitution as SITES innovation credit.
	1			Y	1	D		SITES, O+M P8.1: Plan for Sustainable Site Maintenance			VS Context / ?	Targeted on SITES 4/29/2022 scorecard.
	1			Y	1	D		SITES, S+V C4.8: Optimize Biomass			VS Context / ?	Targeted on SITES 4/29/2022 scorecard.
		1		Y	1	D		SITES, Materials C5.10: Support Sustainability in Plant Production			VS Context / ?	Targeted on SITES 4/29/2022 scorecard.
	1			Y	1	D		Innovation: Community Outreach via SITES: Pre-Design C2.4: Engage Users and Stakeholders			VS Context / ?	Targeted on SITES 4/29/2022 scorecard.
	1				1	C	INc6	LEED Accredited Professional			Guidon	Submit certificate w/Construction Phase Review (final docs)
0	5	1	0	0								

RP Category: 4							Regional Priority (46202)(LEEDv4-HC)(Master Site)				Responsibility	Comments
	1			Y	1	D	LTc3	Regional Priority: High Priority Site			Guidon	via Master Site / Min Threshold =1pt
	1			Y	1	D	LTc6	Regional Priority: Bicycle Facilities			Madeline Smith / Chris Reinhart	via Master Site / v4.1 sub / Min Threshold =1pt
			1	N	1	D	SSc4	Regional Priority: Rainwater Management			VS-Context /	via Master Site / v4.1 sub / Min Threshold =1pt / (Currently not achievable)
	1				1	D	EAc2	Regional Priority: Optimize Energy Performance			Justin Merriman / Leslie	Min Threshold: 9pts (22%> baseline)
	1				1	C	MRc1	Regional Priority: Building Life Cycle Impact Reduction			Mike Davis / Consultant?	Min Threshold: 1pt / (via Option-4, LCA path)
	1				1	D	EQc7	Regional Priority: Enhanced IAQ			Mike Davis	Min Threshold: 1pt
0	3	2	1	3								

62	23	16	14		110	<b>TOTALS</b>
<b>Certified:</b> 40 to 49 points, <b>Silver:</b> 50 to 59 points, <b>Gold:</b> 60 to 79 points, <b>Platinum:</b> 80 to 110						



1. Definitions that are a part of "SITES v2 Rating System: For Sustainable Land Design and Development" (SITES v2) apply to this Section.
- B. Chain of Custody (CoC): The path taken by raw materials, processed materials, finished products, and co-products from the forest to the consumer, including each successive stage of processing, transformation, manufacturing and distribution.
- C. Chain-of-Custody Certificates: Certificates signed by manufacturers certifying that wood used to make products was obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001. Certificates shall include evidence that manufacturer is certified for chain of custody by an FSC-accredited certification body. A chain-of-custody certificate number on invoices for nonlabeled products indicates that the certifier's guidelines for product accounting have been followed. A chain-of-custody certification is not required by distributors of a product that is individually labeled with the Forest Stewardship Council logo and manufacturer's chain of custody number. CoC certification requirements are determined by Forest Stewardship Council Chain of Custody Standard 40-004 v2-1.
- D. Regional Materials: Materials that have been extracted, harvested, or recovered, as well as manufactured, within a certain number of miles of the Project site. The distance requirement for soils, compost, mulch, boulders, rocks, and aggregate is 50 miles; plants must be within 250 miles; all other materials must be within 500 miles. If only a fraction of a product or material is extracted/harvested/recovered and manufactured locally, then only that percentage (by weight) shall contribute to the regional value.
- E. Recycled Content: The recycled content value of a material assembly shall be determined by weight. The recycled fraction of the assembly is then multiplied by the cost of assembly to determine the recycled content value.
  1. "Postconsumer" material is defined as waste material generated by end users (households, or commercial, industrial, and institutional facilities) of a product, which can no longer be used for its intended purpose that is recycled into raw material for a new product.
  2. "Preconsumer" material is defined as material diverted from the waste stream during the manufacturing process. Excluded is reutilization of materials, such as rework, regrind, or scrap, generated in a process and capable of being reclaimed within the same process that generated it.

### 1.3 PREINSTALLATION MEETINGS

- A. SITES Pre-Construction Meeting:
  1. Before construction starts, the SITES Project Manager and Construction Manager's Representative will conduct a meeting that includes at least one person from each discipline from the design team, plus the major subcontractors. The purposes of this meeting shall be to:

- a. Review construction specifications and drawings and convey the project's sustainability principles and performance goals to the Contractor and Subcontractors.
- b. Review the steps need to achieve all the prerequisites and pursued credits.
- c. Review the SITES Punchlist.
  - 1) Before the Pre-Construction Meeting, the SITES Project Manager and CM's Representative will submit a "SITES Punchlist" that assigns responsibility for each prerequisite and pursued credit to a member of the project team. Each assignment is to be signed-off on. The "SITES Punchlist" will be submitted to GBCI as part of the SITES Certification Review Process.
- d. Schedule SITES Status Meetings.
- e. Establish the SITES Compliance Officer.

#### 1.4 ADMINISTRATIVE REQUIREMENTS

- A. SITES Project Manager: Responsible for administration of SITES Certification Application.
  - 1. This is a designated member of the Construction Manager's team.
- B. Contractor's Responsibilities:
  - 1. Participate in SITES coordination meetings.
  - 2. Submit and maintain documentation to GBCI through SITES' dedicated online file exchange platform, and respond to questions and requests from GBCI regarding SITES credits that are the responsibility of the Contractor, that depend on product selection or product qualities, or that depend on Contractor's procedures until GBCI has made its determination on the Project's SITES certification application.
    - a. Document correspondence with GBCI as informational submittals.
- C. SITES Status Meetings:
  - 1. SITES Project Manager and Owner's Representative will conduct regularly scheduled meetings to review Project Status. These may be conducted concurrently with other Project Meetings required by Division 01 Section "Project Management and Coordination."

#### 1.5 ACTION SUBMITTALS

- A. General: Refer to the SITES scorecard, technical sections of the Specifications and this Section for responsibilities regarding documentation. The Landscape Architect will review documentation before it is submitted to SITES' dedicated online file exchange platform.

1. The Contractor and other SITES team members are responsible for online documentation of construction related information required for SITES compliance.
  2. Submit additional sustainable design submittals required by other Specification Sections.
  3. Maintain copies of SITES compliance submittals for confirmation of compliance at Project completion.
- B. Sustainable design submittals are in addition to other submittals, but shall be processed at the same time as other submittals are processed.
1. If submitted item(s) are identical to those submitted to comply with other requirements, include separate, additional copy(ies) with other submittal as a record copy of compliance with indicated SITES requirements instead of separate sustainable design submittal. Mark additional copy "Sustainable design submittal."
- C. Sustainable Design Documentation Submittals: Review technical sections of the specifications and provide the following documentation pertinent to their work:
1. Environmental Product Declarations complying with SITES requirements.
  2. Documentation for products that comply with SITES requirements for multi-attribute optimization.
    - a. Include documentation for regional materials, indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material and costs of regional materials.
  3. Sustainability reports for products that comply with SITES requirements for raw material and source extraction reporting.
  4. Documentation for products that comply with SITES requirements for leadership extraction practices. Include the following:
    - a. Product data and certification letter from product manufacturers, indicating participation in an extended producer responsibility program and statement of costs.
    - b. Product data and certification for bio-based materials, indicating that they comply with requirements. Include statement of costs.
    - c. Product data and chain-of-custody certificates for products containing certified wood. Include statement of costs.
    - d. Receipts for salvaged and refurbished materials used for Project, indicating sources and costs.
    - e. Product data and certification letter from product manufacturers, indicating percentages by weight of postconsumer and preconsumer recycled content for products having recycled content. Include statement of costs.
    - f. Documentation for regional materials, indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material and costs of regional materials.

5. Material ingredient reports for products that comply with SITES requirements under “Section 5: Site Design – Materials Selection” of the SITES v2 Reference Guide.
6. Documentation for products that comply with SITES requirements “Section 5: Site Design – Materials Selection” of the SITES v2 Reference Guide.
  - a. Include documentation for regional materials, indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material and costs of regional materials.
7. Documentation complying with Division 01 Section "Construction Waste Management and Disposal."
8. Product data for products that fall into one of the following categories (excluding products that are salvaged, reused, or refurbished):
  - a. Decking, railing, fencing trellises, or lattices (wood and non-wood).
  - b. Pipes, hoses, and irrigation components.
  - c. Conduit, wiring, electrical equipment.
  - d. Lighting.
  - e. Membranes, liners, and geotextiles.
  - f. Fabrics and canvas.
  - g. Extruded, spray, or board foams.
  - h. Paints and coatings.
  - i. Adhesives, sealants, elastomers (e.g., flexible plastics) water proofing, weather stripping, expansion joint filling, and flashing.
  - j. Synthetic surfacing materials and associated products (e.g., crumb rubber, artificial turf).

## 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: Submit qualification data for the SITES Compliance Officer.
- B. Total Materials Cost: Provide a statement indicating total cost for materials used in the SITES project. Project and cost items that comply with sustainable requirements specified, for work included under technical sections of the work. Costs exclude labor, overhead, and profit.
  1. Include a completed SITES v2 *Materials Worksheet*. This editable spreadsheet file is available to registered SITES project teams to assist in tracking and calculating project materials costs. This will be provided to the Contractor by the SITES Project Manager and Owner’s Representative for completion and submittal by the Contractor.
- C. Erosion and Sedimentation Control (ESC) Plan: Provide the erosion and sedimentation control plan (ESC) for all construction activities associated with the project.
  1. The ESC plan must comply with U.S. EPA requirements for the construction general permit (CGP). The CGP outlines the provisions necessary to comply with Phase I and Phase II of the U.S. EPA National Pollutant Discharge Elimination

System (NPDES) program (or local equivalent for projects outside the United States). Although the CGP applies only to sites greater than one acre (0.40 hectares), its requirements are applied to all SITES projects.

- D. Sustainable Design Action Plans: Provide preliminary submittals within 14 days of date established for the Notice to Proceed for products to be incorporated in the work of this project.
- E. Sustainable Design Progress Reports: Concurrent with each Application for Payment, submit reports comparing actual construction and purchasing activities with sustainable design action plans.

## 1.7 QUALITY ASSURANCE

- A. Sustainable Design Program: The Contractor shall be responsible for implementing processes, programs, means and methods required to ensure compliance with sustainable design requirements and objectives of the Contract Documents, including but not limited to the following:
  - 1. Reviewing and vetting submittals for technical sections with respect to compliance with Sustainable Design Requirements.
  - 2. Product and Execution requirements specified in various sections of the project specifications.
  - 3. Proposed SITES points that specifically address construction execution issues material reporting requirements and indoor air quality testing requirements.
- B. SITES Compliance Officer: Engage an experienced SITES-accredited professional to coordinate SITES requirements.
  - 1. Qualifications: The SITES Compliance shall have at least two years of experience implementing the SITES rating system on other projects.
    - a. Alternatively, if the project is already served by a LEED Compliance Officer, this individual may serve as the SITES Compliance Officer. This alternative qualification is subject to approval by the SITES Project Manager and Owner's Representative.
- C. Responsibilities of Subcontractors: Each subcontractor shall coordinate SITES submittal requirements and process delivery of certifications and SITES substantiation documents through the Contractor's SITES Compliance Officer, who in turn will coordinate with the Landscape Architecture team.
- D. Responsibilities of the SITES Compliance Officer: The SITES Compliance Officer shall perform the following services:
  - 1. General: Take primary responsibility for organizing and managing the process of compiling requirements of the construction-related SITES Points for which each Subcontractor is responsible, including collecting and organizing the documentation required for the Landscape Architect's submission to the GBCI upon completion of the project.

2. SITES v2 *Materials Worksheet*: Coordinate the development and submittal of the SITES v2 *Materials Worksheet*.
3. Erosion and Sedimentation Control (ESC) Plan: Coordinate the development and submittal of the ESC Plan.
4. Construction Waste Management: The Contractor shall be responsible for verifying compliance, enforcing and documenting implementation of the Construction Waste Management Plan.
  - a. SITES v2 Credit 7.6: Divert reusable vegetation, rocks, and soil from disposal: This credit supports a net-zero waste site by diverting from disposal vegetation, mineral and rock waste, and soils generated during construction. This is an additional requirement for the Construction Waste Management plan when SITES is required for the project.
    - 1) If applicable, then include information on how the Contractor intends to divert reusable vegetation, rocks, and soil from disposal. This section of the plan applies to all on-site plant material, mineral and rock waste, and soils generated during the land-clearing activities of the site during all phases of design and construction.
    - 2) Contaminated soils and diseased or invasive plant materials should not be included in calculations of land-clearing materials totals. Salvaging plants is a technique that can be used to meet the requirements of Credit 7.6.
    - 3) Soils must be reused for functions comparable to their original function (i.e., topsoil is used as topsoil, subsoil as subsoil, or subsoil amended to become functional topsoil).
    - 4) Diversion target: Retain 100 percent of land-clearing materials:
      - a) For use within 50 miles of the site.
5. Air Quality Protection Plan: As Required by SITES v2 Credit 7.7: Protect air quality during construction. The Contractor shall be responsible for protecting air quality and reduce pollution by using construction equipment that reduces emissions of localized air pollutants and greenhouse gasses. SITES v2 requirements apply to all diesel engines used on site during construction.
  - a. Delivery vehicles are not covered by SITES; exclude them from calculations.
  - b. Submit a policy to reduce diesel emissions from idling construction equipment. The policy shall include the following:
    - 1) Limit unnecessary idling to no more than five minutes in any 60-minute period.
    - 2) Implement a preventative maintenance plan for all equipment according to engine manufacturer specifications.
    - 3) Use ultra-low sulfur diesel fuel that meets American Society of Testing and Materials (ASTM) specifications with sulfur less than or equal to 15 ppm for all non-road diesel equipment.
    - 4) Use no construction equipment with Tier 0 engines.

- 5) 50 percent of the total run-time hours of construction equipment meets one of the following criteria:
      - a) Tier 2 or higher engines
      - b) Tier 3 or higher engines
      - c) Tier 4 or higher engines
  6. SITES Compliant Materials: Assist the Subcontractors in identifying and obtaining supporting documentation for products that satisfy the specified sustainable design and specified product requirements. Each Subcontractor shall coordinate with the SITES Compliance officer and provide documentation in a timely manner as required for filing by the Landscape Architect team.
  7. SITES Progress Meetings: Assist the Landscape Architect in scheduling, conducting and distributing minutes of record the Landscape Architect takes at regularly scheduled SITES progress meetings consisting of members of the Contractor, Subcontractors, Landscape Architect, Commissioning Agent and the Owner.
  8. Schedules and Tracking: Prepare schedules and tracking documentation for circulation to construction contracting team members for the purposes of organizing the sustainable design compliance responsibilities of each team member.
  9. Observation and Inspection: Perform periodic on-site observations and inspections of the work in progress in order to verify conformance with all required sustainable design requirements. These observations shall occur not less than once per week.
  10. Documentation: Provide documentation content for the Landscape Architect's formal SITES submission documentation, as required by the GBCI to verify conformance with the SITES rating system.
- E. The services described above (by the SITES Compliance Officer as a representative of the Contractor) shall not preclude nor substitute for the requirements of other dedicated sustainable design related services that the project may require, or general construction supervision required on a full or part-time basis to verify.

## **PART 2 - PRODUCTS**

### **2.1 SUSTAINABLE DESIGN - PERFORMANCE CRITERIA:**

- A. Performance criteria listed below represent overall project wide criteria. Individual sections of the Specifications contain specific thresholds selected by the Landscape Architecture in order to comply with SITES credits targeted to achieve the SITES Silver certification level. The Contractor can vary from individually targeted percentages and thresholds stated in individual sections of the specifications, as long as the overall percentages for the SITES credit is achieved as required to provide a SITES v2 Silver certification level.
- B. Specific performance criteria for individual products and systems are listed in each of the technical sections. If product specific performance criteria cannot be met, the

CONTRACTOR shall be responsible for providing alternative products which ensure that the overall project wide performance will still be achieved. All product substitutions must comply with requirements of Division 01 Section "Substitution Procedures".

## 2.2 MATERIALS

- A. Provide all products and procedures necessary to obtain SITES credits required in this Section. Although other Sections may specify some requirements that contribute to these SITES credits, the Contractor shall provide additional materials and procedures necessary to obtain SITES credits indicated.

## PART 3 - EXECUTION

### 3.1 SMOKE-FREE WORK ZONE

- A. Smoking is not permitted within the building or within 25 feet (8 m) of entrances, operable windows, or outdoor-air intakes.

### 3.2 EROSION AND SEDIMENTATION CONTROL

- A. The Contractor shall be responsible for executing the Erosion and Sedimentation Control (ESC) plan.

### 3.3 CONSTRUCTION WASTE MANAGEMENT

- A. Comply with Division 01 Section "Construction Waste Management and Disposal."
- B. When a project is subject to pursuing SITES certification, the following information shall be submitted:
  - 1. List of all construction and demolition materials generated on-site, specifying each material as either structural or road and infrastructural.
  - 2. Location of receiving agent.
  - 3. Tabulated quantity of waste (tons or cubic yards) diverted by type (e.g., structural and road and infrastructural materials).
  - 4. Tabulated total construction and demolition waste (tons or cubic yards) generated during construction.
  - 5. Narrative that describes the implementation of the construction and demolition management plan and practices followed on-site.
  - 6. Project specifications and details on the handling of demolition materials, including sorting on-site or comingling.

### 3.4 AIR QUALITY PROECTION

- A. The Contractor shall be responsible for executing the Air Quality Protection Plan.



END OF SECTION 018115

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Estimate points below  
(key at bottom)

Targeted	Possible	Unlikely	Not Achievable	PREREQUISITE OR CREDIT #	TITLE	CASE / OPTION / THRESHOLD	POINTS	POSSIBLE POINTS PER CREDIT
13	0	0	0	<b>1: SITE CONTEXT</b>			<b>Possible Points:</b>	<b>13</b>
Y				CONTEXT P1.1	Limit development on farmland	Case 1: Sites without farmland soils		
						Case 2: Sites with farmland soils - VSPZ		
						Case 3: Sites with farmland soils - Mitigation		
Y				CONTEXT P1.2	Protect floodplain functions	Case 1: Sites without floodplain		
						Case 2: Previously developed and brownfield sites within floodplain		
						Case 3: Greenfield sites within floodplain		
Y				CONTEXT P1.3	Conserve aquatic ecosystems	Case 1: Sites without aquatic ecosystems		
						Case 2: Sites with naturally occurring aquatic ecosystems		
						Case 3: Sites with naturally occurring poor quality aquatic ecosystems		
Y				CONTEXT P1.4	Conserve habitats for threatened and endangered species	Case 1: Brownfields and previously developed sites		
						Case 2: Greenfield sites		
6				CONTEXT C1.5	Redevelop degraded sites	Case 1: Previously developed sites	3	<b>3 to 6</b>
						Case 2: Brownfield sites	6	
4				CONTEXT C1.6	Locate projects within existing developed areas		4	<b>4</b>
3				CONTEXT C1.7	Connect to multi-modal transit networks	Option 1: Pedestrian and bicycle network	2	<b>2 to 3</b>
						Option 2: Transit network	3	

3	0	0	0	<b>2: PRE-DESIGN ASSESSMENT + PLANNING</b>			<b>Possible Points:</b>	<b>3</b>
Y				PRE-DESIGN P2.1	Use an integrative design process			
Y				PRE-DESIGN P2.2	Conduct a pre-design site assessment			
Y				PRE-DESIGN P2.3	Designate and communicate Vegetation and Soil Protection Zones			
3				PRE-DESIGN C2.4	Engage users and stakeholders		3	<b>3</b>

4	8	1	10	<b>3: SITE DESIGN - WATER</b>			<b>Possible Points:</b>	<b>23</b>
Y				WATER P3.1	Manage precipitation on site			
Y				WATER P3.2	Reduce water use for landscape irrigation			
	4		2	WATER C3.3	Manage precipitation beyond baseline	80th percentile precipitation event	4	<b>4 to 6</b>
						90th percentile precipitation event	5	
						95th percentile precipitation event	6	
4		1	1	WATER C3.4	Reduce outdoor water use	Option 1: Reduce outdoor water use	4	<b>4 to 6</b>
						Option 2: Significantly reduce outdoor water use	5	
						Option 3: Eliminate outdoor water use	6	
	4		1	WATER C3.5	Design functional stormwater features as amenities	50% of stormwater features	4	<b>4 to 5</b>
						100% of stormwater features	5	
			6	WATER C3.6	Restore aquatic ecosystems (project must have existing feature)	No aquatic ecosystems present on site		<b>4 to 6</b>
						30% of the geographic extent	4	
						60% of the geographic extent	5	
						90% of the geographic extent	6	

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Estimate points below  
(key at bottom)

Targeted  
Possible  
Unlikely  
Not Achievable

PREREQUISITE OR  
CREDIT #

TITLE

CASE / OPTION / THRESHOLD

POINTS

POSSIBLE POINTS PER CREDIT

# SITES v2 Scorecard - 14100 IU Health AAHC

Estimate points below  
(key at bottom)

Targeted	Possible	Unlikely	Not Achievable	PREREQUISITE OR CREDIT #	TITLE	CASE / OPTION / THRESHOLD	POINTS	POSSIBLE POINTS PER CREDIT
7	6	1	26	<b>4: SITE DESIGN - SOIL + VEGETATION</b>				<b>Possible Points: 40</b>
Y				SOIL+VEG P4.1	Create and communicate a soil management plan			
Y				SOIL+VEG P4.2	Control and manage invasive plants	Case 1: No invasive plants found on site		
						Case 2: Invasive plants identified on site		
Y				SOIL+VEG P4.3	Use appropriate plants			
			6	SOIL+VEG C4.4	Conserve healthy soils and appropriate vegetation (project must have existing feature)	No healthy soils and/or appropriate vegetation present on site		
						50% of the site's existing vegetated area	4	<b>4 to 6</b>
						75% of the site's existing vegetated area	5	
						95% of the site's existing vegetated area	6	
			4	SOIL+VEG C4.5	Conserve special status vegetation (project must have existing feature)		4	<b>4</b>
3	1		2	SOIL+VEG C4.6	Conserve and use native plants	20% total native plant score	3	<b>3 to 6</b>
						40% total native plant score	4	
						60% total native plant score	6	
4		1	1	SOIL+VEG C4.7	Conserve and restore native plant communities	20% total native plant community score	4	<b>4 to 6</b>
						40% total native plant community score	5	
						60% total native plant community score	6	
	1		5	SOIL+VEG C4.8	Optimize biomass	minimal point score	1	<b>1 to 6</b>
						low point score	3	
						mid point score	5	
						high point score	6	
	4			SOIL+VEG C4.9	Reduce urban heat island effects		4	<b>4</b>
			4	SOIL+VEG C4.10	Use vegetation to minimize building energy use (project must have building on site)	No buildings present on site		<b>1 to 4</b>
						Option 1: Reduce energy use - 5% reduction	2	
						Option 1: Reduce energy use - 7% reduction	4	
						Option 2: Provide shade structures - 30% shaded	1	
						Option 2: Provide shade structures - 60% shaded	2	
						Option 3: Provide a windbreak - one row	1	
						Option 3: Provide a windbreak - two or more rows	2	
			4	SOIL+VEG C4.11	Reduce the risk of catastrophic wildfire (project must be located in fire-prone area)	Project not in a fire-prone area		<b>4</b>
						Project is in a fire-prone area	4	

# SITES v2 Scorecard - 14100 IU Health AAHC

Estimate points below  
(key at bottom)

Targeted	Possible	Unlikely	Not Achievable	PREREQUISITE OR CREDIT #	TITLE	CASE / OPTION / THRESHOLD	POINTS	POSSIBLE POINTS PER CREDIT
4	8	9	20	<b>5: SITE DESIGN - MATERIALS SELECTION</b>				<b>Possible Points: 41</b>
Y				<b>MATERIALS P5.1</b>	Eliminate the use of wood from threatened tree species			
			4	<b>MATERIALS C5.2</b>	Maintain on-site structures and paving (project must have existing feature)	No structures or paving present on site		
						10% of the total existing built surface area	2	<b>2 to 4</b>
						20% of the total existing built surface area	3	
						30% of the total existing built surface area	4	
		3	1	<b>MATERIALS C5.3</b>	Design for adaptability and disassembly	30% of total materials cost, excluding plants, rocks, and soils	3	<b>3 to 4</b>
						60% of total materials cost, excluding plants, rocks, and soils	4	
			4	<b>MATERIALS C5.4</b>	Use salvaged materials and plants	10% of total materials cost, excluding soils	3	<b>3 to 4</b>
						20% of total materials cost, excluding soils	4	
	3		1	<b>MATERIALS C5.5</b>	Use recycled content materials	20% of total materials cost, excluding plants and soils	3	<b>3 to 4</b>
						40% of total materials cost, excluding plants and soils	4	
	3		2	<b>MATERIALS C5.6</b>	Use regional materials	30% of total materials cost	3	<b>3 to 5</b>
						60% of total materials cost	4	
						90% of total materials cost	5	
1		2	2	<b>MATERIALS C5.7</b>	Support responsible extraction of raw materials	Option 1: Advocate for sustainable extraction of raw materials	1	<b>1 to 5</b>
						Option 2: Support suppliers that disclose environmental data	3	
						Option 3: Support suppliers that meet extraction standards	5	
1		2	2	<b>MATERIALS C5.8</b>	Support transparency and safer chemistry	Option 1: Advocate for transparency and safer chemistry	1	<b>1 to 5</b>
						Option 2: Support manufacturers that disclose chemical data	3	
						Option 3: Support manufacturers with chemical hazard assessments	5	
1		2	2	<b>MATERIALS C5.9</b>	Support sustainability in materials manufacturing	Option 1: Advocate for sustainable materials manufacturing	1	<b>1 to 5</b>
						Option 2: Support manufacturers that disclose data on sustainable practices	3	
						Option 3: Support manufacturers that achieve sustainable practices	5	
1	2		2	<b>MATERIALS C5.10</b>	Support sustainability in plant production	Option 1: Advocate for sustainable plant production	1	<b>1 to 5</b>
						Option 2: Support producers that disclose data on sustainable practices	3	
						Option 3: Support producers that achieve sustainable practices	5	

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Estimate points below  
(key at bottom)

Targeted	Possible	Unlikely	Not Achievable	PREREQUISITE OR CREDIT #	TITLE	CASE / OPTION / THRESHOLD	POINTS	POSSIBLE POINTS PER CREDIT
17	4	4	5	<b>6: SITE DESIGN - HUMAN HEALTH + WELL-BEING</b>				<b>Possible Points: 30</b>
		2	1	HHWB C6.1	Protect and maintain cultural and historic places (project must have existing feature)	No cultural or historic places present on site		<b>2 to 3</b>
						Option 1: Historic buildings, structures, or objects	2	
						Option 2: Historic or cultural landscapes	3	
2				HHWB C6.2	Provide optimum site accessibility, safety, and wayfinding		2	<b>2</b>
2				HHWB C6.3	Promote equitable site use		2	<b>2</b>
	2			HHWB C6.4	Support mental restoration		2	<b>2</b>
		2		HHWB C6.5	Support physical activity		2	<b>2</b>
	2			HHWB C6.6	Support social connection		2	<b>2</b>
			4	HHWB C6.7	Provide on-site food production	Option 1: Food production	3	<b>3 to 4</b>
						Option 2: Food production and regular distribution	4	
4				HHWB C6.8	Reduce light pollution		4	<b>4</b>
4				HHWB C6.9	Encourage fuel efficient and multi-modal transportation		4	<b>4</b>
2				HHWB C6.10	Minimize exposure to environmental tobacco smoke	Option 1: Designate smoke-free zones	1	<b>1 to 2</b>
						Option 2: Prohibit smoking on site	2	
3				HHWB C6.11	Support local economy		3	<b>3</b>

4	1	3	8	<b>7: CONSTRUCTION</b>				<b>Possible Points: 17</b>
Y				CONSTRUCTION P7.1	Communicate and verify sustainable construction practices			
Y				CONSTRUCTION P7.2	Control and retain construction pollutants			
Y				CONSTRUCTION P7.3	Restore soils disturbed during construction			
4	1			CONSTRUCTION C7.4	Restore soils disturbed by previous development	low point score	3	<b>3 to 5</b>
						mid point score	4	
						high point score	5	
			4	CONSTRUCTION C7.5	Divert construction and demolition materials from disposal	50% of structural materials + 95% of roads / infrastructure materials	3	<b>3 to 4</b>
						75% of structural materials + 95% of roads / infrastructure materials	4	
		3		CONSTRUCTION C7.6	Divert reusable vegetation, rocks, and soil from disposal	100% of land-clearing materials retained for use within 50 miles	3	<b>3 to 4</b>
						100% of land-clearing materials retained on site	4	
			4	CONSTRUCTION C7.7	Protect air quality during construction	50% total run-time hours from Tier 2 or higher engines	2	<b>2 to 4</b>
						50% total run-time hours from Tier 3 or higher engines	3	
						50% total run-time hours from Tier 4 or higher engines	4	

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Estimate points below  
(key at bottom)

Targeted	Possible	Unlikely	Not Achievable	PREREQUISITE OR CREDIT #	TITLE	CASE / OPTION / THRESHOLD	POINTS	POSSIBLE POINTS PER CREDIT
9	3	5	5	<b>8. OPERATIONS + MAINTENANCE</b>				<b>Possible Points: 22</b>
Y				O+M P8.1	Plan for sustainable site maintenance			
Y				O+M P8.2	Provide for storage and collection of recyclables			
3			2	O+M C8.3	Recycle organic matter	100% of vegetation trimmings recycled / composted off site within 50 miles	3	<b>3 to 5</b>
						100% of vegetation trimmings recycled / composted on site	4	
						100% of vegetation trimmings + food waste recycled / composted on site	5	
4		1		O+M C8.4	Minimize pesticide and fertilizer use	Option 1: Plant health care plan	4	<b>4 to 5</b>
						Option 2: Best management practices for plant health care	5	
	2	1	1	O+M C8.5	Reduce outdoor energy consumption	30% reduction from baseline energy use for outdoor equipment	2	<b>2 to 4</b>
						60% reduction from baseline energy use for outdoor equipment	3	
						90% reduction from baseline energy use for outdoor equipment	4	
		3	1	O+M C8.6	Use renewable sources for landscape electricity needs	Option 1: On-site - 50% annual outdoor site electricity	3	<b>3 to 4</b>
						Option 1: On-site - 100% annual outdoor site electricity	4	
						Option 2: Green power - 50% annual outdoor site electricity	3	
						Option 2: Green power - 100% annual outdoor site electricity	4	
2	1		1	O+M C8.7	Protect air quality during landscape maintenance	Option 1: Scheduled maintenance	2	<b>2 to 4</b>
						Option 2: Low-emitting equipment	3	
						Option 3: Manual or electric powered maintenance equipment	4	
3	7	1	0	<b>9. EDUCATION + PERFORMANCE MONITORING</b>				<b>Possible Points: 11</b>
3		1		EDUCATION C9.1	Promote sustainability awareness and education	Option 1: Educational and interpretive elements	3	<b>3 to 4</b>
						Option 2: Additional education	4	
	3			EDUCATION C9.2	Develop and communicate a case study		3	<b>3</b>
	4			EDUCATION C9.3	Plan to monitor and report site performance		4	<b>4</b>
6	3	0	0	<b>10. INNOVATION OR EXEMPLARY PERFORMANCE</b>				<b>Possible Bonus Points: 9</b>
	3			INNOVATION C10.1 (BONUS POINTS)	Innovation or exemplary performance	Option 1: Exemplary performance	3	<b>3 to 9</b>
						Option 2: Innovation outside the SITES v2 Rating System	3	
3				PILOT CREDIT 2	SITES Accredited Professional		3	<b>3</b>
3				PILOT CREDIT 3	Assess and Improve Site Carbon Performance	Option 1: Assess the amount of CO2 sequestered by vegetation	2	<b>2 to 6</b>
						Option 1: Assess CO2 sequestered with 10% increase from baseline	3	
						Option 2: Assess embodied and operational CO2	2	
						Option 2: Assess embodied and operational CO2 with 10% reduction	3	
						Option 3: Complete Opt. 1 Path 1 and Opt. 2 Path 1	4	
						Option 3: Complete Opt. 1 Path 1 and Opt. 2 Path 1 with 20% improvement	6	

SITES v2 Scorecard - 14100 IU Health AAHC

Estimate points below  
(key at bottom)

Targeted	Possible	Unlikely	Not Achievable
Targeted	Possible	Unlikely	Not Achievable
70	40	24	74

PREREQUISITE OR CREDIT #

TITLE

CASE / OPTION / THRESHOLD

POINTS

POSSIBLE POINTS PER CREDIT

TOTAL ESTIMATED POINTS				Total Possible Points:	200
------------------------	--	--	--	------------------------	-----

	SITES Certification levels	Points
	CERTIFIED	70
	SILVER	85
	GOLD	100
	PLATINUM	135



## SECTION 01 91 19 - GENERAL ENCLOSURE COMMISSIONING REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. General requirements for coordinating and scheduling commissioning.
  - 2. Commissioning meetings.
  - 3. Commissioning reports.
  - 4. Use of test equipment, instrumentation, and tools for commissioning.
  - 5. Construction checklists, including, but not limited to, installation checks, and performance tests.
  - 6. Commissioning tests and commissioning test demonstration.
  - 7. Adjusting, verifying, and documenting identified systems and assemblies.

#### 1.2 ALLOWANCES

- A. Labor and management costs for the performance of commissioning.
- B. The following are excluded from the commissioning allowance:
  - 1. Equipment and systems installation, and field quality-control testing indicated in the Contract Documents.
  - 2. Test equipment, instrumentation, and tools required to perform tests.
  - 3. Work to correct commissioning issues.
  - 4. Work to repeat tests when equipment and systems fail acceptance criteria.

#### 1.3 UNIT PRICES

- A. Commissioning allowance may be adjusted up or down by the "List of Unit Prices" Article in Section 012200 "Unit Prices" when actual labor hours are computed at the end of commissioning. See Section 012100 "Allowances" for commissioning allowance.
- B. The following are excluded from the computation for the adjustment of the commissioning allowance for technician labor hours:
  - 1. Work to correct commissioning issues.
  - 2. Work to repeat tests when equipment and systems fail acceptance criteria.

#### 1.4 DEFINITIONS

- A. Acceptance Criteria: Threshold of acceptable work quality or performance specified for a commissioning activity, including, but not limited to, construction checklists, performance tests, performance test demonstrations, commissioning tests and commissioning test demonstrations.
- B. Basis-of-Design Document: A document prepared by Owner, Architect, or Commissioning Authority that records concepts, calculations, decisions, and product selections used to comply

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with Owner's Project Requirements and to suit applicable regulatory requirements, standards, and guidelines.

- C. Building Enclosure Commissioning Authority (BECxA): An entity engaged by Owner, and identified in Section 011000 "Summary," to evaluate Commissioning-Process Work.
- D. Commissioning Plan: A document, prepared by Commissioning Authority, that outlines the organization, schedule, allocation of resources, and documentation requirements of commissioning.
- E. Commissioning: A quality-focused process for verifying and documenting that the facility and its systems and assemblies are planned, designed, installed, and tested to comply with Owner's Project Requirements. The requirements specified here are limited to the construction phase commissioning activities. The scope of commissioning is defined in Section 011000 "Summary."
- F. Construction Phase Commissioning Completion: The stage of completion and acceptance of commissioning when resolution of deficient conditions and issues discovered during commissioning and retesting until acceptable results are obtained has been accomplished. Owner will establish in writing the date Construction Phase Commissioning Completion is achieved. See Section 017700 "Closeout Procedures" for certificate of Construction Phase Commissioning Completion submittal requirements.
  - 1. Commissioning is complete when the work specified in this Section and related Sections has been completed and accepted, including, but not limited to, the following:
    - a. Completion of tests and acceptance of test results.
    - b. Completion of punch list items.
    - c. Resolution of issues, as verified by retests performed and documented with acceptance of retest results.
    - d. Comply with requirements in Section 017900 "Demonstration and Training."
    - e. Completion and acceptance of submittals and reports.
- G. Owner's Project Requirements: A document written by Owner, Architect, or Commissioning Authority that details the functional requirements of a project and the expectations of how it will be used and operated, including Project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.
- H. Owner's Witness: Commissioning Authority, Owner's Project Manager, or Architect-designated witness authorized to authenticate test demonstration data and to sign completed test data forms.
- I. "Systems," "Assemblies," "Subsystems," "Equipment," and "Components": Where these terms are used together or separately, they shall mean "as-built" systems, assemblies, subsystems, equipment, and components.
- J. Test: Performance tests, performance test demonstrations, commissioning tests, and commissioning test demonstrations.

## 1.5 COMPENSATION

- A. Should Architect, Commissioning Authority, other Owner's witness, or Owner's staff perform additional services or incur additional expenses due to actions of Contractor listed below, compensate Owner for such additional services and expenses.
  - 1. Failure to provide timely notice of commissioning activities schedule changes.
  - 2. Failure to meet acceptance criteria for test demonstrations.

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**1.6 COMMISSIONING TEAM**

- A. Members Appointed by Contractor(s):
  - 1. Commissioning Coordinator: A person or entity employed by Contractor to manage, schedule, and coordinate commissioning.
  - 2. Project superintendent and other employees that Contractor may deem appropriate for a particular portion of the commissioning.
  - 3. Subcontractors, installers, suppliers, and specialists that Contractor may deem appropriate for a particular portion of the commissioning.
  - 4. Appointed team members shall have the authority to act on behalf of the entity they represent.
- B. Members Appointed by Owner:
  - 1. Commissioning authority, plus consultants that Commissioning Authority may deem appropriate for a particular portion of the commissioning.
  - 2. Owner representative(s), facility operations and maintenance personnel, plus other employees, separate contractors, and consultants that Owner may deem appropriate for a particular portion of the commissioning.
  - 3. Architect, plus employees and consultants that Architect may deem appropriate for a particular portion of the commissioning.

**1.7 INFORMATIONAL SUBMITTALS**

- A. Comply with requirements in Section 013300 "Submittal Procedures" for submittal procedures general requirements for commissioning.
- B. Commissioning Plan Information:
  - 1. List of Contractor-appointed commissioning team members to include specific personnel and subcontractors to the performance of the various commissioning requirements.
  - 2. Schedule of commissioning activities, integrated with the construction schedule. Comply with requirements in Section 013200 "Construction Progress Documentation" for construction schedule general requirements for commissioning.
  - 3. Contractor personnel and subcontractors to participate in each test.
  - 4. List of instrumentation required for each test to include identification of parties that will provide instrumentation for each test.
- C. Commissioning schedule.
- D. Two-week look-ahead schedules or notification of activities as they relate to Enclosure Commissioning.
- E. Commissioning Coordinator Letter of Authority:
  - 1. Within 10 days after approval of Commissioning Coordinator qualifications, submit a letter of authority for Commissioning Coordinator, signed by a principal of Contractor's firm. Letter shall authorize Commissioning Coordinator to do the following:
    - a. Make inspections required for commissioning.
    - b. Coordinate, schedule, and manage commissioning of Contractor, subcontractors, and suppliers.
    - c. Obtain documentation required for commissioning from Contractor, subcontractors, and suppliers.
    - d. Report issues, delayed resolution of issues, schedule conflicts, and lack of cooperation or expertise on the part of members of the commissioning team.

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- F. Commissioning Coordinator Qualification Data: For entity coordinating Contractor's commissioning activities to demonstrate their capabilities and experience.
  - 1. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- G. Test Reports (Notify the commissioning team of project specific tests to be witnessed in advance of such testing including pre-testing)
  - 1. Pre-tested components typically included as part of the submittals.
  - 2. Project specific Off-Site Test Reports: Test Data and conditions of mock-up for each test performed.
  - 3. Project specific On-Site Test Reports: Test Data and conditions of mock-up for each test performed.
  - 4. Submit Daily construction reports for enclosure related activities.
- H. Assembly and Construction Checklists:
  - 1. The contractors shall prepare checklists of the assembly, installation and testing of their systems(s) for review by the BECxA and AOR as part of their submittals. These checklists are intended to provide consistent high-quality assembly and construction consistent with testing and manufacturers recommendations throughout the construction of the project. Checklists are to be product or system specific and shall also include supplier's criteria and a sign off location for the person responsible for that activity.

## 1.8 CLOSEOUT SUBMITTALS

- A. Commissioning Report:
  - 1. At Construction Phase Commissioning Completion, include the following:
    - a. Approved test procedures
    - b. Test data forms completed and signed.
    - c. Progress reports.
    - d. Commissioning issues report log.
    - e. Commissioning issues reports showing resolution of issues.
    - f. Correspondence or other documents related to resolution of issues.
    - g. List unresolved issues and reasons they remain unresolved and should be exempted from the requirements for Construction Phase Commissioning Completion.

## 1.9 QUALITY ASSURANCE

- A. Commissioning Coordinator Qualifications:
  - 1. Documented experience commissioning systems of similar complexity to those contained in these documents on at least three projects of similar scope and complexity.
  - 2. Certification of commissioning process expertise. The following certifications are acceptable. Owner reserves the right to accept or reject certifications as evidence of qualification.
    - a. Certified Commissioning Professional, by Building Commissioning Association.
    - b. Accredited Commissioning Process Authority Professional, by University of Wisconsin.
    - c. Accredited Commissioning Process Manager, by University of Wisconsin.
    - d. Accredited Green Commissioning Process Provider, by University of Wisconsin.

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#### 1.10 COMMISSIONING AUTHORITY'S RESPONSIBILITIES

- A. Commissioning Authority Responsibilities: Comply with requirements in Section 011000 Summary.

### PART 2 - PRODUCTS

#### 2.1 REPORT FORMAT AND ORGANIZATION

- A. General Format and Organization for Contractor Prepared Reports as follows:
  - 1. Bind report in three-ring binders.
  - 2. Label the front cover and spine of each binder with the report title, volume number, project name, Contractor's name, and date of report.
  - 3. Electronic Data: Portable document format (PDF); a single file with outline-organized bookmarks for major and minor tabs and tab contents itemized for specific reports.
- B. Commissioning Report:
  - 1. Include a table of contents and an index to each test.
  - 2. Include major tabs for each Specification Section.
  - 3. Include minor tabs for each test.
  - 4. Within each minor tab, include the following:
    - a. Test specification.
    - b. Approved test procedures.
    - c. Test data forms completed and signed.
    - d. Commissioning issue reports, showing resolution of issues, and documentation related to resolution of issues pertaining to a single test. Group data forms, commissioning issue reports showing resolution of issues, and documentation related to resolution of issues for each test repetition together within the minor tab, in reverse chronological order (most recent on top).

### PART 3 - EXECUTION

#### 3.1 PREPARATION

- A. Review preliminary construction checklists and preliminary test procedures and data forms.

#### 3.2 CONSTRUCTION CHECKLISTS

- A. Construction checklists cannot modify or conflict with the Contract Documents.
- B. Create construction checklists based on actual systems and equipment to be included in Project.
- C. Material Checks: Compare specified characteristics and approved submittals with materials as received. Include factory tests and other evaluations, adjustments, and tests performed prior to shipment, if applicable.

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1. Delivery Receipt Check: Inspect and record physical condition of materials and equipment on delivery to Project site, including agreement with approved submittals, cleanliness, and lack of damage.
  2. Installation Checks:
    - a. Location according to Drawings and approved Shop Drawings.
    - b. Configuration.
    - c. Compliance with manufacturers' written installation instructions.
    - d. Attachment to structure.
    - e. Correct labeling and identification.
- D. Performance Tests:
1. As required by Project Manual.
- E. Deferred Construction Checklists: Obtain Owner approval of proposed deferral of construction checklists, including proposed schedule of completion of each deferred construction checklist, before submitting request for Certificate of Construction Phase Commissioning Completion. When approved, deferred construction checklists may be completed after date of Construction Phase Commissioning Completion. Include the following in request for Certificate of Construction Phase Commissioning Completion:
1. Identify deferred construction checklists by number and title.
  2. Provide a target schedule for completion of deferred construction checklists.
  3. Written approval of proposed deferred construction checklists, including approved schedule of completion of each deferred construction checklist.
- F. Delayed Construction Checklists: Obtain Owner approval of proposed delayed construction checklists, including proposed schedule of completion of each delayed construction checklist, before submitting request for Certificate of Construction Phase Commissioning Completion. When approved, delayed construction checklists may be completed after date of Construction Phase Commissioning Completion. Include the following in request for Certificate of Construction Phase Commissioning Completion:
1. Identify delayed construction checklist by construction checklist number and title.
  2. Provide a target schedule for completion of delayed construction checklists.
  3. Written approval of proposed delayed construction checklists, including approved schedule of completion of each delayed construction checklist.

### 3.3 GENERAL EXECUTION REQUIREMENTS

- A. Schedule and coordinate commissioning with the construction schedule.
- B. Perform activities identified in construction checklists, including tests, and document results of actions as construction proceeds.
- C. Perform test demonstrations for Owner's witness. Unless otherwise indicated, demonstrate tests for 100 percent of work to which the test applies. In some instances, demonstration of a random sample of other than 100 percent of the results of a test is specified.
- D. Report test data and commissioning issue resolutions.
- E. Schedule personnel to participate in and perform Commissioning-Process Work.
- F. Installing contractors' commissioning responsibilities include, but are not limited to, the following:

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1. Installing contractors may be required to assist in tests of equipment and systems with which their work interfaces.

### 3.4 COMMISSIONING COORDINATOR RESPONSIBILITIES

- A. Management and Coordination: Manage, schedule, and coordinate commissioning, including, but not limited to, the following:
  1. Coordinate with subcontractors on their commissioning responsibilities and activities.
  2. Obtain, assemble, and submit commissioning documentation.
  3. Attend and arrange for attendance of contractors for periodic on-site commissioning meetings. Comply with requirements in Section 013100 "Project Management and Coordination.
  4. Provide meeting minutes for distribution to the affected contractors tracking issues and resolutions.
  5. Report inconsistencies and issues in system operations.
  6. Direct and coordinate test demonstrations.
  7. Coordinate witnessing of test demonstrations by Owner's witness.
  8. Coordinate and manage training. Be present during training sessions to, present training and direct the training presentations of others. Comply with requirements in Section 017900 "Demonstration and Training."
  9. Prepare and submit specified commissioning reports.
  10. Track commissioning issues until resolution and retesting is successfully completed.
  11. Retain original records of Commissioning-Process Work, organized as required for the commissioning report. Provide Owner's representative access to these records on request.
  12. Assemble and submit commissioning report.

### 3.5 COMMISSIONING TESTING

- A. Quality Control: Construction checklists, including tests, are quality-control tools designed to improve the functional quality of Project. Test demonstrations evaluate the effectiveness of Contractor's quality-control process.
- B. Owner's witness will be present to witness commissioning work requiring the signature of an owner's witness, including, but not limited to, test demonstrations. Owner's project manager will coordinate attendance by Owner's witness with Contractor's published commissioning schedule. Owner's witness will provide no labor or materials in the commissioning work. The only function of Owner's witness will be to observe and comment on the progress and results of commissioning.
- C. Construction Checklists:
  1. Complete construction checklists as Work is completed.
  2. Distribute construction checklists to installing contractors before they start work.
  3. Installers:
    - a. Verify installation using approved construction checklists as Work proceeds.
    - b. Complete and sign construction checklists at a frequency as necessary to maintain the project schedule and no less than weekly for work performed during the preceding time period.
  4. Provide Commissioning Authority access to construction checklists.
- D. Installation Compliance Issues: Record as an installation compliance issue Work found to be incomplete, inaccessible, at variance with the Contract Documents, nonfunctional, or that does

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not comply with construction checklists. Record installation compliance issues on the construction checklist at the time they are identified. Record corrective action and how future Work should be modified before signing off the construction checklist.

**E. Test Procedures and Test Data Forms:**

1. Test procedures shall define the step-by-step procedures to be used to execute tests and test demonstrations.
2. Completed test data forms are the official records of the results of tests.
3. Commissioning Authority will provide to Contractor preliminary test procedures and test data forms for performance tests and commissioning tests after approval of Product Data, Shop Drawings, and preliminary operation and maintenance manual.
4. Review preliminary test procedures and test data forms and provide comments within 14 days of receipt from Commissioning Authority. Review shall address the following:

**F. Performance of Tests:**

1. Perform test demonstrations on a sample of tests after submittals are approved.
2. Notify Owner's witness at least 10 days in advance of each test demonstration.
3. Perform and complete each step of the approved test procedures in the order listed.
4. Record data observed during performance of test demonstrations on approved data forms at the time of demonstration and when the results are observed.
5. Provide full access to Owner's witness to directly observe the performance of all aspects of system response during the test demonstration. On completion of a test demonstration, sign the completed data form and obtain signature of Owner's witness at the time of the test to authenticate the reported results.
6. Test demonstration data forms not signed by Contractor and Owner's witness at the time of the completion of the procedure will be rejected. Test demonstrations for which data forms are rejected shall be repeated and results shall be resubmitted.
  - a. Exception for Failure of Owner's Witness to Attend: Failure of Owner's witness to be present for agreed-on schedule of test demonstration shall not delay Contractor. If Owner's witness fails to attend a scheduled test, Contractor shall proceed with the scheduled test. On completion, Contractor shall sign the data form for Contractor and for Owner's witness and shall note the absence of Owner's witness at the scheduled time and place.

**G. Commissioning Compliance Issues:**

1. Test results that are not within the range of acceptable results are commissioning compliance issues.
2. Track and report commissioning compliance issues until resolution and retesting are successfully completed.
3. If a test demonstration fails, determine the cause of failure. Direct timely resolution of issue and then repeat the demonstration. If a test demonstration must be repeated due to failure caused by Contractor work or materials, reimburse Owner for billed costs for the participation in the repeated demonstration.
4. Test Results: If a test demonstration fails to meet the acceptance criteria, perform the following:
  - a. Complete a commissioning compliance issue report form promptly on discovery of test results that do not comply with acceptance criteria.
  - b. Submit commissioning compliance issue report form within 5 days of the test.
  - c. Determine the cause of the failure and submit to AOR and BECx for review.
  - d. Establish responsibility for corrective action if the failure is due to conditions found to be Contractor's responsibility.
5. Commissioning Compliance Issue Report: Provide a commissioning compliance issue report for each issue. Do not report multiple issues on the same commissioning compliance issue report.



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- a. Exception: If a failure is determined to be systemic from a single cause repeated in numerous locations a single tracking number and report may be used, if it references all the known locations.
- 6. Diagnose and correct failed test demonstrations as follows:
  - a. Perform diagnostic tests and activities in coordination with the BECxA and AOR to determine the fundamental cause of issues observed.
  - b. The diagnostic process will follow ASTM E2128-12 as amended for application to the specific issue.
  - c. Record each step of the diagnostic procedure prior to performing the procedure. Update written procedure as changes become necessary.
  - d. Record the results of each step of the diagnostic procedure.
  - e. Record the conclusion of the diagnostic procedure on the fundamental cause of the issue.
  - f. Determine and record corrective measures. Submit for review prior to performing corrective work.
- 7. Retest:
  - a. Schedule and repeat the complete test procedure for each test demonstration for which acceptable results are not achieved. Obtain signature of Owner's witness on retest data forms. Repeat test demonstration until acceptable results are achieved. Except for issues that are determined to result from design errors or omissions, or other conditions beyond Contractor's responsibility, compensate Owner for direct costs incurred as the result of repeated test demonstrations to achieve acceptable results.
  - b. For each repeated test demonstration, submit a new test data form, marked "Retest."
  - c. Exceptions will be allowed if the cause of the issue is obvious and resolution can be completed during this test sequence with the BECxA and AOR approval.

### 3.6 COMMISSIONING MEETINGS

- A. Schedule and conduct commissioning meetings. Agendas are to be issued with input and review by the BECxA and AOR and the meeting reporting procedures are to be in compliance with requirements in Section 013100 "Project Management and Coordination."

### 3.7 SCHEDULING

- A. Commence commissioning as early in the construction period as possible.
- B. Commissioning Schedule: Integrate commissioning into Contractor's construction schedule. See Section 013200 "Construction Progress Documentation."
  - 1. Include detailed commissioning activities in monthly updated Contractor's construction schedule and short interval schedule submittals.
  - 2. Schedule the start date and duration for the following commissioning activities:
    - a. Submittals.
    - b. Preliminary operation and maintenance manual submittals.
    - c. Installation checks.
    - d. Performance test demonstrations.
  - 3. Determine milestones and prerequisites for commissioning. Show commissioning milestones, prerequisites, and dependencies in monthly updated critical-path-method construction schedule and short interval schedule submittals.
- C. Two-Week Look-Ahead Commissioning Schedule:

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1. Contractor to issue a two-week look-ahead schedules and shall identify upcoming construction that involve participation from the BECxA and AOR consistent with the specified activities of the BECxA and AOR. Contractor personnel required, and anticipated duration for each test activity shall be identified on these schedules.

**D. Owner's Witness Coordination:**

1. Coordinate Owner's witness participation via Architect and BECxA.
2. Notify Architect of commissioning schedule changes at least two workdays in advance for activities requiring the participation of Owner's witness.

**3.8 COMMISSIONING REPORTS**

**A. Test Reports:**

1. Pre-startup reports include observations of the conditions of installation, organized into the following sections:
  - a. Preinstallation Physical Condition Checks: Observe physical condition of equipment prior to installation. Note conditions including, but not limited to, physical damage, corrosion, water damage, or other contamination or dirt.
  - b. Preinstallation Verification Checks: Verify components and systems are correctly installed and complete. Note missing, improperly configured, improperly installed, or nonfunctional components.
  - c. Summary of Installation Compliance Issues and Corrective Actions: Identify installation compliance issues and the corrective actions for each. Verify that issues noted have been corrected.
2. Test data reports include the following:
  - a. "As-tested" system configuration. Complete record of conditions under which the test was performed, including, but not limited to, the status of equipment, systems, and assemblies; temporary adjustments and settings; and ambient conditions.
  - b. Data and observations, including, but not limited to, data trend logs, recorded during the tests.
  - c. Signatures of individuals performing and witnessing tests.
3. Commissioning Compliance Issues Reports: Report as commissioning compliance issues results of tests and test demonstrations that do not comply with acceptance criteria. Report only one issue per commissioning compliance issue report. Use sequentially numbered facsimiles of commissioning compliance issue report form included in this Section, or other form approved by AOR and BECxA. Distribute commissioning compliance issue reports to parties responsible for taking corrective action. Identify the following:
  - a. Commissioning compliance issue report number. Assign unique, sequential numbers to individual commissioning compliance issue reports when they are created, to be used for tracking.
  - b. Action distribution list.
  - c. Report date.
  - d. Test number and description.
  - e. Location.
  - f. Briefly describe observations about the performance associated with failure to achieve acceptable results. Identify the cause of failure if apparent.
  - g. Diagnostic procedure or plan to determine the cause (include in initial submittal)
  - h. Diagnosis of fundamental cause of issues as specified below (include in resubmittal).
  - i. Fundamental cause of unacceptable performance as determined by diagnostic tests and activities.

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**3.9 CERTIFICATE OF CONSTRUCTION PHASE COMMISSIONING COMPLETION**

- A. When Contractor considers that construction phase commissioning, or a portion thereof which Owner agrees to accept separately, is complete, Contractor shall prepare and submit to Owner and Commissioning Authority through Architect a comprehensive list of items to be completed or corrected. Failure to include an item on such list does not alter Contractor's responsibility to compete commissioning.
- B. On receipt of Contractor's list, Commissioning Authority will make an inspection to determine whether the construction phase commissioning or designated portion thereof is complete. If Commissioning Authority's inspection discloses items, whether included on Contractor's list, which is not sufficiently complete as defined in "Construction Phase Commissioning Completion" Paragraph in the "Definitions" Article, Contractor shall, before issuance of the Certificate of Construction Phase Completion, complete or correct such items on notification by Commissioning Authority. In such case, Contractor shall then submit a request for another inspection by Commissioning Authority to determine construction phase commissioning completion.
- C. Contractor shall promptly correct deficient conditions and issues discovered during commissioning. Costs of correcting such deficient conditions and issues, including additional testing and inspections, the cost of uncovering and replacement, and compensation for Architect's and Commissioning Authority's services and expenses made necessary thereby, shall be at Contractor's expense.
- D. When construction phase commissioning or designated portion is complete, Commissioning Authority will prepare a Certificate of Construction Phase Commissioning that shall establish the date of completion of construction phase commissioning. Certificate of Construction Phase Commissioning Completion shall be submitted prior to requesting inspection for determining date of Substantial Completion.

END OF SECTION 019119

## SECTION 01 91 19.43 - EXTERIOR ENCLOSURE COMMISSIONING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes Building Enclosure Commissioning (BECx) process requirements for the above- and below-grade systems and assemblies:
  - 1. Horizontal and vertical waterproofing.
  - 2. Opaque walls.
  - 3. Roofs.
  - 4. Glazed openings.
  - 5. Interfaces.

#### 1.2 DEFINITIONS

- A. Building Enclosure: Materials, components, systems, and assemblies intended to provide shelter and environmental separation between interior and exterior, or between two or more environmentally distinct interior spaces in a building or structure. The building enclosure includes, but is not limited to, exterior walls, above and below grade, and roof assemblies.
- B. BECx: Building Enclosure Commissioning, as defined in Section 019113.43 "Exterior Enclosure General Commissioning Requirements."
- C. BECxA: Building Enclosure Commissioning Authority, as defined in Section 019113.43 "Exterior Enclosure General Commissioning Requirements."
- D. First-Installation Mockups: Initial installation of specific enclosure materials, components, systems, and assemblies that are part of Work.
- E. Integrated Enclosure Mockups: Integrated mockups of the exterior enclosure erected separately from the building but on Project site, consisting of multiple products, assemblies, and subassemblies.
- F. Laboratory Mockups: Full-size physical assemblies constructed at testing facility.
- G. "Systems," "Assemblies," "Subsystems," "Equipment," and "Components": Where these terms are used together or separately, they shall mean "as-built" systems, assemblies, subsystems, equipment, and components.
- H. Water Penetration: Visible evidence of uncontrolled water penetration on or adjacent to the test specimen in a location not intended to collect and drain water to the building enclosure.
- I. Interior Condensation: The accumulation of condensation on any surface in contact with the interior air that is visible or concealed inboard of the primary seal or vapor barrier system.
- J. Primary Seal: The line of sealant or vapor barrier.
- K. Weather or Secondary Seal: The outer line of sealant.

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- L. Pressure Equalized (PE) Rain Screen system: The enclosure system design and construction consistent with American Aluminum Manufacturers Association (AAMA) definition of a Pressure Equalized Rain Screen system. Where the term "Rain Screen" is used, it shall default to this definition.

### 1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Construction Checklists: Draft Construction Checklists will be created by Contractor for BECxA review.
- C. Construction Checklists: Include the following and comply with requirements in Section 019113 "General Commissioning Requirements" for Construction Checklists:

Specification sections to be reviewed		Review Type			
Spec #	Specification Section Name	Pre-Award	Coord. Meetings	For Information	Full Review
034500	Precast Architectural Concrete	X	X		X
042200	Concrete Unit Masonry			X	
072100	Thermal Insulation	X	X		X
072500	Weather Barriers	X	X		X
074113.16	Standing Seam Metal Roof Panels	X	X		X
074213.19	Insulated Metal Wall Panels	X	X		X
075423	Thermoplastic Polyolefin (TPO) Roofing	X	X		X
077100	Roof Specialties				X
077200	Roof Accessories				X
084113	Aluminum Framed Entrances and Storefronts	X	X		X
084413	Glazed Aluminum Curtain Walls	X	X		X
088000	Glazing	X	X		X
089119	Fixed Louvers	X	X		X

- D. BECx Process Submittals:
1. Pre-award Submittals: For System noted. These meetings will be conducted with the likely and key subcontractors as a part of the review and award process. These meetings will focus on an initial review of the proposed system and its performance to advise if it appears to meet the performance requirements specified and review proposed alternates or concerns prior to potential award. Pre-coordination with information received as a part of the proposal documents will be reviewed. These meetings are not intended to be exhaustive in scope but are to understand identify issues prior to acceptance of a proposal.
  2. Coordination Meetings: For Systems noted: The coordination meetings will be conducted with the key subcontractors. These meeting are to begin prior to the development of the enclosure system submittals and are intended to coordinate the typical details particularly at the interfaces prior to the development of the system details. Agenda developed between the Contractor / CM and the BECx will identify the parties to be a part of a particular meeting and the information needed / items to be discussed. To be of value to the sub-contractors, it is required that they attend with the

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- requested information and are active participants. required that they attend with the requested information and are active participants.
- 3. Shop Drawings: For mockups, including elevations, plans, sections, and full-size details. Show interface conditions, interconnections, and terminations.
- 4. Field quality-control reports.
- 5. Testing Program: Developed specifically for Project.
- 6. Test Reports: Prepared by a qualified testing agency for each test.
- 7. Record Drawings: As-built drawings of mockups showing changes made during testing.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For building envelope systems and components to include in operation and maintenance manuals.

#### 1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated.
- B. Build mockups to evaluate constructability and performance and demonstrate the coordination of trades and sequencing of work necessary to ensure functional and integrated performance of materials, components, systems, assemblies, and interfaces.
  - 1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 2. Notify Architect and BECxA seven days in advance of the dates and times when mockups will be constructed and tested.
- C. Integrated Exterior Mockups: Build at Project site on site at locations as indicated on Drawings.
- D. First Installation Mockups: Prepare each major exterior enclosure system for testing when first installed and before proceeding with construction of additional similar assemblies. If in compliance, Work may remain as part of the completed construction.
  - 1. Wall Mockups: Extend one full structural bay wide by one full story high plus additional height to connect to assemblies below and above. Include a typical wall to interior floor slab connections.
    - a. Minimum Size: as indicated on Drawings.
  - 2. Roof Mockups: Include parapet or roof edge conditions, flashings, and typical pipe, dunnage, and similar penetrations.
    - a. Minimum Size: as indicated on Drawings.
  - 3. Horizontal Below-Grade Waterproofing and Slab-on-Grade Mockups: Include edge conditions and typical penetrations.
  - 4. Vertical Below-Grade Waterproofing Mockups: Include edge, termination, and penetrations.
  - 5. Building Expansion Joint Mockups: Include starting point at foundation and extend up vertical surfaces, across horizontal waterproofed surfaces and roofs and return to foundation. Include each type of corner, intersection, transition, and termination.
  - 6.
- E. Mockups specified for quality assurance and control in the following sections may be combined with BECx mockups for testing purposes.

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PART 2 - On-Site Testing:

Preliminary listing of On-Site Testing			
Spec #	Specification Section Name	Testing	
		Primary System for Testing	Include for Interface Detailing
034500	Precast Architectural Concrete		X
042200	Concrete Unit Masonry		X
072100	Thermal Insulation		X
072500	Weather Barriers	X	
074113.16	Standing Seam Metal Roof Panels	X	
074213.19	Insulated Metal Wall Panels	X	
075423	Thermoplastic Polyolefin (TPO) Roofing	X	
077100	Roof Specialties		X
077200	Roof Accessories		X
084113	Aluminum Framed Entrances and Storefronts	X	
084413	Glazed Aluminum Curtain Walls	X	
088000	Glazing	X	
089119	Fixed Louvers	X	

PART 3 - PRODUCTS (Not Used)

PART 4 - EXECUTION

4.1 CONSTRUCTION CHECKLISTS

- A. Contractor (sub-contractor) to prepare detailed Construction Checklists for exterior enclosure BECx systems, subsystems, equipment, and components. Complete and submit Construction Checklists for record.

4.2 CONSTRUCTION CHECKLIST REVIEW

- A. Review and provide written comments on draft Construction Checklists. Contractor will create required draft Construction Checklists and provide them to BECxA.
- B. Return draft Construction Checklist review comments within Ten [10] days of receipt.
- C. When review comments have been resolved, BECxA will provide final Construction Checklists, marked "Approved for Use, (date)."
- D. Use only Construction Checklists, marked "Approved for Use, (date)."

4.3 GENERAL TESTING REQUIREMENTS

- A. The Architect is to write the criteria for all laboratory and field testing. The BECx is to review the test criteria and provide comments for acceptance and inclusion by the Architect in the Project Manual technical specifications.

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- B. If tests cannot be completed because of a deficiency outside the scope of the building enclosure systems, document the deficiency and report it to Owner. After deficiencies are resolved, reschedule tests.
- C. If seasonal testing is specified, complete appropriate initial performance tests and documentation and schedule seasonal tests.
- D. Coordinate schedule with and perform BECx activities at the direction of the BECxA.

#### 4.4 INTEGRATED EXTERIOR MOCKUP TESTING

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests.

#### 4.5 FIRST-INSTALLATION MOCKUP TESTING

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests.

#### 4.6 BUILDING ENCLOSURE TESTING

- A. Building Enclosure Testing: Perform testing before installation of interior finishes unless otherwise indicated.
- B. Testing Agency: Owner will engage a qualified testing agency to perform tests.

#### 4.7 ACCESS TO CONSTRUCTION SITE

- A. The Contractor is to provide a safe workplace per the General Conditions of the Construction Contract Agreement.
- B. The Contractor is to provide access to the work for on-site observations by the BECx in the same manner as provided to the Architect per the General Conditions of the Construction Contract Agreement. Access is to include scaffolding, lifts, and other means for close-up observation of any position on the building.

END OF SECTION 019119.43