

SECTION 011000 - SUMMARY

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, and provisions of Request for Proposal (RFP) apply to this Section.

1.2 SUMMARY

- A. General Contractor shall coordinate "Work by Owner" with other elements of the construction project including:
 - 1. Project information.
 - 2. Work covered by the Performance Requirements.
 - 3. Work by Owner.
 - 4. Work under separate contracts.
 - 5. Owner-furnished products.
 - 6. Access to site.
 - 7. Coordination with occupants.
 - 8. Work restrictions.
 - 9. Specification and Drawing conventions.
 - 10. Miscellaneous provisions.
- B. The General Contractor work includes constructing the Project as envisioned in the RFP, which includes but is not limited to:
 - 1. Performance Requirements
- C. General Description of Work:
 - 1. It is a requirement that the General Contractor must provide and be responsible for all components not supplied by Owner; the General Contractor is to be the single point of accountability and the responsible party for functioning of the entire building system in area of renovation.
 - 2. Services shall include, but are not limited to the following:
 - a. Building Permit will be acquired by the Courts. Acquiring all other required Permits and Inspections required for construction and occupancy is the responsibility of the Contractor.
 - b. Construction of complete scope of project as awarded and amended.
 - 3. Coordinate, furnish, install, and test as necessary the following:
 - a. All infrastructure and wiring for low voltage requirements. Contractor must coordinate with all Courts AV/IT staff for telephones, equipment, wireless and networking infrastructure, cabling and switches impacted by this project.

- b. All finishes with DC Courts Standards
 - c. Coordination with Courts to identify a date for moving Court staff after substantial completion and before final completion. The move of staff, staff furniture, and equipment will be done by Courts.
- D. The Project shall function as an integral part of and be fully compatible with the existing DC Courts system.
- E. Related Requirements:
 - 1. Section 019113 "General Commissioning Requirements" for procedures governing commissioning.

1.3 PROJECT INFORMATION

- A. Owner: District of Columbia Courts

Capital Projects & Facilities Management Division
510 4th St. NW, Suite 214
Washington, DC 20001

- B. Construction Manager:

- 1. Construction Manager has been engaged for this Project to serve as an agent to Owner and to provide assistance in administering the Contract for construction between Owner and General Contractor, according to a separate contract between Owner and Construction Manager.

- C. Web-Based Project Management Information Software: Procore Construction Management Software administered by Owner and Construction Manager will be used for the purpose of managing communication and documents. Procore provides for an online central collaboration hub for access to real time project information and will be the primary method for construction data dissemination. The Contractor shall be responsible for utilizing the Procore system for:

- 1. All Submittals, RFIs, Meeting Minutes, Daily Reports, Punch Lists, Observation Reports, Design Drawings (including all drawing updates and design changes), Specifications, Project Photographs, Procurement Log, etc. as outlined in other sections of the specification and RFP.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

- A. Type of Contract:

- 1. Project will be constructed under a single Construction IDIQ Task Order contract.

- B. The Work of the Project is defined by the RFP and Performance Requirements.

1.5 WORK BY OWNER OR UNDER SEPARATE CONTRACTS

- 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.
- B. Preceding Work: Owner will perform the following construction operations at Project site. Those operations are scheduled to be substantially complete before work under this Contract begins.
 - 1. The Courts will remove all furniture to be salvaged prior to start of construction.
- C. Subsequent Work: Owner will perform the following additional work at site after Substantial Completion. Completion of that work will depend on successful completion of preparatory Work under this Contract.
 - 1. Signage (All life safety signage required for occupancy is to be by the General Contractor, coordinated with Owner's signage vendor)
 - 2. Furniture Installation (General Contractor to coordinate electrical requirements of new furniture)

1.6 OWNER-FURNISHED PRODUCTS

- A. Owner will furnish products indicated. The Work includes receiving, unloading, handling, storing, protecting, and installing Owner-furnished products and making building services connections. Items like existing equipment relocated by Owner and installed by General Contractor.
- B. Owner-Furnished Products:
 - 1. TBD

1.7 ACCESS TO SITE

- A. General: General Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
- B. Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 - 1. Limits: Confine construction operations to areas indicated in the Contract Documents.
 - 2. Driveways, Walkways and Entrances: Keep driveways, parking garage, loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.

- b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- C. Condition of Existing Building: Maintain all portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.
 - 1. Maintain existing egress routes and maintain established egress width of routes from existing building affected by construction operations.
 - 2. Where construction activities necessitate temporary closure or relocation of egress routes or of established egress pathways, ensure proper egress, exiting and way-finding signage is in place prior to such closures or relocations; and ensure that code required maximum travel distances are not exceeded and that the aggregate width of egress provided is at least equivalent to that which existed before the closure or rerouting.
 - a. A plan for any temporary modifications shall be provided to the Owner and the Authority having Jurisdiction for review and approval, prior to starting any work.
 - 3. Damage caused by construction activities shall be repaired to a level of finish acceptable to the Owner and Construction Manager at no additional cost to the owner.
- D. Condition of Existing Grounds: Protect and Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.
 - 1. Damage to existing grounds caused by construction activities shall be anticipated and will be included in construction costs. Unanticipated damage will be repaired to a level of finish acceptable to the Owner and Construction Manager at no additional cost to the owner.

1.8 COORDINATION WITH OWNER'S OCCUPANTS

- A. Full Owner Occupancy: Owner will occupy site and adjacent spaces within the building(s) during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits unless otherwise indicated.
 - 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used spaces. Do not close or obstruct walkways, corridors, or other occupied or used spaces without written permission from Owner and approval of authorities having jurisdiction.
 - 2. Notify Owner not less than 72 hours in advance of activities that will affect Owner's operations.
 - 3. Any work that disrupts regular building operations must occur during off hours, unless explicitly granted approval from the Courts in advance.
 - 4. Work restrictions may be imposed due to ongoing operations in adjacent courtrooms and related spaces.

1.9 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
 2. Due to continued operation of adjacent courtroom facilities, work hour restrictions shall be as outlined below.
 3. For Owner specific restrictions related to the execution of the Work refer to the Request for Proposal
- B. On-Site Work Hours: Limit work in the existing building to working hours indicated in the Request for Proposal.
1. Weekend Hours: Prior approval of weekend hours is required.
 2. Hours for Utility Shutdowns: Shall be on weekends or after normal working hours and must have prior written approval for all shutdowns.
 3. Hours for Core Drilling: Shall be on weekends or after normal working hours, after 7:00pm and before 6:00am Monday through Friday. Coordinate with the Request for Proposal requirements.
 4. Work performed during Holiday hours need to be coordinated with the Authorities having Jurisdiction.
- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
1. Submit an Outage Request to Owner not less than twenty-one (21) calendar days in advance of proposed utility interruptions.
 2. Obtain DC Courts written permission before proceeding with utility interruptions.
 3. Utility Interruptions: Shall be on weekends or after normal working hours. Weekend interruptions shall begin on Saturday 8:00am and complete no later Sunday 10:00pm.
 4. Fire-Life Safety System Interruptions and Tie-Ins: Shall be on weekends or after normal working hours.
- D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
1. Notify Owner not less than three (3) calendar days in advance of proposed disruptive operations.
 2. Obtain DC Courts written permission before proceeding with disruptive operations.
 3. Work generating noise, vibration, and/or odors must be done off hours.
- E. Restricted Substances: Use of tobacco products and other controlled substances within the existing or new building and on Project site is not permitted. No smoking is permitted within 25 feet of an entrance, operable window, or any out-side air intakes.
- F. Employee Identification: Owner will provide identification badges for General Contractor personnel working on Project site and require personnel to use identification badges at all times.
- G. Employee Screening: Comply with Owner's requirements for drug and background screening of General Contractor personnel working on Project site.
1. Maintain list of approved screened personnel with Owner's representative.

2. The Court Security Officers and US Marshal Service (USMS) will perform unannounced checks to confirm this enforcement requirement.
 3. The USMS will perform occasional random sweeps of the construction site with personnel, canine patrols, and/or detection devices. The General Contractor will not impede these sweeps and will allow the USMS access to all areas of the site.
 4. After installation of data or telecommunications equipment, additional security requirements will be implemented in accordance with Security Regulations.
- H. Work Plans: As outlined in this section and related to work restrictions, any time that work is being coordinated or scheduled that results in outages or access to spaces not typically within the boundaries of the work area, the Contractor shall supply a separate Work Plan along with access and outage requests that provides an adequate description of the work that will be completed, the areas that will be impacted, and the duration of the impact to the spaces / occupants as a result of the access, outage, or work.
1. Work Plans shall be submitted utilizing contract drawings showing highlighted areas impacted
 2. Work Plans shall follow the same requirements outlined in the outage section and shall be submitted no less than twenty-one (21) calendar days prior to access or outage. The Contractor may be required to present the Work Plan to the Owner to facilitate review and acceptance.
 3. Work Plans should state all coordination with Owner, AHJ, Testing Agencies, etc. that might be necessary for the execution of the work plan.

1.10 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 General 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. Refer to Request for Proposal for additional requirements.
- 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.

1.11 MISCELLANEOUS PROVISIONS

A. Security

- 1 Construction Security Requirements: After award of the Contract, all General Contractor employees shall be required to furnish information to allow for background checks. All information on the completed forms must be typed and all signatures must be original. Comply with security regulations as imposed by the occupying agency and submit the following forms:
 - a. Use Security Clearance Form, Criminal History Request Form, and Request for Issuance of a Security Access Badge Form to be provided by Owner.
 - b. Secure Access: Notify the Owner and Construction Manager not less than ten (10) working days prior to performing work in a security area. Use form Chamber Access Request Form, to be provided by Owner.
 - c. Court Security Officer (CSO) escort is required for entry and exit into secured areas even when security access has been approved.
- 2 Mechanical/Electrical/Security Closet Access: Notify the Owner and Construction Manager, not less than ten (10) days prior to performing work in any Mechanical/Electrical/Security Closets.
 - a. Use form Request for Access to Electrical Closet with Instructions, to be provided by Owner.
3. Telecommunications Closet Access: Notify the Owner and Construction Manager not less than ten (10) days prior to performing work in a Telecommunications Closet.
 - a. Use form Request for Access Telecommunications Closet with Instructions, to be provided by Owner.

B. General Security Regulations

1. Non-publicity: It is a specific condition of this Contract that the General Contractor, or any sub of the General Contractor performing work on this project, shall not use or allow to be used any aspect of this project for publicity or advertising brochures.
2. Agency Security Regulations: All persons employed within the boundaries of the property or restricted-access areas therein, and all persons permitted to enter such property and areas shall comply with the security regulations that have been established for this Contract.
 - a. The General Contractor agrees on behalf of themselves and all subs of the General Contractor that the following security regulations will be observed by General Contractor and subs of the General Contractor personnel on the property. The General Contractor shall make it a specific provision of his subcontracts that these regulations be accepted.
 - b. At the commencement of the work under this Contract, the following security facilities and procedures will apply;

- 1) The General Contractor shall provide information about all General Contractor and subs of the General Contractor personnel and others who require continuing access to the site, before access is required and when access ceases.
 - 2) In order to permit the Owner to supply badges for on-site personnel, the General Contractor shall cause each individual to complete a personnel identification form. These forms will be provided by the Owner to the General Contractor at the pre-construction conference. Processing of the forms will be performed by the Owner.
 - 3) The permanent badge furnished by the Owner to each General Contractor employee or other person granted access to the site will serve to authorize the wearer to enter and leave the security area. The badge must be worn so as to be clearly visible at all times when on the work site.
 - 4) The badge will be retained by the individual if they require continued admittance to the site, but the General Contractor will arrange for its immediate return to the Owner when such need ceases.
- c. At the commencement of the work under this Contract, the following security procedures shall apply to the General Contractor and all subs of the General Contractor:
- 1) Comply with the security regulations of the project.
 - 2) In the case of any questions as to the eligibility of an individual to obtain a pass, notify the Owner, who will obtain a determination whether the individual can obtain a pass.
 - 3) Cameras are not permitted without written permission from the Owner. If approved, permission will be granted in writing and will provide additional guidelines.
 - a) Use Camera Letter Request Form to be provided by Owner.
 - 4) Personnel may be subject to inspection of their personal effects when entering and leaving the facility. In addition, unscheduled inspections of personnel may be made while on site.
 - 5) If any work is canceled, notify Owner or his designated representative.
- d. The Owner reserves the right to close down the job site and order General Contractor personnel off the premises in the event of a national emergency or a shut-down, for as long as security problems persist. The General Contractor may only return to the site with approval from the CO, COTR or DC Courts Chief Security Officer.
- e. The Owner reserves the right to exclude or remove from the site or building any employee of the General Contractor or a sub of the General Contractor whom the Owner deems incompetent, careless, insubordinate or otherwise objectionable, or whose continued employment on the work is deemed by the Owner to be contrary to the public interests. The Owner further reserves the right to complete processing of the security documentation for personnel assigned to work within restricted access areas prior to access to such areas by the personnel.

3. No employment interviews shall be conducted by the General Contractor or its subcontractors within the secured area. The General Contractor and subs of the General Contractor will be required to maintain a field office, outside the limits established by the security area, for all public contacts. Applicants for employment and other persons not entitled to access to the secured area shall be required to contact the General Contractor or subs of the General Contractor at these offices.

1.14 ATTACHMENT FORMS

- A. The following forms are available to download on PMIS from the Owner.

1. Security Clearance Form and Criminal History Request.
2. Secure Access Request Form.
3. Request for Access to Electrical Closet with Instructions.
4. Request for Access Telecommunications Closet with Instructions
5. Camera Letter Request Form

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 012100 - ALLOWANCES

PART 1 - GENERAL

3.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, provisions of Request for Proposal (RFP) apply to this Section.

3.2 SUMMARY

- A. Section includes administrative and procedural requirements governing allowances.
- B. 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.
- C. Related Requirements:
 - 1. Section 012600 "Contract Modification Procedures" for requirements of providing pricing backup for utilization of Allowances.
 - 2. Section 012900 "Payment Procedures" for how Allowances are represented on Schedule of Values (SOV) and payment applications.
 - 3. Section 014000 "Quality Requirements" for procedures governing the use of allowances for field testing by an independent testing agency.

3.3 DEFINITIONS

- A. Allowance is a quantity of work or dollar amount established in lieu of additional requirements, used 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.

3.4 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Owner of the date when final selection, or purchase and delivery, of each product or system described by an allowance must be completed by the Owner to avoid delaying the Work.
- B. At Owner'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 defined within the contract documents from the designated supplier.

3.5 ACTION SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances as outlines in Specification 012600.

3.6 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.

3.7 LUMP-SUM ALLOWANCES

- A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner 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 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 Owner, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

3.8 UNIT-COST ALLOWANCES

- A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner 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 under unit-cost allowance shall be included as part of the Contract Sum and not part of the allowance.
- C. Unused Materials: Return unused materials purchased under this allowance type to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.

1. If requested by Owner, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

3.9 QUANTITY ALLOWANCES

- A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner 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 under allowance shall be included as part of the Contract Sum and not part of the allowance.
- C. Unused Material: Return unused materials purchased under an allowance to manufacture or supplier for credit to Owner, after installation has been completed and accepted.
 1. If requested by Owner, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

3.10 CONTINGENCY ALLOWANCES

- A. Use the contingency allowance only as directed or approved by Owner, refer to Specification 012600 to indicate amounts to be charged to the allowance.
 1. The Contractor shall not be paid overhead and profit for utilization of the Contingency Allowance for any additional cost item of work, not included in the cost of work that should have been reasonably known by the Contractor involving unforeseen conditions, conflicts, or questions of clarity in the Contract Documents, or between the Contract Documents and the existing conditions.
- B. Contractor's overhead, profit, and related costs for products and equipment ordered by Owner under the contingency allowance are not 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 only for Owner added scope utilizing the Contingency Allowance.
- D. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner as outlined in specification 012600.

3.11 ADJUSTMENT OF ALLOWANCES

- A. Allowance Adjustment: To adjust allowance amounts, Contractor shall prepare a proposal based on the difference between purchase amount and the allowance amount. Allowances shall first be

modified by utilizing Contingency Allowance and then modified by Change Modification by Owner.

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 markups.
 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.

END OF SECTION 012100

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 – GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
 - 1. 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.
 - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
 - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required to meet other Project requirements but may offer advantage to Contractor or Owner.

1.3 ACTION SUBMITTALS

- A. Proposed Products List and Substitution Requests:
 - 1. Intent:
 - a. To fully identify, prior to beginning the Work, the products Contractor intends to provide, and substitutions the Contractor requests.
 - b. To facilitate timely submittal processing by avoiding rejection of unacceptable products and unspecified products later during construction.
 - 2. Proposed Products List:
 - a. Within 14 calendar days after date of receipt of notice to proceed and before submitting any Product Submittals, submit for approval the list of the products proposed for installation. Include the name of the manufacturer for each product and, where applicable, the name of Subcontractor.
 - b. The list shall be tabulated by and be complete for each Specification Section.
 - c. For each product listed, clearly indicate: a) As Specified, or b) Not As Specified. For each product designated Not As Specified, clearly indicate: c) Comparable Product, or d) Proposed Substitution.
- B. Substitution Requests Accompanying the Proposed Products List:
 - 1. A request for substitution will be considered, subject to the following requirements:
 - a. Include with the proposed products list a completed substitution request form for each proposed substitution anticipated for the Project. Check the box indicating the request is submitted with the proposed products list.

- b. Submit each proposed substitution using a separate copy of the substitution request form. Use substitution request form included in the Project Manual, or request an electronic version of form from the Architect. See Section 012510 “Substitution Request Form.” Submit in number of copies specified for proposed product list.
- c. The substitution request is submitted at the time the proposed products list is submitted. A request submitted after the time set for submittal of the proposed products list is subject to automatic rejection.
- d. Include with the request complete data on the proposed substitution. Such data shall include:
 - 1) Product Data highlighted to show applicability to the proposed substitution and project conditions;
 - 2) Performance and test data;
 - 3) References, and samples, where applicable; and
 - 4) An itemized comparison of the proposed substitution with the product features specified in the Contract Documents, including data relating to design and artistic effect, where applicable.
- e. Include copies of the pertinent Contract Documents, clearly marked and highlighted to show changes necessary to accommodate the proposed substitution.
- f. If the proposed substitution is due to unavailability of a specified product, a written statement shall accompany it, written by the supplier of the specified product, confirming lack of availability.
- g. By submitting the substitution request, Contractor affirms that: 1) the proposed substitution conforms to the required dimensions and meets or exceeds the standards of required function, appearance, and quality set by the specified product: and 2) the burden of proof rests with the Contractor.
- h. By submitting a substitution request, Contractor agrees to absorb all costs resulting from acceptance of the proposed substitution, including both known and subsequently discovered revisions to other construction needed to accommodate the substitution, and other expected and unforeseen costs, such as delays, code approval-related expenses, and additional architectural services.

C. Substitution Requests After Proposed Products List:

- 1. Use no product in the Work that is not named in the Contract Documents, or not listed in the Proposed Products List, or not approved as a substitute or comparable product. Products specified solely by reference standard or performance requirements do not require naming.
- 2. During construction of the Work, products not listed on the accepted Proposed Products List shall not be used without receipt of an approved substitution request for a listed product. A substitution request will be considered under one of the following conditions:
 - a. The product listed on the accepted Proposed Product List becomes unavailable. Include with the substitution request a letter from the listed manufacturer, on the manufacturer's letterhead, verifying that the product is no longer available.
 - b. Conditions uncovered at the Site render the listed product inappropriate, or an undesirable choice for the conditions uncovered. Include with the substitution request a full description of the uncovered conditions and why the requested substitution is preferable to the listed product.
- 3. Make each substitution request on the specified substitution request form. Fully execute form in accordance with the provisions of Article, Proposed Products List and Accompanying Substitution Requests, except for provisions requiring submittal concurrent with proposed products list. Check the box indicating the Contractor's request is being submitted separate from and after submittal of the proposed products list.

- D. A request for substitution forwarded by the Contractor means that Contractor:
1. Has investigated the proposed substitution.
 2. Has determined that the substitution is equal to or superior in quality and serviceability (performance) to the product specified in the Contract Documents.
 3. Will provide the same guarantee for the substitution that is required for the product specified in the Contract Documents.
 4. Waives all claims for additional costs that subsequently become apparent as a result of the substitution.
 5. Will coordinate the installation of the accepted substitution into the Work, and will make such changes in the Work of the various trades as may be required to provide a completed condition.
- E. A request for a substitution will not be considered if:
1. The substitution is merely indicated or implied on the Shop Drawing or Product Data submittal without the specified formal request and documented proof of conformance. Submittal approvals for items not meeting specifications are not valid. Completed construction related to such items is subject to rejection.
 2. Implementation requires a major revision of the Contract Documents in order to accommodate the substitution.
 3. The substitution request is substantially incomplete.
- F. Architect's Review of Proposed Products List and Substitution Requests:
1. The Architect will review properly submitted proposed products list and accompanying substitution requests.
 2. The Architect will evaluate each substitution request and inform Contractor in writing whether the proposed substitution is accepted, accepted as noted, or not accepted.
 - a. Substitution requests that do not conform to requirements, including submittal timing, are subject to return without review.
 - b. A substitution will not be considered accepted by the Owner until it has been documented by Change Order.
 3. The Architect's decision as to conformance and acceptability will be consistent with the intent of the Contract Documents.
 4. In the absence of written acceptance of a substitution request, proposed substitutions shall be understood as not accepted.
 5. The Architect will endeavor to evaluate the substitution request in a reasonable period of time. With the request, the Contractor shall inform the Architect of the deadline for final decision on the request. In the absence of Architect's decision within the critical time, the Contractor shall proceed with the specified product.
- G. Product List and Substitution Request Format:
1. Product List: Provide PDF of the list.
 2. Substitution Requests: Provide PDF of requests.

1.4 QUALITY ASSURANCE

SUBSTITUTION PROCEDURES

- 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.

1.5 PROCEDURES

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

1.6 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
 - 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Substitution request is fully documented and properly submitted.
 - c. Requested substitution will not adversely affect Contractor's construction schedule.
 - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - e. Requested substitution is compatible with other portions of the Work.
 - f. Requested substitution has been coordinated with other portions of the Work.
 - g. Requested substitution provides specified warranty.
 - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Architect will consider requests for substitution if received within 60 days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect.
 - 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 - b. Requested substitution does not require extensive revisions to the Contract Documents.
 - c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - d. Substitution request is fully documented and properly submitted.
 - e. Requested substitution will not adversely affect Contractor's construction schedule.
 - f. Requested substitution has received necessary approvals of authorities having jurisdiction.

- g. Requested substitution is compatible with other portions of the Work.
- h. Requested substitution has been coordinated with other portions of the Work.
- i. Requested substitution provides specified warranty.
- j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. The Contract language contained within this Section shall supplement and take precedence over all other change request pricing contract provisions provided by the Owner. These contract provisions shall govern the pricing and administration of all change request proposals to be submitted by the Contractor, Subcontractors, and all other lower tier Contractors (Sub-Subcontractors) working on the project.
- C. This specification section will be acknowledged by all agreements the Contractor enters into with any entity or individual in relation to the project. The change request pricing provisions apply to all types of contracts and subcontracts.
- D. Related Requirements:
 - 1. Section 012500 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.
 - 2. Section 012100 "Allowances"
 - 3. Section 013216 "Construction Project Schedules" for administrative procedures for handling project scheduling as it relates to Change Modifications after Contract Award.

1.3 CHANGES IN THE WORK

- A. The Owner may issue architectural supplemental instructions (ASI) and/or bulletins authorizing changes in the Work.
- B. Letter Directive: A Letter Directive instructs Contractor to provide pricing associated with a change in the Work for subsequent inclusion in a Contract Modification. The Letter Directive shall be signed by the Contracting Officer.
 - 1. A Letter 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.
 - 2. Letter Directives issued by the Owner are not instructions to either stop work in progress or to execute the proposed change unless they include a Notice to Proceed. Letter

Directives with NTP are direction from the Owner to perform the change work and shall be issued as an alternative to an executed Change Modification.

3. The Contractor is obligated to proceed with the Work for a Letter Directive when an NTP is included, even though there has not been an agreement reached with the Owner as to an adjustment to the Contract Price or Time, and even if there is dispute as to same. Letter Directives with NTP are issued to the Contractor when the changes need to be expedited, or the Contractor fails to agree on the terms offered by the Owner. The Contractor shall not proceed when the submitted rough order of magnitude value exceeds 5% of the original contract value.
- C. The Contractor may request changes in the Work but shall not act on those changes until approved in writing by the Contracting Officer. Any change made without the Courts' written authorization shall be the responsibility of the Contractor.
- D. Contractor's failure to submit notice of a claim as outlined in these provisions shall constitute a complete waiver by the Contractor of any claim for additional compensation or extension of time. This written notice requirement may not be waived by verbal representations or the acts of representatives of the Owner.
- E. The Contractor shall continue its performance of the Work regardless of the existence of any claims submitted.
- F. Documentation: If requested or required, maintain detailed records on a time and material basis of work required by the Letter Directive.

1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Construction Manager 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. Change Proposal Requests issued by the Construction Manager are not instructions either to stop work in progress or to execute the proposed change.
 2. Within 14 calendar days, unless otherwise specified, after receipt of a Letter Directive, submit an itemized quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change. If Contractor cannot provide proposal within 14 calendar days, they shall submit written request for extension and submit to Owner a Rough Order of Magnitude as a basis for negotiation.
 - 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 relationships. Use available total float before requesting an extension of the Contract Time.

- 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 to the Owner within 14 calendar days of discovery of event, or first appearance of the circumstances that constitutes the change.
1. Include a statement outlining all known facts and circumstances, 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. Provide documentation that supports the claim, and actual damage or injuries suffered.
 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 relationships. Use available total float before requesting an extension of the Contract Time.
 6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.

1.5 PRICING MODIFICATIONS

- A. The Contractor shall proceed with any extra work or changes which alter the Contract by adding to, or deducting from the Contract Sum or Contract Time in strict accordance with the Contract, and the following terms:
1. A Letter Directive for a change in the Work may include a change in the Contract Price or the time for Contractor's performance, or any combination there-of
 - a. Any change in Contract Price or Contract time resulting from a potential change shall be determined as follows: By mutual agreement between Owner and the Contractor evidenced by (a) the change in the Contract Price or time being set forth in a Contract Modification in accordance with this Section, and (b) the execution of a Contract Modification.
 2. Whenever change proposals to adjust the contract price become necessary, the Owner will have the right to select the method of pricing to be used by the Contractor in accordance with the provisions of this section. The options will be (1) lump sum change proposal, (2) unit price change proposal, or (3) time and material changes
 - a. Lump Sum Change Proposals - Contractor shall submit properly itemized Lump Sum Change Proposal covering the additional work and/or the work to be deleted. This proposal shall be itemized for various components of the work and segregated by labor, material, and equipment in a detailed format satisfactory to Owner. Owner requires itemization on all change proposals from the Contractor, subcontractors, and sub-subcontractors regardless of tier.
 - 1) Labor: Estimated labor costs to be included for self-performed work shall be based on the cost per hour paid by the Contractor or any contractor for those workers or crews of workers who the Contractor or any contractor reasonably anticipates will perform the changes in work. Labor hours shall be limited to workers directly involved in the work. No general condition supervision shall

- be included. Costs include payments, assessments, or benefits required by lawful labor union collective bargaining agreements, compensation insurance payments, contributions made to the State pursuant to the Unemployment Insurance Code, and for taxes paid to the federal government required by the Social Security Act.
- 2) Material: Estimated material change costs shall reflect the Contractor, or any subcontractors anticipated net actual cost for the purchase, or the material needed for the changed work. Estimated material costs shall reflect cost reduction available to the Contractor or any subcontractor due to trade discounts, free material credits, and / or volume rebates. Price quotations from material suppliers must be itemized by each specific item to be purchased. "Lot pricing" quotations will not be considered sufficient substantiating detail.
 - 3) Equipment: Allowable change order estimated costs may include appropriate rental of major equipment specifically needed to perform change order work (defined as tools and equipment with an individual purchase cost of more than \$1000). Fuel utilized for equipment shall be considered as a separate direct cost associated with the change order work.
- b. Unit Price Change Proposals - As an alternative to Lump Sum Change Proposals, the Owner may choose the option to use Contract Unit Prices as were presented by the Contractor as part of their contract price for construction. The Contractor will submit a written unit price proposal itemizing the quantities of each item of work for which there is an applicable Contract Unit Price. Unit prices will be considered to cover all direct and indirect costs of furnishing an installing the item including all markup.
 - c. Time and Material with Not to Exceed - As an alternative to either Lump Sum Change Proposals or Unit Price Change Proposals, the Owner may elect to have any extra work performed on Time and Material basis. In this instance, the Contractor will track direct labor, material, and equipment costs relative to the work daily, verified by the Construction Manager or delegate of the Owner. Upon completion of the work, the change shall be compiled as outlined in previous sections including the tickets as verification of labor, material, and equipment utilized and shall be marked utilizing the following mark-up percentages.
3. Maximum Markup Percentage on Self-Performed Work: With respect to pricing change orders, the maximum markup percentage to be paid to any contractor (regardless of tier) on self-performed work shall be a single percentage not to exceed the following sliding scale of percentages, of the net direct cost of (1) direct labor costs applicable to the change order or extra work, (2) the net cost of material and installed equipment incorporated into the change or extra work, and (3) net rental cost of major equipment and related fuel costs necessary to complete the change in the work.
 - a. 15% on the first \$100,000 of the change order direct cost of self-performed work,
 - b. 10% on the portion of the change order direct cost of self-performed work greater than \$100,000.
 4. Maximum Markup Percentages Allowable on work Performed by Lower Tier Contractors: With respect to pricing the change order proposal involving work performed by lower tier contractors, the allowable markup percentage shall be:
 - a. 10% on the first \$100,000 of the change order work performed by all subcontractors combined for any particular change order proposal.
 - b. 5% on any amount greater than \$100,000 of approved change order work performed by all subcontractors combined for any change order proposal.

5. The agreed upon markup percentage is intended to cover the profit, fee, and all indirect costs associated with the change order work. Items to be covered by the markup percentage include, but are not limited to: home office expense, branch office and field office overhead expense of any kind, project management, superintendents, general foreman, estimating, engineering, coordination, expediting, purchasing, detailing, legal, accounting, data processing, or any administrative expenses, shop drawings, permits, comprehensive general liability insurance, auto insurance, and umbrella insurance, pick-up truck costs. The cost of the use of small tools is also considered covered by the markup percentages. Small tools shall be defined as tools and equipment (power or non-powered) with an individual value of \$1,000 or less.
6. The credit to be allowed by the Contractor to the Owner for a deletion or change which results in a net decrease in the Contract Sum shall be the total actual costs (as set forth above in section 1.4) saved. The Contractor shall provide a positive six percent (6%) markup on all deductive change orders to account for Contractor's overhead, bonds, and insurance on deducted work.
7. The application of the markup percentages referenced in the preceding paragraphs will apply to both additive and deductive change orders. In those instances where a change involves both additive and deductive work, the additions and deductions will be netted, and the markup percentage adjustments will be applied to the net additive or deductive amount as outlined above.
8. Sales and use tax (if applicable) shall not be subject to any Markup Percentage. Any sales or use tax properly payable by the Contractor or any contractor shall be added after computing the change order amount before tax.
9. In no event will any amounts for "contingency" be allowed to be added as a separate line item in change order estimates.
10. For any changes in schedule for the change order, Contractor shall follow steps as outlined for Time Impact Analysis (TIA) as outlined in specification section 013216.

1.6 MATERIAL/EQUIPMENT ESCALATION CHANGE REQUESTS

- A. Contractor shall be responsible for buying out and purchasing materials/equipment as soon as possible to avoid cost escalation.
- B. In the event of an unforeseen material/equipment cost escalation, a change request may be submitted by the Contractor for review and acceptance by the Owner. These change proposals shall be substantiated as outlined in section 1.5 above including the following substantiating information:
 1. Material submittal schedule to reflect when the material was contractually obligated to be submitted, reviewed, and approved. Based either upon the approved baseline schedule, or the contractual submission schedule outlined in the Contractor's executed agreement with the vendor supplying the material/equipment.
- C. If materials/equipment were submitted and procured based upon the above and escalation can be substantiated as an unforeseen condition, the cost will be covered by Contract Modification issued by the Owner for the difference in material/equipment cost.
- D. In the case that either the material/equipment was not submitted or procured timely as outlined above then the Owner shall not be responsible for the increase, and it shall be the burden of the Contractor.

1.7 ADMINISTRATIVE CHANGE REQUESTS

- A. Allowance Adjustment: See Section 012100 "Allowances" for administrative procedures for preparation of Change Proposal for adjusting the Contract Sum to reflect actual costs of allowances.

1.8 CHANGE REQUEST PROCEDURES

- A. On Owner's approval of a Work Change Request Proposal, a Contract Modification will be issued for signatures of Owner and Contractor on form provided by Owner.
- B. The execution of a Contract Modification by the Contractor shall constitute conclusive evidence of the Contractor's agreement to the ordered changes in the Work and the change in the Contract Price and time for performance by the Contractor. By executing the Contract Modification, the Contractor waives and forever releases any claim against the Owner for additional time or compensation for issues or matters relating to or arising out of or resulting from the Work included within or affected by the executed Change Modification.
- C. The Contractor shall notify and obtain the consent and approval of the Contractor's surety with reference to all Change Modifications and provide such consent in the form of fully executed Performance Bond Rider and Payment Bond Rider as is applicable to the contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
 - 1. 012100 "Allowances" for procedural requirements governing the handling and processing of allowances.
 - 2. Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 - 3. Section 013200 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.
 - 4. 013216 "Construction Project Schedules" for administrative procedures for handling project scheduling as it relates to requirements for schedule updates.
 - 5. Section 013300 "Submittal Procedures" for administrative requirements governing the preparation and submittal of the submittal schedule.

1.3 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.

1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule. Cost-loaded Critical Path Method Schedule may serve to satisfy requirements for the schedule of values.
 - 1. Coordinate line items in the schedule of values with items required to be indicated as separate activities in Contractor's construction schedule.
 - a. Application for Payment forms
 - b. Submittal schedule
 - c. Items required to be indicated as separate activities in Contractor's construction schedule

2. Submit the schedule of values to Owner at earliest possible date, but no later than 14 calendar days before the date scheduled for submittal of initial Applications for Payment.
 3. Subcontractor schedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work; provide subcontractor schedules showing values coordinated with each element.
- 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 Architect.
 - c. Architect's Project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 2. Arrange schedule of values consistent with format of form provided by Owner
 3. 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. Round dollar amounts to whole dollars, with total equal to Contract Sum.
 - 1) Labor.
 - 2) Materials.
 - 3) Equipment.
 4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
 5. 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.
 6. 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.

7. Purchase Contracts: Provide a separate line item in the schedule of values for each purchase contract. Show line-item value of purchase contract. Indicate Owner payments or deposits, if any, and balance to be paid by Contractor.
8. Closeout Costs: Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
9. Schedule of Values Revisions: Revise the schedule of values when Change Orders result in a change in the Contract Sum. Include at least one separate line item for each Change Order.

1.5 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 Construction Manager and paid for by Owner.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner 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 Construction Manager by the fifth day 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 14 days prior to due date for review by Owner and Construction Manager.
 2. Prior to submission of final application for payment, the Contractor's schedule update supporting the payment application must be submitted via PMIS. Approval of the final payment application may be withheld by the DC Courts if the schedule is not acceptable. Reference section 013216
- D. Application for Payment Forms: Use form Applications for Payment provided by Owner.
- E. The owner shall withhold fifty percent (50%) of the Contractor's mobilization cost until the Baseline Schedule is approved.
- F. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Owner 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 Owner-requested project acceleration.
- G. 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 Owner, 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.
- H. Transmittal: Submit one hard copy, signed and notarized original copies of each Application for Payment to Owner 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.
- I. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment to include subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 2. When an application shows completion of an item, submit conditional final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. 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.
 5. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
- J. 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. Contractor's construction schedule (preliminary if not final).
 4. Combined Contractor's construction schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor.

5. Products list (preliminary if not final).
 6. Sustainable design action plans, including preliminary project materials cost data.
 7. Schedule of unit prices.
 8. Submittal schedule (preliminary if not final).
 9. List of Contractor's staff assignments.
 10. List of Contractor's principal consultants.
 11. Copies of building permits.
 12. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 13. Initial progress report.
 14. Report of preconstruction conference.
 15. Certificates of insurance and insurance policies.
 16. Performance and payment bonds.
 17. Data needed to acquire Owner's insurance.
- K. Application for Payment at Substantial Completion: After Construction Manager 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.
- L. Final Payment Application: Within 30 days 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. District of Columbia Affidavit of Release of Liens.
 5. Evidence that claims have been settled.
 6. 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.
 7. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, other Division 01 Specification Sections, and provisions of Request for Proposal (RFP) apply to this Section.

1.2 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General coordination procedures.
 - 2. Coordination drawings.
 - 3. RFIs.
 - 4. Digital project management procedures.
 - 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. Section 013200 "Construction Progress Documentation" for documenting the progress of construction during performance of the Work
 - 2. Section 013216 "Construction Progress Schedule" for preparing and submitting Contractor's construction schedule
 - 3. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 4. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.
 - 5. Section 019113 "General Commissioning Requirements" for coordinating the Work with Owner's Commissioning Authority.

1.3 DEFINITIONS

- A. BIM: Building Information Modeling.
- B. RFI: Request for Information. Request from Owner, Construction Manager, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

- A. 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. Include the following information in tabular form:
1. Name, address, telephone number, and email address 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. Key Personnel Names: Within 15 days of NTP, 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, 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. General Contractor shall input all key personnel information on the specified web-based Project software Procore directory. Keep list current at all times.
- C. A detailed 3-week look-ahead schedule shall be submitted once a week by the close of business on the last day of the previous week's work. The schedule shall include the following:
1. Specific location of work for each trade.
 2. Description of work for each trade.
 3. Number of persons who will be on site for each location and trade.
 4. Specific impacts required, such as equipment or utility shutdowns.
 5. Hours of operation.
 6. Ensure that line items tie back to Contractor's construction schedule utilizing activity IDs to ensure continuity between activities on the look ahead schedule and the contract schedule.

1.5 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 construction operations with the Courts for access and use of the spaces impacted by the Work. Phasing of the work may be required to maintain Courts operations.
 3. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 4. Make adequate provisions to accommodate items scheduled for later installation.
 5. Coordinate installation of different components with other contractors to ensure maximum performance and accessibility for required maintenance, service, and repair.
 6. Make adequate provisions to accommodate items scheduled for later installation.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and scheduled 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. Delegated design services.
 5. Delivery and processing of submittals.
 6. Progress meetings.
 7. Preinstallation conferences.
 8. Project closeout activities.
 9. Startup and adjustment of systems.
- D. 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. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

1.6 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated 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. Any work that proceeds without proper coordination drawings is at the sole risk of the contractor. Conduct a Coordination Drawing meeting to review the drawings and process for developing and submitting the drawings, prior to the start of any work.
1. Coordination drawings must be submitted to the Construction Manager and be reviewed prior to the start of any new Work. No payment applications will be processed for Work that was conducted without approved coordination drawings.
 2. Content: Project-specific information, drawn accurately to a minimum ¼ inch scale plan, elevation and section drawings, to indicate and resolve conflicts. Drawings submitted shall be CAD electronic files preferably utilizing latest release of AutoCAD showing: partitions, fire/smoke rated barriers, ceiling heights, structural framing locations and elevations, column lines, and other related work. After Subcontractor's written approval of coordination drawings, Contractor shall determine method used to resolve interferences not previously identified. Contractor shall give written approval of changes to coordination drawings prior to start of work. Maintain one working copy of current approved Coordination Drawings at project site. The Contractor's resolution to coordination issues of various subcontractor's should not directly impact the intent of architectural elements of the project such as ceilings, walls, and chases. 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 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. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, fire protection, and electrical systems.
- d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
- e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
- f. Indicate required installation sequences.
- g. Indicate dimensions shown on Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

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

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.
2. Plenum Space: Indicate sub-framing for support of ceiling, raised access floor, and wall systems, mechanical and electrical equipment, and related Work. Locate components within plenums to accommodate layout of light fixtures and other components indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
6. Mechanical and Plumbing Work: Show the following:
 - a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
 - b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
 - c. Fire-rated enclosures around ductwork.

7. Electrical Work: Show the following:
 - a. Runs of vertical and horizontal conduit 1-1/4 inches (32 mm) in diameter and larger.
 - b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
 - c. Panel board, switch board, switchgear, transformer, busway, generator, and motor-control center locations.
 - d. Location of pull boxes and junction boxes, dimensioned from column center lines.
 8. Fire-Protection System: Show the following:
 - a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
 9. Review: Architect and Construction Manager will review coordination drawings to confirm that in general the Work is being coordinated, but not for the details of the coordination, which are the Contractor's responsibility. If Owner determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Owner will so inform the Contractor, who shall make suitable modifications and resubmit.
 10. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in Section 013300 "Submittal Procedures."
- C. 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 Preparation Format: Latest version of Revit at the time of NTP.
 3. File Submittal Format: Submit or post coordination drawing files using format same as file preparation format and PDF format.
 4. Owner will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.
 - a. The Architect 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 Revit.
 - c. Contractor shall execute a data licensing agreement in the form of an Agreement form acceptable to Owner.

1.7 REQUEST FOR INFORMATION (RFI)

- A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, the Contractor shall prepare and submit an RFI in the form specified.
1. All RFIs are to be uploaded to the Owner's project management website, by the Contractor. Review and comment shall follow the project defined communication structure, as defined in other sections of the specifications.
 2. Construction Manager and/or Architect will return without response those RFIs submitted by other entities controlled by Contractor.

3. Requests for information directly from Subcontractors will not be answered. RFIs will be returned without response for reasons including but not limited to: requests for substitutions, money, time, forgiveness, direction, and means and methods.
 4. Coordinate and submit RFIs in a prompt manner as to avoid delays in Contractor's work or work of subcontractors.
 5. Do not issue RFI as request for substitution. Such RFIs will be returned with notification to submit proper "Request for Substitution".
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Date.
 2. Name of Contractor.
 3. RFI number, numbered sequentially.
 4. RFI subject.
 5. Specification Section number and title and related paragraphs, as appropriate.
 6. Drawing number and detail references, as appropriate.
 7. Field dimensions and conditions, as appropriate.
 8. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 9. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: Software-generated form with substantially the same content as indicated above, acceptable to the Owner and Construction Manager.
1. Attachments shall be electronic files in PDF format, for approval by Owner.
- D. Construction Manager Action: Construction Manager will review each RFI that is designated by Contractor for Owner's action. Allow 14 calendar days for response for each RFI. RFIs received by the Construction Manager after 1:00 p.m. will be considered as received the following working day.
1. If, in the opinion of the Owner, the RFI is too complicated, and will require coordination with other components, and it will take more than 14 calendar days to properly respond to, the Owner will notify the Contractor through the Construction Manager of the required time within 7 working days
 2. The following Contractor-generated RFIs will be 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 coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Architect's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.

1.8 DIGITAL PROJECT MANAGEMENT PROCEDURES

- A. Owner's Data Files Not Available: Owner will not provide BIM model digital data files for Contractor's use during construction.
- B. Use of Owner's Digital Data Files: Digital data files of CAD drawings will be provided by Architect for Contractor's use during construction.
 - 1. Digital data files may be used by Contractor in preparing coordination drawings, Shop Drawings, and Project Record Drawings.
 - 2. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Contract Drawings.
 - 3. Digital Drawing Software Program: Contract Drawings are available in AutoCAD (DWG)
 - 4. Contractor shall execute a data licensing agreement in the form.
 - a. Subcontractors, and other parties granted access by Contractor to Owner's digital data files shall execute a data licensing agreement in the form provided by Owner.
- C. Web-Based Project Software: Use Owner's web-based Project software site, Procore, for purposes of hosting and managing Project communication and documentation until Final Completion.
 - 1. Provide four hours of software training for the Project Website users.
 - 2. Contractor, subcontractors, and other parties granted access to the Project Website shall execute the data licensing agreement implemented on the website.
- D. PDF Document Preparation: Where PDFs are required to be submitted to Owner or Construction Manager prepare 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. Name file with submittal number or other unique identifier, including revision identifier.
 - 3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

1.9 PROJECT MEETINGS

- A. General: Contractor will schedule and conduct meetings and conferences at Project site unless otherwise indicated. Coordinate all meetings with the Construction Manager.
 - 1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Construction Manager of scheduled meeting dates and times a minimum of 14 calendar days prior to meeting.
 - 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 - 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Construction Manager, within two (2) days of the meeting.
 - 4. Meeting participants will have three (3) days to provide revisions back to the entity responsible and the meeting minutes shall be redistributed to the team.
 - 5. There shall be no private meetings without appropriate attendees, and meeting minutes shall be distributed to all parties, to document the outcome of those meetings.

- B. Preconstruction Conference: Contractor will coordinate with Construction Manager to schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 14 calendar days after execution of the Agreement.
1. 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.
 2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Responsibilities and personnel assignments.
 - b. Tentative construction schedule.
 - c. Phasing.
 - d. Critical work sequencing and long lead items.
 - e. Designation of key personnel and their duties.
 - f. Lines of communications.
 - g. Use of web-based Project software.
 - h. Procedures for processing field decisions and Change Orders.
 - i. Procedures for RFIs.
 - j. Procedures for testing and inspecting.
 - 1) Schedule for all testing and inspections shall be part of the schedule process, per section 013200 "Construction Progress Documents."
 - k. Commissioning procedures.
 - l. Procedures for processing Applications for Payment.
 - m. Distribution of the Contract Documents.
 - n. Submittal procedures.
 - o. Sustainable design requirements.
 - p. Preparation of Record Documents.
 - q. Use of the premises and existing building.
 - r. Work restrictions.
 - s. Working hours.
 - t. Owner's occupancy requirements.
 - u. Responsibility for temporary facilities and controls.
 - v. Procedures for moisture and mold control.
 - w. Procedures for disruptions and shutdowns.
 - x. Construction waste management and recycling.
 - y. Parking availability.
 - z. Office, work, and storage areas.
 - aa. Equipment deliveries and priorities.
 - bb. First aid.
 - cc. Security.
 - dd. Progress cleaning.
 3. Minutes: Contractor responsible for conducting meeting will record and distribute meeting minutes.
 4. Preinstallation Conferences: Within 14 calendar days of award, the Contractor is to provide a list of construction activities requiring a pre-installation conference. This list should include any finish systems (i.e. Drywall, Tile, etc.) or other systems that would require testing, commissioning, or training. Pre-installation conferences should be represented in

the project schedule as milestones. Pre-Installation conferences shall be scheduled and coordinated by the contractor to not impact production on the project. 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 Construction Manager and Owner's Commissioning Authority of scheduled meeting dates.

5. 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 RFIs.
 - d. Related Change Orders.
 - e. Purchases.
 - f. Deliveries.
 - g. Submittals.
 - h. Sustainable design 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.
 6. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 7. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
 8. 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.
- C. Project Closeout Conference: Contractor will schedule and conduct a project closeout conference, at a time convenient to 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, Construction Manager, 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. Procedures for completing and archiving web-based Project software site data files.
 - d. Submittal of written warranties.
 - e. Requirements for completing sustainable design documentation.
 - f. Requirements for preparing operations and maintenance data.
 - g. Requirements for delivery of material samples, attic stock, and spare parts.
 - h. Requirements for demonstration and training.
 - i. Preparation of Contractor's punch list.
 - j. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
 - k. Submittal procedures.
 - l. Coordination of separate contracts.
 - m. Owner's partial occupancy requirements.
 - n. Installation of Owner's furniture, fixtures, and equipment.
 - o. Responsibility for removing temporary facilities and controls.
 4. Minutes: Contractor responsible for conducting meeting will record and distribute meeting minutes.
- D. Progress Meetings: Contractor shall conduct progress meetings at biweekly or at agreed to intervals.
1. Coordinate dates of meetings with preparation of payment requests.
 2. 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.
 3. 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 sustainable design documentation.
 - 6) Deliveries.
 - 7) Off-site fabrication.
 - 8) Access.
 - 9) Site use.
 - 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 RFIs.
 - 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.
- 4. Minutes: Contractor will record and distribute the meeting minutes to each party present and to parties requiring information. Minutes to be distributed within 48 hours of the meeting.
 - a. Schedule Updating: Revise Contractor's 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.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, and provisions of the Request for Proposal (RFP) apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Daily construction reports.
 - 2. Procurement log.
 - 3. Submittal log
 - 4. Site condition reports.
 - 5. Unusual event reports.
- B. Related Requirements:
 - 1. Section 011000 "Summary" for Construction Progress Documents kept in the Owner's project management database (Procore).
 - 2. Section 013216 "Construction Project Schedule" for scheduling requirements.
 - 3. Section 013300 "Submittal Procedures" for submitting schedules and reports.
 - 4. Section 014000 "Quality Requirements" for submitting a schedule of tests and inspections.
 - 5. Section 013233 "Photographic Documentation" for Periodic Construction Photographs

1.3 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
 - 1. Working electronic copy of schedule file, where indicated.
 - 2. PDF file.
- B. Procurement log: Submit at bi-weekly intervals and with Payment Application.
- C. Submittal Log: Submit at bi-weekly intervals.
- D. Site Condition Reports: Submit at time of discovery of differing conditions.
- E. Unusual Event Reports: Submit at time of unusual event.

1.4 REPORTS

- A. Reports are to be stored in the Owner's PMIS system.
- B. Daily Construction Reports: Utilizing the Daily Report module in the Owner's PMIS system, report the following information concerning events at Project site:
 - 1. List of subcontractors at Project site.
 - 2. List of separate contractors at Project site.
 - 3. Approximate count of personnel at Project site.
 - 4. Equipment at Project site.
 - 5. Material deliveries.
 - 6. High and low temperatures and general weather conditions, including presence of rain or snow.
 - 7. Testing and inspection.
 - 8. Accidents.
 - 9. Meetings and significant decisions.
 - 10. Unusual events.
 - 11. Stoppages, delays, shortages, and losses.
 - 12. Meter readings and similar recordings.
 - 13. Emergency procedures.
 - 14. Orders and requests of authorities having jurisdiction.
 - 15. Change Orders received and implemented.
 - 16. Construction Change Directives received and implemented.
 - 17. Services connected and disconnected.
 - 18. Equipment or system tests and startups.
 - 19. Partial completions and occupancies.
 - 20. Substantial Completions authorized.
- C. Procurement Log: 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 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.
- D. 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.
- E. Incident Reports: 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, responses by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

1. Contact the Owner's Facility Management Department and Construction Manager immediately upon Unusual Event. Provide an initial action plan to mediate the Unusual Event

Submit Unusual Event Reports directly to Owner's Facility Management Department and Construction Manager. The Contractor shall submit initial findings and action plan immediately upon the discovery of the unusual event. A formal report shall be submitted within one day of an occurrence.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013200

SECTION 013216 - CONSTRUCTION PROJECT SCHEDULE

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. The Contractor shall use a Critical Path Method ("CPM") Project Schedule to plan, coordinate, and perform the Work. The Project Schedule shall be produced using widely used, commercially available computer software that is capable of generating and monitoring a CPM schedule and is capable of exporting readable output in PDF format. Develop a detailed Network Plan demonstrating complete fulfillment of all Work shown in the contract documents. Regularly update the Network Plan in accordance with the requirements of this Section, and use it in planning, coordinating, and performing all the Work under this contract. Schedule activities shall accurately depict the contractor's means and methods to complete the entire scope of work including, but not limited to, activities of subcontractors, consultants, equipment vendors and suppliers, the Owner, and others, as required. The contractor is required to follow the Network Plan in the execution of the work.
 - 1. Startup construction schedule.
 - 2. Contractor's Construction Schedule (CPM).
 - 3. Construction schedule updating reports.
- B. Related Requirements:
 - 1. Section 011000 "Summary"
 - 2. Section 013300 "Submittal Procedures" for submitting schedules and reports.
 - 3. Section 014000 "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 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. Each activity shall be limited to one trade unless the Owner specifically approves otherwise on an exception basis.
 - 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.

- B. Baseline Schedule: The original work plan approved by the Owner as the Project Schedule depicting the contractor's plan to prosecute the work.
- C. Constraint: A scheduling restriction imposed on the start date, finish date or float of an activity. No constraints will be allowed.
- D. Cost Loading: The allocation of the schedule of values for completing an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum.
- E. CPM: A scheduling technique using activities, durations, and interrelationships/dependencies (logic), such that all activities are interrelated with logic ties from the beginning of the project to the completion of the project. There shall be no open-ended relationships in the schedule. All activities shall have at least one successor with a finish relationship ("finish to start" or "finish to finish" except the last activity in the network).
- F. Critical Path: The Project critical path is defined as the longest, continuous path of interrelated activities depicting project work from notice of award (or NTP) to project completion. All reports and graphics indicating the Critical Path shall depict the longest path of interrelated activities. Unless otherwise approved by the Owner, the Baseline Schedule Critical Path shall use all allotted Contract time. The contractor has the right to develop a schedule that forecasts an early finish. However, all time between the forecasted early finish of substantial completion and the contractual substantial completion date shall be shown as float.
- G. Current Schedule of Record: The current accepted construction schedule, recently updated or revised to reflect the actual progression of the work.
- H. Data Date: The date to which progress is updated. In most scheduling software, the data date represents the next day of work and all progress is updated through the day prior to the data date.
- I. Float: The amount of time an activity can be delayed in a project network without causing delay to subsequent activities (free float) or the project completion date (total float).
 - 1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date
 - 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 Substantial Completion date.
- J. Float Suppression: The masking of available float through the use of constraints, unreasonable logical relationships or unreasonable durations. Float suppression techniques are not to be allowed.
- K. Fragnet: A subset group of interrelated activities representing only a portion of the CPM schedule.
- L. Resource Loading: The allocation of manpower and equipment necessary for completing an activity as scheduled.
- M. Network Plan: The Network Plan is the entire database of activities, logic, durations, and all items relating to any activity input into the scheduling software and is the complete representation of

the Project Schedule prepared using the Critical Path Method and graphically shown in a time-scaled form. The network shows the sequence and interdependence of the activities, and planned and actual progress by activity, required for complete performance of the Work.

- N. Project Schedule: The Project Schedule includes the Preliminary Schedule (submitted at bid or as determined by the CO), the approved Baseline Schedule (developed based on the Preliminary Schedule), and all subsequent Schedule Updates, Schedule Revisions, Recovery Schedules, and As-Built Schedule.
- O. Recovery Schedule: A schedule depicting the General Contractor's plan for recovery of time lost on the project.
- P. Retained Logic: When you choose Retained Logic, the remaining duration of a progressed activity is not scheduled until the logical relationships of all predecessors are satisfied. When you choose Progress Override, network logic is ignored, and the activity can progress without delay
- Q. Schedule Revision: A schedule in which the plan for the work is revised. A Schedule Revision is required when the current schedule no longer represents the actual or planned prosecution of the Work.
- R. Schedule Update: A schedule in which only actual start dates, actual finish dates and duration percent completes are updated from the prior data date to the current data date. No Revisions will be permitted in a Schedule Update. (i.e. added activities, deleted activities, logical relationships, etc.) unless the Owner specifically approves otherwise on an exception basis.
- S. Time Impact Analysis: A technique to demonstrate a revision or proposed revision against the current approved Project Schedule.
- T. Working Day: A Working Day is a calendar day scheduled for active prosecution of the work.

1.4 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
 - 1. Working electronic copy of schedule file, where indicated.
 - 2. PDF file.
- B. Preliminary Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
 - 1. Submit a working digital copy of schedule, using software indicated, and labeled to comply with requirements for submittals.
- C. Baseline Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
 - 1. Submit a working digital copy of schedule, using software indicated, and labeled to comply with requirements for submittals.

- D. Schedule Updates: Submit with Applications for Payment no later than the 5th of the following month

1.5 QUALITY ASSURANCE

- A. Contractor Scheduler: Contractor's scheduler shall have experience in CPM scheduling and reporting on projects of similar size and complexity.
- B. Scheduling Consultant Qualifications: For projects with a construction value over \$250,000, engage with an experienced specialist in CPM scheduling and reporting, with capability of producing CPM reports and diagrams within 24 hours of Owner's request.

1.6 COORDINATION

- A. Coordinate Contractor's Construction Schedule with the schedule of values, list of subcontracts, 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.
- B. Prescheduling Conference: Conduct conference at Project site to comply with requirements in 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 submittal requirements and procedures.
 - 7. Review time required for review of submittals and resubmittals.
 - 8. Review requirements for tests and inspections by independent testing and inspecting agencies.
 - 9. Review time required for Project closeout and Owner startup procedures, including commissioning activities.
 - 10. Review procedures for updating schedule.

1.7 PROJECT SCHEDULE, GENERAL

- A. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.
 - 1. Use Microsoft Project (only for projects less than \$250,000) or Primavera P6, version 8.2 or later (for all projects larger than \$250,000).

- B. Scheduling Consultant: Engage a consultant to provide planning, evaluation, and reporting using CPM scheduling.
1. In-House Option: Owner may waive requirement to retain a consultant if Contractor employs skilled personnel with experience in CPM scheduling and reporting techniques. Submit qualifications.
 2. Meetings: Scheduling consultant shall attend all meetings related to Project progress, alleged delays, and time impact.
- C. Time Frame: Extend Project Schedule from date established for the Notice to Proceed to date of Final Completion.
1. Contract completion date shall not be changed by submission of a schedule that shows an early or late completion date, unless specifically authorized by Change Order.
- D. Activities: Comply with the following:
1. Procurement Activities: Include procurement process activities for the long lead items and major items, requiring a cycle of more than 60 calendar days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 2. Submittal Review Time: Include review and resubmittal times indicated in section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Project Schedule with submittal schedule.
 3. Startup and Testing Time: Include no fewer than 21 calendar days for startup and testing.
 4. Commissioning Time: Include no fewer than 21 calendar days for commissioning.
 5. Punch List and Final Completion: Include not more than 30 calendar days for completion of punch list items and Final Completion.
 6. Work by Owner equipment, security, IT FFE etc.: Include no fewer than 15 working days for Owner provided and installed items
- E. Work Restrictions: Include work restrictions indicated in the Contract Documents and as follows in schedule 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 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 section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 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 Phase: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
 - a. Subcontract awards for major trades.
 - b. Submittals.
 - c. Fabrication.
 - d. Deliveries.
 - e. Installation.
 - f. Tests and inspections.
 - g. Startup and placement into final use and operation.
 - h. Commissioning.
- F. Schedule Composition
 - 1. Open Ended Logic
 - a. Only 2 open-ended activities are allowed: the first activity "NTP" shall have no predecessor logic, and the last activity "Final Completion" shall have no successor logic.
 - b. Dangling activities are defined as activities that either a) have only predecessors with finish-finish type relationships and/or b) have only successors with start-start type relationships. Dangling activities are effectively open ended and shall not be allowed.
 - 2. Leads, Lags, and Start to Finish Relationships
 - a. Lags shall be reasonable as determined by the Owner and not used in place of realistic original durations, shall not be in place to artificially absorb float, or to replace proper schedule logic.
 - b. Leads (negative lags) and Start to Finish (SF) relationships are prohibited.
 - c. Lag relationships shall not exceed 10% of total relationships
 - 3. Relationship Ratio
 - a. Relationship ratio is defined as the number of start-to-start and finish-to-finish relationships over the total number of relationships.
 - b. Relationship ratio shall not exceed 20%
- G. Recovery Schedule: When periodic update indicates the Work is 30 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. Distribution: Distribute copies of approved schedule to Architect, Construction Manager, 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.

1.8 PRELIMINARY SCHEDULE

- A. Within fourteen (14) calendar days after Notice to Proceed, Contractor shall submit a Preliminary Schedule detailing the entire scope of the contract. Only the scope, durations and logical relationships will be included in the Preliminary Schedule. (No cost loading or resource loading shall be included in the Preliminary Schedule.)
- B. Within two weeks of receipt by the Owner of the Preliminary Schedule, the Contractor and Owner shall meet to discuss the results of the Owner's schedule review. To the extent that revisions are required, the Contractor shall resubmit the Preliminary Schedule to the Owner for approval within seven (7) calendar days of receipt of the Owner's comments.
1. Activities, for major submittals and long lead items including activities representing: (1) Submittals, (2) Review & Approvals, (3) Fabrication, and (4) Deliveries, construction, inspections, close-out, start-up, testing and balancing, commissioning and turnover, and work by separate contractors. Submittal activities and fabrication activities shall not be cost loaded.
 2. The Preliminary Schedule shall indicate intended submittal dates and depict the review period as defined in the Contract for Owner review. Procurement/submittal activities shall be assigned codes that will allow these activities to be sorted and printed separately from the construction/close-out/commissioning work activities.
 3. The Preliminary Schedule shall have a Data Date no later than NTP, and no activities shall be progressed later than the data date
 4. Activity descriptions of the work shall include area designators sufficient to identify where the Work will occur. The work related to each Activity shall be limited to one work trade and one area. All activity descriptions shall be unique. No two activities can have the same description.
 5. Establish a schedule calendar(s) as it relates to durations for activities (proposed number of working days per week, holidays to be observed, planned number of shifts per day, weather affected activities such as roofing or landscaping that normally cannot occur in the winter/fall months).
 6. The following days are recognized as legal holidays and shall be indicated as non-working days on all construction calendars.
 - a. New Year's Day
 - b. Martin Luther King, Jr. Birthday
 - c. Inauguration Day (when applicable)
 - d. President's Birthday
 - e. DC Emancipation Day
 - f. Memorial Day
 - g. Independence Day
 - h. Labor Day
 - i. Columbus Day
 - j. Veterans Day
 - k. Thanksgiving Day
 - l. Christmas Day
 7. Interrelationships (logic) and sequencing for ALL activities. Each activity shall have at least one successor (except for the last activity) relationship to form a logically connected Network Plan from NTP to the Contract Completion Date. For each activity, at least one successor must be a finish relationship (finish to start or finish to finish).
 8. The contractor shall provide (screen shots of) the schedule software settings used under each tab of User Preferences, Admin Preferences, and Schedule Options with the baseline schedule and each subsequent schedule submittal.

9. Activity durations shall be in units of whole working days and scope of work shall be limited to one trade each. Except submittal and procurement activities, durations shall not exceed 20 working days unless approved by the Owner. Durations for Owner submittal reviews shall meet the requirements set forth in the Contract Documents.
10. Incorporate seasonal weather conditions in the project's geographic area into the project planning and include an average number of days lost to weather per month using the NOAA historical data five (5) year averages.
11. Contractual milestone events as defined in the Contract Documents including, but not limited to, phased work, work restrictions/access/shift work, and work being performed by separate contractors. The Contractor is prohibited from assigning milestones that are NOT consistent with key dates shown by Owner in the Contract Documents without specific Owner approval.
12. ALL activities shall at a minimum be coded by AREA, RESPONSIBILITY (trade/subcontractor), and PHASE. Additional codes are allowed to sufficiently identify where work will occur. Codes shall be a maximum of six (6) characters and abbreviations shall be fully described in the Project Schedule. Include an activity code field Schedule of Values (SOV) for the coding of each schedule activity; this is for the tabulation and summarization of contractor assigned cost-loading Schedule of Values for application of Progress Payment Request reporting. The Contractor's self-performed work shall be clearly identifiable.

1.9 BASELINE SCHEDULE

- A. Upon approval of the Preliminary Schedule (scope and logic), the contractor shall cost load and resource load the schedule and submit it as the proposed Baseline Schedule.
- B. The Baseline Project Schedule shall be submitted within seven (7) calendar days of the approval of the Preliminary Schedule.
- C. Except for certain procurement activities (not including fabrication or delivery), each Activity representing a portion of the work shall be cost and manpower loaded, unless otherwise approved by the Owner.
 1. All activities shown in the Project Schedule shall be cost-loaded. The assigned dollar value (cost-loading) shall cumulatively equal the total Contract price. Mobilization costs, bond and insurance costs, general requirements, overhead and profit, etc., shall be individual activities. Activity costs shall be stated in at least the same level of detail as and shall correlate to the total contract price. To the extent that the Contractor anticipates requesting payments for stored materials, delivery activities shall be cost-loaded to reflect the cost of materials (excluding labor for installation) and shown separate from the related fabrication activity. Payment for stored materials is at the sole discretion of the Owner.
 2. All field installation activities shown in the Project Schedule shall be resource loaded to depict the Contractor's planned use of labor.

1.10 BASELINE SCHEDULE REVIEW PROCESS AND SUBMITTAL REQUIREMENTS

- A. The Owner will review the Baseline Schedule and provide comments to the Contractor within 14 calendar days of receipt of submittal and, if needed, will arrange for a Baseline Schedule Review Meeting with the Contractor for discussion of the schedule. The Baseline Schedule, when approved, shall become the basis for the next monthly Schedule Update and Schedule Revision submitted by the Contractor.

1. In the event that the Owner provides comments or the Baseline Schedule does NOT meet the requirements of this specification, the contractor shall, within seven (7) calendar days, revise the Project Schedule to bring it into compliance with these requirements, and Contractor shall make a full Baseline Schedule submission for owner's review and approval.
 2. Upon approval of the Baseline Schedule by the owner, the cost-loaded values shown in the Baseline Schedule and progress of activities will be used as a basis for determining progress payments. Monthly progress payments shall be based upon information developed using the current monthly Schedule Update. The computer-generated cost report will be used by the Owner for verification of the Application for Payment submitted by the Contractor.
 3. Owner approval of the Baseline Project Schedule does not relieve the Contractor of responsibility whatsoever for the accuracy or feasibility of the Project Schedule, or of the Contractor's ability to meet the Substantial Completion Date. Such acceptance does not create a warranty, expressed or implied, or acknowledge or admit the reasonableness of the activities, logic, phasing, durations, manpower, cost or equipment loading of the Contractor's Project Schedule.
 4. If the Contractor fails to submit the Baseline Schedule in a timely manner, the owner shall withhold approval of progress payments until the Contractor submits the required Project Schedule. Additionally, the owner shall withhold fifty percent (50%) of the Contractor's mobilization cost until the Baseline Schedule is approved.
 5. Payment for delivered materials will not be made unless deliveries are depicted on the Baseline Schedule.
- B. The Baseline Schedule submission shall be comprised of the following, unless otherwise requested by owner:
1. An electronic copy of the entire Project Schedule shall be uploaded into Procore and an electronic copy in native format (that is, the format of the scheduling software) The electronic copy shall be in a compressed format. The electronic filename shall have a unique identifier. The file naming structure shall be concise and accurately describe the file. Hard copy prints, and reports shall be generated from the same version of the Project Schedule that is provided in electronic form.
 2. Cost- and Resource-Loading of Baseline Schedule: Assign cost to construction activities on the Baseline schedule. Do not assign costs to submittal activities. Obtain Owner'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, sustainable design documentation, and demonstration and training (if applicable), in the amount of 5 percent of the Contract Sum.
 - a. Each activity cost shall reflect an appropriate value subject to approval by Owner.
 - b. Each activity cost shall not exceed \$100,000.
 - c. Total cost assigned to activities shall equal the total Contract Sum.
 3. The Contractor shall prepare and submit cost loading graphic charts (i.e., S-Curve and monthly histogram), and it shall be computer generated from the Contractor's schedule data. The graphic shall show actual and forecasted monthly cash flow in a histogram format, and the actual and forecasted cost over the planned project execution period shown on a cumulative cost curve using actual dates, early dates, and late dates.
 4. The Contractor shall prepare and submit a manpower histogram depicting the monthly (or weekly if requested by the Owner) actual and forecasted manpower usage (in a histogram format) and the actual and forecasted cumulative manpower for the project execution period. The manpower-loading shall indicate the total number of workers, not total number

- of crews. The manpower charts shall be computer generated from the Contractor's schedule data.
5. The Contractor shall submit a Schedule Calculation Summary Report which includes listings of constraints, open-ends, out-of-sequence work, and scheduling statistics. This report is computer-generated when the Project Schedule is calculated.
 6. A narrative providing additional clarification/explanation of items such that Owner is informed of the approach used to plan and sequence the work, coordinate with other separate contractors to the extent applicable, and resource and cost load the Project Schedule.

1.11 SCHEDULE UPDATES

- A. The Project Schedule shall be updated on a monthly basis throughout the entire Project period of performance until project completion is achieved. Schedule updates shall be submitted by the 5th of each month following the update period along with the Applications for Payment. Schedules that are not accepted may result in rejection of a payment application.
- B. The monthly Progress reports shall be submitted in the format described herein and shall include at a minimum:
 1. For activities started and/or completed during the previous period: actual start and actual completion dates, number of working days;
 2. For activities begun but not yet completed: the actual start date, physical percentage complete to date, the remaining duration of the work, and the estimated completion date;
 3. For activities not yet started: estimated start dates, revised duration, and estimated completion dates, as necessary; if estimated start dates for activities vary from current schedule, explain variance and effects;
 4. For authorized Contract changes: revised activities, and durations where required;
 5. The monthly submittal to the Owner shall include the Contractor's Schedule Narrative Report in detail, and shall follow the outline below:
 - a. Contractor's transmittal letter
 - b. Description of problem areas
 - c. Current and anticipated Contractor caused delays
 - 1) Cause of delay
 - 2) Corrective action and schedule adjustments to correct the delay so as to maintain affected original milestone completion dates.
 - 3) Impact of the delay on other activities, on milestones, and on completion dates.
 - d. Current and anticipated non-Contractor caused delays:
 - 1) Cause of delay
 - 2) Proposed plan of corrective action and schedule adjustments necessary to correct the delay and maintain affected milestone completion dates, to include anticipated costs and time for which the Contractor considers the Owner liable.
 - e. Longest Path
 - 1) Discussion of the longest path in the previous schedule at the beginning of the period.
 - 2) Discussion of progress achieved on the longest path.
 - 3) General description of the work on the forecasted longest path for the remainder of the project.

- 4) Discussion of changes to the longest path since the prior month's approved schedule.
- f. Logic, lag, duration or constraint changes
 - 1) Changes to relationship logic, lags, durations or constraints are not allowed unless specifically approved on a case-by-case basis by Owner. Proposed changes must be listed in tabular format with justifications.
 - 2) Added or deleted activities.
 - 3) Added or deleted activities are not allowed unless specifically approved on a case-by-case basis by Owner. Proposed changes must be listed in tabular format with justifications.
- g. Approved changes in construction sequence.
- h. Pending items and status thereof:
 - 1) Permits.
 - 2) Potential Revisions.
 - 3) Change Orders.
 - 4) Time extensions.
 - 5) Other
- i. Contract completion date(s) status:
 - 1) Ahead of schedule, and number of calendar days.
 - 2) Behind schedule, and number of working days.
 - 3) Revised Reports.
 - 4) Revised cost loading and cash flow information
- 6. No revisions or additions to the monthly Schedule Updates shall be made other than those reflecting the Owner's prior written approval (i.e., change orders, potential revisions, stop work orders, etc.);
- 7. The Contractor agrees that, whenever it becomes apparent from the monthly schedule update that any Contract completion date will not be met, at No Fault of the Owner, the Contractor will take any or all of the following actions with prior approval of the Owner and at no additional cost to the Owner:
 - a. Re-sequencing construction activities
 - b. Providing additional labor
 - c. Working additional shifts or otherwise accelerating the work to maintain the Contract stipulated completion dates
- 8. Whenever it becomes apparent from the current monthly schedule update that any milestone date(s) and/or contract completion dates will not be met due to the Contractor's slow progress on critical activities, items a, b and c above shall be incorporated in the Project Schedule all in accordance with section titled "Recovery Schedule". The revised schedule shall be submitted to the Owner for review and acceptance.
- 9. A schedule, which has not been accepted in accordance with all requirements set forth in the Contract, may not be used by the Contractor as a basis for requesting equitable adjustments or partial progress payments.

1.12 DELAYS AND TIME EXTENSIONS

- A. The Owner is not bound by any Project Schedule until approved in writing by the Owner. In the event the Contractor proceeds with a schedule that is not approved by the Owner, and in the event of a delay claim, the Contractor shall have the burden of proving that the schedule used is reasonable, and based on its actions, throughout the project, the schedule would have been met.

- B. Whenever delays are experienced, the Contractor shall submit a written Time Impact Analysis to the Owner, illustrating the influence of each delay on the current Project Schedule completion date. Submit a time impact analysis for approval by the Owner based on industry standard AACE 52R-06. Utilize a copy of the last approved schedule prior to the first day of the impact or delay for the time impact analysis. If the Owner determines the time frame between the last approved schedule and the first day of impact is too great, prepare an interim updated schedule to perform the time impact analysis.
- C. Each Time Impact Analysis shall include a fragment network analysis (fragnet), demonstrating how the Contractor proposes to incorporate the delay into the Project Schedule. Additionally, the analysis shall demonstrate the time impact based on the date that the delay began, the status of construction at that point in time, and the event time computation of all affected activities. The event items used in the analysis shall be those included in the latest updated copy of the detailed progress schedule or as adjusted by mutual agreement. Contract time extensions will be granted only to the extent that time adjustments for the activity or activities affected exceed the total or remaining float along the path of activities.
- D. Each Time Impact Analysis shall be submitted within fourteen (14) calendar days after a delay occurs or is recognized. In cases in which the Contractor does not submit a Time Impact Analysis for delay within the specified period of time, then it is mutually agreed that that particular delay has no time impact on the Contract completion date and the Project's longest path and no time extension will be granted. Approval or rejection of each Time Impact Analysis by the Owner shall be made within 14 calendar days after receipt of each Time Impact Analysis, unless subsequent meetings and negotiations are necessary. Upon mutual agreement by both parties, fragnets illustrating the influence of Change Order and delays will be incorporated into the Project Schedule during the first update after agreement is reached.
- E. Adjustments to Contract Time for Concurrent Delay:
 - 1. The Contractor may make a claim for an extension of the Contract Time, subject to the following:
 - a. If an Excusable Delay and Compensable Delay occur concurrently, the maximum extension of the Contract Time shall be the number of days from the commencement of the first delay to the cessation of the delay which ends last.
 - b. If an Inexcusable Delay occurs concurrently with either an Excusable Delay and/or a Compensable Delay, the extension of the Contract Time shall be the number of days, if any, for which the Excusable Delay or the Compensable Delay was concurrent with the Inexcusable Delay.
- F. Delays due to Severe Weather
 - 1. Definitions:
 - a. "Adverse weather" - atmospheric conditions at a definite time and place that are unfavorable to construction activities.
 - b. "Unusually severe weather" - weather that is more severe than the adverse weather anticipated for the season or location involved.
 - 2. This provision specifies the procedure for determination of time extensions for unusually severe weather in accordance with the contract. In order for the Owner to award a time extension for unusually severe weather, the following conditions must be satisfied:
 - a. The weather experienced at the project site during the contract period must be found to be unusually severe, that is, more severe than the adverse weather anticipated for the project location as defined by NOAA historical data five-year averages.

- b. The unusually severe weather must cause a delay to the completion of the project. Project delay shall be demonstrated by a Time Impact Analysis.
- c. The delay must be beyond the control and without the fault or negligence of the contractor.

1.13 SCHEDULE SOFTWARE SETTINGS AND RESTRICTIONS

- A. Activity Constraints: Date/time constraint(s), other than those required by the contract, are not allowed unless accepted by the Owner
- B. Default Progress Data Disallowed: Actual Start and Actual Finish dates on the CPM schedule must match the dates on the Contractor Daily Reports.
- C. Software Settings: Handle schedule calculations and Out-of-Sequence progress (if applicable) through Retained Logic, not Progress Override. Show all activity durations and float values in days. Show activity progress using Remaining Duration. Set default activity type to "Task Dependent".
- D. At a minimum, include the following settings and parameters in Baseline Schedule preparation:
 - 1. General: Define or establish Calendars and Activity Codes at the "Project" level, not the "Global" level.
 - 2. Project Level, Dates Tab: Set "Must Finish By" date to "Contract Completion Date".
 - 3. Project Level, Defaults Tab:
 - a. Duration Type: Set to "Fixed Duration & Units".
 - b. Percent Complete Type: Set to "Physical".
 - c. Activity Type: Set to "Task Dependent".
 - 4. Project Level, Calculations Tab: Reset Remaining Duration and Units to Original: Must be Checked.
 - 5. Project Level, Settings Tab: Define Critical Activities: Check Longest Path.
 - 6. Activity Duration Types must be set to "Fixed Duration & Units".
 - 7. Percent Complete Types must be set to "Physical".
 - 8. Set Schedule Option for defining progressed activities to "Retained Logic."
 - 9. Activity Names must have the most defining and detailed description within the first 30 characters. All Activity Names must be unique.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013200

SECTION 013233 - PHOTOGRAPHIC DOCUMENTATION

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, other Division 01 Specification Sections, and provisions of Request for Proposal (RFP) apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Preconstruction photographs.
 - 2. Periodic construction photographs.
 - 3. Final completion construction photographs.
- B. Related Requirements:
 - 1. Section 017700 "Closeout Procedures" for submitting photographic documentation as Project Record Documents at Project closeout.
 - 2. Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.
 - 3. Section 024119 "Selective Demolition" for photographic documentation before selective demolition operations commence.

1.3 INFORMATIONAL SUBMITTALS

- A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph and video recording. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.
- B. Digital Photographs: Submit image files within three days of taking photographs.
 - 1. Submit photos to Procore or as directed by Owner. Include copy of key plan indicating each photograph's location and direction.
 - 2. Identification: Provide the following information with each image description in file metadata tag and in web-based project software site:
 - a. Name of Project.
 - b. Name and contact information for photographer.
 - c. Name of Contractor.
 - d. Date photograph was taken.
 - e. Description of location, vantage point, direction and elevation of construction.
 - f. Unique sequential identifier keyed to accompanying key plan.

1.4 QUALITY ASSURANCE

- A. Photographer Qualifications: When professional photographs are required for the project, the Contractor shall retain an individual who has been regularly engaged as a professional photographer of construction projects for not less than three years.

1.5 FORMATS AND MEDIA

- A. Digital Photographs: Provide color images in JPG format, produced by a digital camera with minimum sensor size of 12 megapixels, and at an image resolution of not less than 3200 by 2400 pixels, and with vibration-reduction technology. Use flash in low light levels or backlit conditions.
- B. Digital Images: Submit digital media as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
- C. Metadata: Record accurate date and time and GPS location data from camera.
- D. File Names: Name media files with date Project area and sequential numbering suffix.

1.6 CONSTRUCTION PHOTOGRAPHS

- A. Photographer: Engage a qualified photographer to take construction photographs as required by the RFP
- B. Usage Rights: Obtain and transfer copyright usage rights from photographer to Owner for unlimited reproduction of photographic documentation.
- C. General: Take photographs with maximum depth of field and in focus.
 - 1. Maintain key plan with each set of construction photographs that identifies each photographic location.
- D. Preconstruction Photographs: Before commencement of excavation, commencement of demolition, or starting construction, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Construction Manager.
 - 1. Flag excavation areas and construction limits before taking construction photographs.
 - 2. Take a minimum of 20 photographs to show existing conditions adjacent to property before starting the Work.
 - 3. Take a minimum of 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, depending on project requirements, weekly 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. Final Completion Construction Photographs: Take 50 photographs, depending on project size and requirements, after date of Substantial Completion for submission as Project Record Documents. Owner will inform photographer of desired vantage points.
- G. Additional Photographs: Owner may request professional photographs in addition to periodic photographs specified. Additional photographs will be paid for by Change Order and are not included in the Contract Sum or in the allowance for construction photographs.
 - 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. Extra record photographs at time of final acceptance.
 - e. Owner's request for special publicity photographs.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013233

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 – GENERAL

1.1 SUMMARY

A. Section includes:

1. Submittal schedule requirements.
2. Administrative and procedural requirements for submittals.

1.2 DEFINITIONS

- A. Contractor: Refers to an entity in direct Contract with the Owner to furnish and/or perform any portion of the Work of the Contract, including but not limited to a Construction Manager. Contractor shall review and approve product submittals.
1. Contractor shall review and approve Product Submittals prior to forwarding them to the Architect.
- B. Product Submittals: In general, Product Submittals show characteristics of the proposed construction in one of the following forms:
1. Shop Drawings: Drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.
 2. Product Data: Illustrations, standard schedules, performance charts, color charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.
 - a. Product Data does not include Material Safety Data Sheets. Do not submit MSDS. They will be returned without review.
 3. Samples: Physical examples that illustrate materials, equipment, or workmanship and establish standards by which the Work will be judged
- C. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- D. Informational Submittals: Written and graphic information and physical samples that do not require Architect'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."
- E. Closeout Submittals: Written and graphic information that do not require Architect's responsive action. Closeout submittals are those submittals indicated in individual Specification Sections as "closeout submittals."
- F. 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.

- G. Submittal Review Stamp: The review stamp used by the Contractor as evidence that submittal has been reviewed for compliance with Contract Documents.
- H. Submittal Review Sheet: The document provided by the Architect to the Contractor for inclusion with all submittals.

1.3 ACTION SUBMITTALS

- A. Submittal Compliance Form: Allowed in lieu of some product data and sample submittals. See individual specification sections for specific allowable use. By submitting the form, the Contractor certifies that all products specified in the Section are being submitted exactly as indicated, including all options and features indicated, with no substitutions or comparable products. Where a Basis-of-Design manufacturer/product is indicated, along with a list of other manufacturers, the Contractor certifies that only the Basis-of-Design manufacturer/product will be provided and not any other listed manufacturers/products. Where a single manufacturer/product is indicated, even if specified as "available manufacturer" or manufacturer "included but not limited to the following", Contractor certifies that only the indicated single manufacturer/product will be provided.
 - 1. Fill in the information required for Document 013330 "Submittal Compliance Form" and include as a line item on the Submittal Cover Sheet for each applicable Submittal. An editable version of this form is available from the Architect.
 - 2. Upon receipt, the Architect will complete the form in the space below "Architect Action" and indicate the Action on the Submittal Cover Sheet.
 - 3. Procedures and processing time are the same as indicated in this Section.
- B. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include 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 Architect and additional time for handling and reviewing submittals required by those corrections. Note that submittal schedule is a separate document required in addition to the construction schedule.
 - 1. Submit all required types of submittals for each product together. For example: Shop Drawings will not be reviewed when related Samples, Product Data, and test reports have not been submitted.
 - 2. Coordinate submittal schedule with list of subcontractors, the schedule of values, and Contractor's construction schedule.
 - 3. Initial Submittal Schedule: Submit initial Submittals Schedule not more than 7 days after receipt of reviewed Proposed Products List, or concurrently with start-up 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.
 - a. See Section 012500 "Substitution Procedures" for Proposed Products List requirements.
 - 4. Final Submittal Schedule: Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a. Submit revised submittal schedule as required to reflect changes in current status and timing for submittals.
 - b. Categorize submittal items by type, and designate the respective types by type code. Refer to code definitions below.

Type	Code Explanation
SD	Shop Drawings
PD	Product Data
S	Sample
DC	Design Calculations
L	Letter
SoC	Statement of Compliance
Cer	Certificate/Certification
Q	Qualifications Statement (such as for Contractor, fabricator, or erector) SC
	Sample Construction (such as mock-up or sample installation)
InI	Installation Instructions
AT	Acceptance Test
OpI	Operating Instructions
MaI	Maintenance Instructions
MAA	Maintenance Agreement
MaM	Maintenance Materials
Rcp	Receipt (such as for keys, tools, and detachable parts, including delivery tickets)
RD	Record Documents
SW	Special Warranty
TR	Test Report

5. Third Party Software:
 - a. If third party software (i.e. Procore, e-Builder, etc.) is being utilized to distribute and track submittal responses, revise the third party software review codes to match the Architect's review codes.
 - b. If third party software review codes cannot be modified, then the Architect's review codes, as indicated on the Architect's Submittal Review Sheet, shall take precedence.
 - c. If a submittal is returned using third party software and the selected review code assigned to the submittal in the software response differs from the Architect's review codes, in all cases the codes indicated on the Architect's Submittal Review Sheet shall take precedence.
6. "Latest possible date" means the date of receipt by Architect. This date allows for review and return to Contractor in time to meet the construction schedule.

1.4 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Requirements specified for submittals are intended to provide efficient handling, while permitting review responsibilities to be carried out.
- B. Architect will accept submittals only from the Contractor. Only items specified to be submitted will be accepted.
- C. Bind submittals in a manner suitable for 8-1/2 by 11-inch file folder storage, except where doing so is not workable.
- D. Transmit submittals with all transportation charges prepaid.
- E. Avoidable Resubmittals: The first two reviews of each specified submittal will be processed without

cost to the Contractor. After the second review, the Owner may charge the Contractor for the cost of such additional processing, unless the processing results from approved Change Orders causing revisions to previously approved submittals.

- F. MSDS: Do not submit Material Safety Data Sheets. If MSDS are required by the Contract Documents, request clarification of instructions from the Architect.
- G. Architect's Digital Data Files:
1. With the Owner's concurrence, Architect's digital data files used to create the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals, subject to the Architect's electronic file transfer agreement. The Contractor shall expect, and shall so agree, to execute and deliver the Architect's agreement before the transfer of such Instruments of Service.
 2. The Contractor shall expect, and shall so agree, to pay fees to the Architect related to the transfer of Instruments of Service. Fees shall be paid before transfer. The payment of fees to the Architect reflects administrative costs only and are not, in any way, to indicate a "sale" of goods under the Uniform Commercial Code.
 3. Request the Architect's electronic file transfer agreement form. Submit the request for file transfer directly to the Architect. Include the executed agreement, check made payable to SmithGroup, Inc., and a list of documents requested, as identified in the Contract Documents.
 4. The files will not be identical to the Contract Drawings. Prior to requesting files, discuss with the Architect how the files will differ from the Contract Documents, and related limitations, such as which Drawings will not be represented, the file format, what information will be included, and method of transmittal.
 5. The Architect's fee for providing electronic files to the Contractor is as follows:

1 to 10 drawings:	\$250 set-up charge plus \$25 per drawing
11 to 100 drawings:	\$500 set-up charge plus \$5 per drawing
101 to 500 drawings:	\$1,000 set-up charge plus \$2 per drawing
- H. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Submit all submittal items required for each Specification Section 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. the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
 5. Provide coordination between disciplines/trades in action submittals and informational submittals to ensure compatibility and constructability of the Work.
- I. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on receipt of submittal. 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.

1. Initial Review: Allow 10 business days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required.
 2. When a large volume of submittal materials is scheduled, additional review time may be required. Similarly, a particular submittal may require review completion in less than the agreed normal time. Due to variations in submittal volume and processing needs, agreed review time is not intended to apply to extreme conditions.
 3. Resubmittal Review: Allow 10 business days for review of each resubmittal.
 4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 15 business days for initial review of each submittal.
- J. Maintain at the Project Site ready access to the latest reviewed Shop Drawings and Product Data, and one set of samples.

1.5 SUBMITTAL PROCEDURES

- A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections. Before preparing the initial submittal of each type, request the Architect's direction regarding the Contractor's Transmittal format. All submittals, except for samples, shall be submitted as PDF electronic files unless indicated otherwise.
1. Post electronic submittals as PDF electronic files directly to specifically established for Project.
 - a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
 2. Submit electronic submittals via email, or as directed by Architect as PDF electronic files.
 - a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
 3. Action Submittals: Submit electronic PDF files of each submittal unless otherwise indicated. Architect will return electronic PDF copies.
 4. Informational Submittals: Submit electronic PDF files of each submittal unless otherwise indicated. Architect will return a received receipt without further review.
 5. 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.
 - b. Provide a notarized statement on original paper copy certificates and certifications where indicated.

1.6 PREPARING SUBMITTALS

- A. Title Block for Product Submittals
1. Shop Drawings, the cover sheets for Product Data, and the labels for Samples shall each have an identifying title block containing:
 - a. Project title.
 - b. Architect's name, Project Number, and Contract Package title.
 - c. Brief description of each submittal item matching the itemized descriptions on the Contractor's Submittal Transmittal.
 - d. Contractor's name and project or contract number.
 - e. Name and phone number of manufacturer, supplier, subcontractor, or other such

organization furnishing the submittal to the Contractor.

- B. **Product Data:** Collect information into a single submittal per specification section 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.
 - a. Mark where selections are to be made.
 - b. Tailor large catalogs so that excessive unrelated products are not included.
 3. To highlight and mark-up Product Data information, use bold markings that will be easily seen on electronic file format. Do not use a highlighter, pencil, or color.
 4. Clearly convey the differences between similar products included in the submittal.
 - a. Highlight information that differs for different sizes or grades.
 5. Correlate Product Data with Contract Documents:
 - a. Where the Contract Documents include designations such as types or marks, mark Product Data with these itemized designations and include them on the Submittal Transmittal. For example: glass types; fixture item numbers.
 - b. Clearly highlight information on Product Data that shows compliance with specified requirements. For example: manufacturer only (not supplier, distributor, etc.); model number; rating; performance characteristics.
 6. If multiple manufacturers or products are being submitted for similar items, include manufacturer or product name in separate line item descriptions on the Contractor's Submittal Transmittal. Do not use distributor or other supplier names other than manufacturer.
 7. Dimensioning on Product Data shall be the same system of measure (inch-pound vs. metric) as on the Contract Drawings. If preprinted catalogs display only the system not used in the Contract Drawings, mark-up the Product Data with the other system's dimensions.
 8. Submit Product Data before or concurrent with Samples.
- 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.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer if specified.
 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings PDFs formatted such that when printed will fit on sheets at least 8-1/2 by 11 inches, but no larger than 30 by 42 inches.
 3. Each sheet of the same item or system shall be uniform in size and numbered consecutively.
 4. Each sheet shall contain the title block specified below plus an unobstructed space at the right side or bottom, of size not less than 6 by 8 inches for submittal review stamps and notations.
 5. Dimensions on Shop Drawings shall be the same system of measure (i.e., inch-pound or metric) as on the Contract Drawings.
 6. BIM Incorporation: Shop Drawings into BIM established for Project.
- D. **Samples:** Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Submit submittal transmittal electronically as directed above. Electronic copy shall contain digital images of samples with identifying labels clearly visible.
 2. Submit samples with identifying labels firmly attached.
 - a. Labels shall be of a size to contain the Title Block plus unobstructed space for Submittal Review Stamp(s) and notations.
 - b. Each sample shall display, as a minimum, the Architect's project number, and the submittal and item numbers. Where Sample size does not permit the full title block without obstructing information, provide a separate sheet of paper, 8-1/2 by 11-inch, securely attached to each sample (or sample set), with the information above included.
 3. Recording of Sample Installation: Note and preserve the on-site indicators of each area constituting a sample installation, but remove indicators at final clean-up of Project. Use normal submittal form and process to provide record of sample.
 4. When color, texture, or pattern is specified by naming a particular manufacturer and style, include one sample of the specified product for comparison if another product is submitted.
 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.
 - a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect 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: Unless indicated otherwise in individual specification sections, provide three sets of Samples. One to the Architect who will retain it for their records; one to the Owner and one shall be retained at the jobsite.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- E. 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.

- F. 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.
- G. Certificates:
1. Certificates and Certifications Submittals: Submit 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. Provide a notarized signature where indicated.
 2. 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.
 3. 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.
 4. 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.
 5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
 6. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- H. Test and Research 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. 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 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.
 6. 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.

- I. Design 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.
- J. Subcontractor 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. 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.

1.7 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 up with review comments before submitting to Architect .
- B. The Contractor shall be responsible for quantities, weights, and dimensions to be confirmed and correlated at the site; for information that pertains solely to the fabrication processes and to the means, methods, techniques, sequences, and procedures of construction; and for coordination of the work of all trades.
- C. The Contractor shall be responsible for the submittal to be in conformance with information given and the design concept expressed in the Contract Documents.
- D. The Contractor with each submission shall provide specific written notice of any variation from the requirements of the Contract Documents by causing a specific notation to be made on the Submittal attachments or the Submittal-Transmittal.
- E. The Contractor shall affix its own Submittal Review Stamp to all submittals. Architect will not review submittals that do not include a completed Contractor's Submittal Review stamp.

1.8 ARCHITECT'S AND GENERAL CONTRACTOR'S ACTION

- A. General: Architect will not review submittals that do not include the Submittal Review Sheet.
- B. Action Submittals: Architect's staff and consultants will review the submittal, and mark the Submittal Review Sheet with an action code. The code meanings are described below.
- C. Additional codes may be provided within comments or as an electronic submittal review stamp and shall be used in help indicating return of partial submittals.
- D. The Final Review Code on the Submittal Review Sheet prevails and governs the action of the overall submittal.

- E. Review Code meanings are as follows:
1. Action Codes Permitting Use:
 - a. When an action code permitting use is assigned to a submittal, it does not authorize work that does not comply with the requirements of the Contract Documents. Acceptance of the Work will depend on compliance.
 - b. Code AP - Approved: The Work covered by the submittal item may proceed, provided it complies with Contract Document requirements.
 - c. Code AN - Approved as Noted: The Work covered by the submittal item may proceed, provided it complies with the Architect's notations and Contract Document requirements.
 - d. Code AN-R - Approved as Noted - Resubmit: Do not deliver or install the related work until the resubmittal has received Code AP or AN. However, fabrication and other off-site work covered by the submittal item may proceed, at the Contractor's risk, provided it complies with the Architect's notations and Contract Document requirements.
 2. Action Code Prohibiting Use:
 - a. Action Code REJ - Not Approved: The Work covered by the submittal item, including purchasing, fabrication, delivery, and other activity, shall not proceed. Revise the submittal item or prepare a new item in accordance with the Architect's notations. Resubmit the corrected or new item without delay; do not permit submittal items marked "Not Approved" to be used. Work incorporating such items will be rejected.
 3. Action Code for Items Not Required:
 - a. Action Code X - Not Requested by Contract Documents: The submittal item is not called for by the Contract Documents and is being returned unreviewed by the Architect except to the extent necessary to determine its status.
- F. Informational Submittals: For Architect's information only. Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
1. Action Code for Information Only:
 - a. Action Code INF - Information Only - Received: The submittal item is not called for a return with a reviewed action code by the Contract Documents and is being returned unreviewed by the Architect except to the extent necessary to determine its status.
- G. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
- H. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned without review.
- I. Architect will submittals received from sources other than the Contractor.
- J. Submittals not required by the Contract Documents may be returned by the Architect without action.

1.9 SUBMITTAL TRANSMITTAL REQUIREMENTS

- A. General: The Contractor's Submittal Transmittal shall be a PDF electronic file. It is recommended, to expedite the submittal review, the electronic form be emailed for review to the Architect as early as possible.
1. Submittal Numbering: See below.
 2. Contact Information: Full Name, Phone Number and Email Address.

B. Submittal Definition:

1. Each submittal consists of items from only ONE specifications section.
2. Complete Submittal: If ALL the items required by the specifications section are listed on one Submittal Form (including continuation sheet), it is a complete submittal.
3. Partial Submittals: If it is necessary to divide the required items of a given specifications section into two or more submittals to meet schedule or handling requirements, the separate submittals are partial submittals. All partial submittals have the same submittal number, and are differentiated by sequential P-numbers (see below).
4. All items in each submittal, whether complete or partial, will be processed together: Individual items will not be 'broken out' for special handling. Arrange submittals accordingly.

C. Submittal Numbering:

1. Number submittals as described below to assist tracking.
2. Number each submittal in the format nnnnnn-nn.
 - a. The 6-digit number is the number of the section that requires the submittal. For example, 044200.
 - b. The 2-digit number is based on the numerical sequence of submittals from that section. In other words, for each section, the first submittal is 01, the second is 02, and so on. The 2-digit number does not change for partial or re-submittals, so that the submittal can be tracked.
 - c. P-Number for Partial Submittals: Number each partial submittal in the P space, beginning with P1, and increasing by one for each partial submittal of that submittal. If the submittal is a complete submittal, leave the P space blank.
 - d. R-Number for Re-submittals: Number each re-submittal in the arr space, beginning with R1, and increasing by one for each re-submittal of that submittal. Do not include an R-Number for the initial submittal.
 - e. Examples:
 - 1) Initial Complete Submittal: 044200-01. First Re-Submittal: 044200-01-R1.
 - 2) Initial Partial Submittal: 044200-01-P1. Second Partial Submittal: 0044200-01-P2. First Re-submittal of Second Partial Submittal: 044200-R1-P2.

D. Item Kind: Identify each submittal item using the code explanation specified for submittal schedule entries.**E. Shop Drawings: Include a description of each drawing, matching the description on the drawing itself.****F. Description: Provide a brief, clear generic description of each line item, using the Drawings or Specifications as a guide. If more than one manufacturer's model numbers are included in the submittal package, indicate the model numbers in parentheses in the affected line items. Do not list distributors or suppliers other than the manufacturer.****G. Resubmittals: In addition to providing the R-number, enter the information using the same line item number as the original submittal package. Doing so will avoid delay in handling the resubmittal package. Resubmit only those items that previously received Code No. AN-R or REJ.****1.10 SUBMITTAL REVIEW SHEET REQUIREMENTS****A. General: The Contractor shall obtain the Submittal Review Sheet from the Architect's Project Manager.**

- B. The Submittal Review Sheet obtained shall be in PDF format, and shall be submitted as the page after the Submittal Transmittal.
- C. When attached, the Submittal Review Sheet shall not obscure information contained in the submittal.
- D. The Contractor shall not edit any of the information contained within the Submittal Review Sheet except as follows:
 - 1. Submittal Number: See Submittal Numbering in Submittal Transmittal Requirements paragraph.
- E. The Contractor shall submit the PDF file in a manner that will allow editing of the Submittal Review Sheet fields by Architect and its consultants.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 ATTACHMENTS

- A. Sample Submittal Review Sheet

END OF SECTION

PROJECT

PROJECT NO.

SUBMITTAL NO.

DESCRIPTION

DATE RECEIVED

DATE RETURNED

Review is only for the limited purpose of checking for general conformance with information given and the design concept expressed in the Contract Documents. Refer to attached for additional SmithGroup comments and/or review codes. The final review code prevails.

SMITHGROUP ACTION		
DISCIPLINE	REVIEWED BY	REVIEW CODE
FINAL REVIEW CODE:		

GENERAL REVIEW COMMENTS:

SECTION 013573 - DELEGATED DESIGN REQUIREMENTS AND PROCEDURES

PART 1 -GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes procedures for portions of Work under this Contract that include delegated design requirements and procedures.
- B. Related Requirements:
 - 1. Section 013100 "Project Management and Coordination" for project management and coordination with delegated design requirements.
 - 2. Section 013300 "Submittal Procedures" for quality control of submittal procedure and coordination with delegated design requirements.
 - 3. Section 014000 "Quality Requirements" for quality assurance requirements with delegated design requirements.

1.3 DEFINITIONS

- A. Delegated Design: A portion or component of the Work identified by the Contract Documents to be provided by the Contractor, to satisfy performance and design criteria specified in the Contract Documents for that portion or component.
- B. Registered Design Professional: Provide a Design Professional responsible for the Delegated Design, who shall certify that the work is in compliance with the specified performance requirements and design criteria. Design professional shall be legally qualified to practice in jurisdiction where Project is located and shall be experienced in providing delegated design services of the kind indicated.
- C. AHJ: Authority having jurisdiction.
- D. Technical Sections: Specification sections included in Divisions 02 through 35 of the Project Manual.

1.4 SUBMITTAL PROCEDURES

- A. Performance and Design Criteria: Where Delegated Design is specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If specific performance and design criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Construction Manager.
 - 2. Architect's review of Delegated Design submittal shall be limited to verifying conformance with performance and design criteria only.
- B. Delegated-Design Submittal: Include Shop Drawings, Product Data, and other required submittals indicated in individual technical sections. Submit digitally signed PDF electronic file of certificate, 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.
 - 1. In addition to other submittal requirements specified in other technical sections, at minimum, include the following in delegated design submittal:
 - a. Statement of design and performance criteria identified by the Contract Documents.
 - b. Assumptions.
 - c. Details, calculations, etc. related to the performance criteria.
 - d. Reactions to structure (where applicable).
 - e. Instructions for fabrication, assembly, installation, and interface with other trades.
 - 2. 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.
- C. BIM File Incorporation: Incorporate delegated-design drawing and data files into Building Information Model established for Project.
 - 1. Prepare delegated-design drawings in the following format: Same digital data software program, version, and operating system as the original Drawings.
- D. Submittal Procedures for Delegated Design Components:
 - 1. Comply with requirements specified for other types of submittals included in this Section, including, but not limited to, form and procedures for delivering submittals.
 - a. Submit delegated design documents for approval prior to fabrication of components included in delegated design work.
 - b. Comply with AHJ requirements.
 - c. Ensure registered design professional's signed seal is affixed to documents in accordance with jurisdictional requirements.
 - d. Architect's review of delegated design submittals is for the limited purpose of checking for general conformance with information given and the design intent expressed in the Contract Documents. Architect will review submittals consistent with this limited purpose.
 - 1) Architect's review does not lessen nor shift burden or responsibility from Contractor to the Owner.
 - 2) If during submittal review any deficiencies or errors are noted, the submittal will be returned with comments. Otherwise, there will be no responsive action by Architect.
 - 2. Delegated Design Submittal Schedule: Submit list of items identified in the Contract Documents that require delegated design. For each item, include the delegated design entity and the registered design professional.

3. Preliminary Submission: If required by an individual technical section, submit preliminary documentation describing registered design professional's design prior to preparing engineering calculations and shop drawings. Additional preliminary submissions are permitted in order to avoid engineering and detailing of an unacceptable design.

1.5 RESPONSIBILITIES

A. General Contractor's Responsibilities:

1. Ensure drawings, calculations, specifications, and other documentation provided by registered design professional are complete and are sealed and signed by the registered design professional in accordance with requirements of AHJ. Owner shall be entitled to rely on the completeness and accuracy of the documentation provided by the registered design professional.
2. Coordinate and assign complete responsibility for design, documentation, calculations, and submittal of delegated design components.
3. Coordinate components requiring delegated design with adjacent or related systems whether designed by Architect or another entity. Ensure complete, operational systems that perform as intended are provided.
4. When required to be reviewed by AHJ, submit delegated design documentation in a timely manner that will not negatively impact Project's construction schedule.
5. Performance requirements and design criteria are described in each technical section requiring delegated design. Conduct thorough review of other related portions of the Contract Documents to ensure inclusion of full scope of work in delegated design preparation and submittals.
 - a. Provide products and systems complying with specific performance and design criteria indicated.
6. Comply with quality assurance requirements specified in individual technical sections containing delegated design requirements.
7. Comply with accessibility guidelines, codes, policies, and standards required by the AHJ, applicable to the project, and as indicated.
8. Schedule delegated design activities and submittals to occur in a timely manner that will not negatively impact Project's construction schedule. Owner will not be responsible to pay for delays, additional products, additional hours of work, including overtime, restocking or rework required due to failure by Contractor to coordinate delegated design work with work of other trades.

B. Registered Design Professional: Responsibilities include, but are not limited to, the following:

1. Sole responsibility to ensure delegated design accommodates all building movements, including, but not limited to deflection, rotation, creep, shrinkage, live loads, wind loads, and loads, interim and otherwise, resulting from means and methods.
2. If applicable, prepare documentation required by AHJ.
3. Prepare delegated design submittals that are sealed and signed by registered design professional.

C. Owner's Responsibilities: Owner will review and mark submittals in accordance with procedures defined in Section 013300 "Submittal Procedures"

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013573

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections and Request for Proposal (RFP), apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve the Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and quality-control services required by the Contract Documents, Owner, Commissioning Authority, Construction Manager, or authorities having jurisdiction are not limited by provisions of this Section.
 - 4. Specific test and inspection requirements are not specified in this Section.
- C. Related Requirements:
 - 1. Section 012100 "Allowances" for testing and inspection allowances.
 - 2. Section 013216 "Construction Project Schedule" for developing a schedule of required tests and inspections.
 - 3. Section 0191 13 "General Commissioning Requirements" for testing and documentation related to Commissioning activities.

1.3 DEFINITIONS

- A. Experienced: When used with an entity or individual, "experienced" unless otherwise further described 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.
- B. Field Quality-Control Tests: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

- C. 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, assembly, 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).
- D. Mockups: Full-size physical assemblies that are constructed on-site either as freestanding temporary built elements or as part of permanent construction as approved by the Owner. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and 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 establish the standard by which the Work will be judged.
 - 1. Laboratory Mockups: Full-size physical assemblies constructed and tested at testing facility to verify performance characteristics.
 - 2. Integrated Exterior Mockups: Mockups of the exterior envelope constructed on-site as freestanding temporary built elements or as part of permanent construction, consisting of multiple products, assemblies, and subassemblies.
 - 3. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes; doors; windows; millwork; casework; specialties; furnishings and equipment; and lighting.
- E. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by 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 Tests: Tests and inspections that are performed at the source; for example, plant, mill, factory, or shop.
- G. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- H. 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.
- I. 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. Contractor's quality-control services do not include contract administration activities performed by Owner or Construction Manager.

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 Owner for direction 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 Owner for a decision before proceeding.

1.5 ACTION SUBMITTALS

- A. Shop Drawings: For mockups.
 - 1. Include plans, sections, and elevations, indicating materials and size of mockup construction.
 - 2. Indicate manufacturer and model number of individual components.
 - 3. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

1.6 INFORMATIONAL SUBMITTALS

- A. Contractor's Quality Control Plan: For review of installation and means for ensuring quality of activities and responsibilities.
 - 1. Plan shall indicate specific installations that will require intense scrutiny. The Quality Plan shall outline the approach to systems requiring commissioning, and their quality assurance and control guidelines for ensuring the successful completion of those activities.
 - 2. Plan shall outline necessary pre-work and start-up meetings as detailed in Specification Section 013100 "Project Management and Coordination" and the processes and procedures specific to those activities that the Contractor will pursue to ensure quality installations.
 - 3. Additional information on the Contractor's Quality Control Plan is detailed below.
- 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 submitted to authorities having jurisdiction before starting work on the following systems:
 - 1. Seismic-force-resisting system, designated seismic system, or component listed in the Statement of Special Inspections.
 - 2. Main wind-force-resisting system or a wind-resisting component listed in the Statement of Special Inspections.
- 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.
- F. Reports: Prepare and submit certified written reports and documents as specified.
- G. Permits, Licenses, and Certificates: For Owner's record, 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

- A. Quality Control Plan, General: Submit quality control plan within 14 calendar days of Notice to Proceed, and not less than seven (7) calendar days prior to preconstruction conference. 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.
- B. Quality Control Personnel Qualifications: Engage qualified personnel trained and experienced in managing and executing quality assurance and quality control procedures similar in nature and extent to those required for Project.
- 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: 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. Distinguish source quality control tests and inspections from field quality-control 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 Owner has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with the requirements of Authorities Having Jurisdiction.

1.8 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, telephone number, and email address 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 inspection.
 - 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, telephone number, and email address 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, telephone number, and email address 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.

1.9 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. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.
- 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, applying, 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 jurisdiction where Project is located 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 of authorities having jurisdiction shall supersede requirements for specialists.
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented according to ASTM E329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
- 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 and test 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 Owner, through Construction Manager, 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.

1.10 QUALITY CONTROL

- A. Owner Responsibilities: Where quality assurance services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
 2. Payment for these services will be made from testing and inspection allowances, as authorized by Change Orders.
 3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.
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. Engage a qualified testing agency to perform quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.

3. Notify testing agencies at least 48 hours in advance of time when Work that requires testing or inspection 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 inspection 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. 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.
- D. Testing Agency Responsibilities: Cooperate with Owner, Commissioning Authority, Construction Manager, and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Owner, Commissioning Authority, Construction Manager and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the locations 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 duties of Contractor.
- E. 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 Section 013300 "Submittal Procedures."
- F. 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.
- G. Associated Contractor Services: Cooperate with agencies and representatives 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 inspection. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.

5. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 6. Security and protection for samples and for testing and inspection equipment at Project site.
- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.
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 Owner, Commissioning Authority, Construction Manager, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.11 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Contractor will engage a qualified testing agency to conduct special tests and inspections required by Authorities Having Jurisdiction (AHJ) to be the responsibility of Owner, as indicated in individual Specification Sections, and as follows:
1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
 2. Notifying Owner, Construction Manager and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 - a. These reports will be issued concurrently to the Contractor and the Contractor will pursue correction of these irregularities or deficiencies immediately and diligently to close open items. All coordination of corrections or reinspection's
 - b. shall be coordinated through the Special Inspector by the Contractor to verify correction prior to an item being closed.
 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Owner, through Construction Manager, 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.
 7. Contractor shall fully cooperate and coordinate with the Owner's Special Inspector as outlined above. This special inspector shall have no control over Contractor's means, methods, techniques, sequences, or procedures, but will report to Owner and Construction Manager all deficiencies inherent in the work, whether they be related to quality, safety, time, or money.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 ACCEPTABLE TESTING AGENCIES

- A. Contractor shall provide a list of firms to Owner for their acceptance, to perform designated tests and inspections as outlined in the contract documents. The list shall be comprehensive of all testing requirements administered by the Contractor along with reference to relevant specification sections that the tests are required by. This list shall be turned in 14 calendar days after issuance of NTP.

3.2 TEST AND INSPECTION LOG

- A. Test, Inspection, Quality Check Log: Prepare a record of tests and inspections. Include the following:
 - 1. Date the completed tests, inspections, and quality control checks were conducted.
 - 2. Description of the Work tested or inspected.
 - 3. Date test or inspection results were transmitted to Owner.
 - 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site and upload all files to PMIS. Include as an attachment to the Daily Reports. Post changes and revisions as they occur. Provide access to test and inspection log for Owner's, and Construction Manager's reference during normal working hours.
 - 1. Submit log at Project closeout as part of Project Record Documents.

3.3 REPAIR AND PROTECTION

- A. General: On completion of testing, inspection, sample taking, and similar services, repair damaged construction, 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 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 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, and provisions of Request for Proposal (RFP) apply to this Section.

1.2 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. Day(s): Unless otherwise indicated days shall mean "Calendar Days."
- C. "Approved": When used to convey Construction Manager's action on Contractor submittals, applications, and requests, "approved" is limited to Construction Manager's duties and responsibilities as stated in the Conditions of the Contract.
- D. "Directed": A command or instruction by Owner. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- E. "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."
- F. "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.
- G. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- H. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.
- I. "Provide": Furnish and install, complete and ready for the intended use.
- J. "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.
- K. "Certified": Guaranteed in writing over the signature of an authorized representative of the certifying organization.
- L. "N.I.C" or "NIC": Not in Contract.

- M. "Necessary": That which is reasonably necessary to the proper completion of the Work.
- N. "Required": Referring to requirements of the Contract Documents, unless its use clearly implies a different interpretation.
- O. "Shown" or "Indicated": Appearing on the Drawings, unless their use clearly implies a different interpretation.

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 in the following list. Abbreviations and acronyms not included in this list shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States." The information in this list is subject to change and is believed to be accurate as of the date of the Contract Documents.
 - 1. AABC - Associated Air Balance Council; .
 - 2. AAMA - American Architectural Manufacturers Association; www.aamanet.org.
 - 3. AASHTO - American Association of State Highway and Transportation Officials; www.transportation.org.
 - 4. AATCC - American Association of Textile Chemists and Colorists; www.aatcc.org.
 - 5. ABMA - American Boiler Manufacturers Association; www.abma.com.
 - 6. ACI - American Concrete Institute; (Formerly: ACI International); www.concrete.org.
 - 7. ACPA - American Concrete Pipe Association; www.concrete-pipe.org.
 - 8. AEIC - Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
 - 9. AF&PA - American Forest & Paper Association; www.afandpa.org.
 - 10. AGA - American Gas Association; www.aga.org.
 - 11. AHAM - Association of Home Appliance Manufacturers; www.aham.org.
 - 12. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
 - 13. AI - Asphalt Institute; www.asphaltinstitute.org.

14. AIA - American Institute of Architects (The); www.aia.org.
15. AISC - American Institute of Steel Construction; www.aisc.org.
16. AISI - American Iron and Steel Institute; www.steel.org.
17. AITC - American Institute of Timber Construction; www.aitc-glulam.org.
18. AMCA - Air Movement and Control Association International, Inc.; www.amca.org.
19. ANSI - American National Standards Institute; www.ansi.org.
20. APA - APA - The Engineered Wood Association; www.apawood.org.
21. APA - Architectural Precast Association; www.archprecast.org.
22. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).
23. ASCE - American Society of Civil Engineers; www.asce.org.
24. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
25. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
26. ASME - ASME International; (American Society of Mechanical Engineers); www.asme.org.
27. ASSE - American Society of Safety Engineers (The); www.asse.org.
28. ASSE - American Society of Sanitary Engineering; www.asse-plumbing.org.
29. ASTM - ASTM International; www.astm.org.
30. ATIS - Alliance for Telecommunications Industry Solutions; www.atis.org.
31. AWI - Architectural Woodwork Institute; www.awinet.org.
32. AWMAC - Architectural Woodwork Manufacturers Association of Canada; www.awmac.com.
33. AWPAA - American Wood Protection Association; www.awpa.com.
34. AWS - American Welding Society; www.aws.org.
35. AWWA - American Water Works Association; www.awwa.org.
36. BHMA - Builders Hardware Manufacturers Association; www.buildershardware.com.
37. BIA - Brick Industry Association (The); www.gobrick.com.
38. BICSI - BICSI, Inc.; www.bicsi.org.
39. BIFMA - BIFMA International; (Business and Institutional Furniture Manufacturer's Association); www.bifma.org.
40. CEA - Consumer Electronics Association; www.ce.org.
41. CFFA - Chemical Fabrics and Film Association, Inc.; www.chemicalfabricsandfilm.com.
42. CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.
43. CIMA - Cellulose Insulation Manufacturers Association; www.cellulose.org.
44. CISCA - Ceilings & Interior Systems Construction Association; www.cisca.org.
45. CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.
46. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
47. CPA - Composite Panel Association; www.pbmdf.com.
48. CRI - Carpet and Rug Institute (The); www.carpet-rug.org.
49. CRRC - Cool Roof Rating Council; www.coolroofs.org.
50. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
51. CSA - CSA Group; www.csagroup.com.
52. CSA - CSA International; www.csa-international.org.
53. CSI - Construction Specifications Institute (The); www.csinet.org.
54. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.cti.org.
55. CWC - Composite Wood Council; (See CPA).
56. DASMA - Door and Access Systems Manufacturers Association; www.dasma.com.
57. DHI - Door and Hardware Institute; www.dhi.org.
58. ECA - Electronic Components Association; (See ECIA).
59. ECAMA - Electronic Components Assemblies & Materials Association; (See ECIA).

60. ECIA - Electronic Components Industry Association; www.eciaonline.org.
61. EIA - Electronic Industries Alliance; (See TIA).
62. EIMA - EIFS Industry Members Association; www.eima.com.
63. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
64. ESD - ESD Association; (Electrostatic Discharge Association); www.esda.org.
65. ESTA - Entertainment Services and Technology Association; (See PLASA).
66. ETL - Intertek (See Intertek); www.intertek.com.
67. EVO - Efficiency Valuation Organization; www.evo-world.org.
68. FCI - Fluid Controls Institute; www.fluidcontrolsinstitute.org.
69. FIBA - Federation International de Basketball; (The International Basketball Federation); www.fiba.com.
70. FIVB - Federation International de Volleyball; (The International Volleyball Federation); www.fivb.org.
71. FM Approvals - FM Approvals LLC; www.fmglobal.com.
72. FM Global - FM Global; (Formerly: FMG - FM Global); www.fmglobal.com.
73. FSC - Forest Stewardship Council U.S.; www.fscus.org.
74. GA - Gypsum Association; www.gypsum.org.
75. GANA - Glass Association of North America; www.glasswebsite.com.
76. GS - Green Seal; www.greenseal.org.
77. HI - Hydraulic Institute; www.pumps.org.
78. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
79. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
80. HPVA - Hardwood Plywood & Veneer Association; www.hpva.org.
81. IAPSC - International Association of Professional Security Consultants; www.iapsc.org.
82. IAS - International Accreditation Service; www.iasonline.org.
83. ICBO - International Conference of Building Officials; (See ICC).
84. ICC - International Code Council; www.iccsafe.org.
85. ICEA - Insulated Cable Engineers Association, Inc.; www.icea.net.
86. ICPA - International Cast Polymer Alliance; www.icpa-hq.org.
87. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
88. IEC - International Electrotechnical Commission; www.iec.ch.
89. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
90. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
91. IESNA - Illuminating Engineering Society of North America; (See IES).
92. IEST - Institute of Environmental Sciences and Technology; www.iest.org.
93. IGMA - Insulating Glass Manufacturers Alliance; www.igmaonline.org.
94. IGSHPA - International Ground Source Heat Pump Association; www.igshpa.okstate.edu.
95. ILI - Indiana Limestone Institute of America, Inc.; www.iliai.com.
96. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
97. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
98. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
99. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
100. ISO - International Organization for Standardization; www.iso.org.
101. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
102. ITU - International Telecommunication Union; www.itu.int/home.
103. KCMA - Kitchen Cabinet Manufacturers Association; www.kcma.org.

104. LMA - Laminating Materials Association; (See CPA).
105. LPI - Lightning Protection Institute; www.lightning.org.
106. MCA - Metal Construction Association; www.metalconstruction.org.
107. MFMA - Maple Flooring Manufacturers Association, Inc.; www.maplefloor.org.
108. MFMA - Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
109. MHIA - Material Handling Industry of America; www.mhia.org.
110. MIA - Marble Institute of America; www.marble-institute.com.
111. MMPA - Moulding & Millwork Producers Association; www.wmmpa.com.
112. MPI - Master Painters Institute; www.paintinfo.com.
113. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.
114. NAAMM - National Association of Architectural Metal Manufacturers; www.naamm.org.
115. NADCA - National Air Duct Cleaners Association; www.nadca.com.
116. NAIMA - North American Insulation Manufacturers Association; www.naima.org.
117. NBGQA - National Building Granite Quarries Association, Inc.; www.nbgqa.com.
118. NBI - New Buildings Institute; www.newbuildings.org.
119. NCMA - National Concrete Masonry Association; www.ncma.org.
120. NEBB - National Environmental Balancing Bureau; www.nebb.org.
121. NECA - National Electrical Contractors Association; www.necanet.org.
122. NeLMA - Northeastern Lumber Manufacturers Association; www.nelma.org.
123. NEMA - National Electrical Manufacturers Association; www.nema.org.
124. NETA - International Electrical Testing Association; www.netaworld.org.
125. NFPA - National Fire Protection Association; www.nfpa.org.
126. NFPA - NFPA International; (See NFPA).
127. NFRC - National Fenestration Rating Council; www.nfrc.org.
128. NHLA - National Hardwood Lumber Association; www.nhla.com.
129. NLGA - National Lumber Grades Authority; www.nlga.org.
130. NOFMA - National Oak Flooring Manufacturers Association; (See NWFA).
131. NOMMA - National Ornamental & Miscellaneous Metals Association; www.nomma.org.
132. NRCA - National Roofing Contractors Association; www.nrca.net.
133. NRMCA - National Ready Mixed Concrete Association; www.nrmca.org.
134. NSF - NSF International; www.nsf.org.
135. NSPE - National Society of Professional Engineers; www.nspe.org.
136. NSSGA - National Stone, Sand & Gravel Association; www.nssga.org.
137. NTMA - National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
138. NWFA - National Wood Flooring Association; www.nwfa.org.
139. PDI - Plumbing & Drainage Institute; www.pdionline.org.
140. RCSC - Research Council on Structural Connections; www.boltcouncil.org.
141. RFCI - Resilient Floor Covering Institute; www.rfci.com.
142. RIS - Redwood Inspection Service; www.redwoodinspection.com.
143. SAE - SAE International; www.sae.org.
144. SCTE - Society of Cable Telecommunications Engineers; www.scte.org.
145. SDI - Steel Deck Institute; www.sdi.org.
146. SDI - Steel Door Institute; www.steeldoor.org.
147. SEFA - Scientific Equipment and Furniture Association (The); www.sefalabs.com.
148. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
149. SIA - Security Industry Association; www.siaonline.org.
150. SJI - Steel Joist Institute; www.steeljoist.org.
151. SMA - Screen Manufacturers Association; www.smainfo.org.

152. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
 153. SMPTE - Society of Motion Picture and Television Engineers; www.smpte.org.
 154. SPFA - Spray Polyurethane Foam Alliance; www.sprayfoam.org.
 155. SPIB - Southern Pine Inspection Bureau; www.spib.org.
 156. SPRI - Single Ply Roofing Industry; www.spri.org.
 157. SRCC - Solar Rating & Certification Corporation; www.solar-rating.org.
 158. SSINA - Specialty Steel Industry of North America; www.ssina.com.
 159. SSPC - SSPC: The Society for Protective Coatings; www.sspc.org.
 160. TCNA - Tile Council of North America, Inc.; www.tileusa.com.
 161. TEMA - Tubular Exchanger Manufacturers Association, Inc.; www.tema.org.
 162. TIA - Telecommunications Industry Association (The); (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
 163. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
 164. TMS - The Masonry Society; www.masonrysociety.org.
 165. TPI - Truss Plate Institute; www.tpinst.org.
 166. TPI - Turfgrass Producers International; www.turfgrasssod.org.
 167. TRI - Tile Roofing Institute; www.tilerroofing.org.
 168. UL - Underwriters Laboratories Inc.; www.ul.com.
 169. UNI - Uni-Bell PVC Pipe Association; www.uni-bell.org.
 170. USAV - USA Volleyball; www.usavolleyball.org. USGBC - U.S. Green Building Council; www.usgbc.org.
 171. WA - Wallcoverings Association; www.wallcoverings.org.
 172. WASTEC - Waste Equipment Technology Association; www.wastec.org.
 173. WCLIB - West Coast Lumber Inspection Bureau; www.wclib.org.
 174. WCMA - Window Covering Manufacturers Association; www.wcmanet.org.
 175. WDMA - Window & Door Manufacturers Association; www.wdma.com.
 176. WI - Woodwork Institute; www.wicnet.org.
 177. WSRCA - Western States Roofing Contractors Association; www.wsrca.com.
 178. WWPA - Western Wood Products Association; www.wwpa.org.
- B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.
1. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
 2. ICC - International Code Council; www.iccsafe.org.
 3. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.
- C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up to date as of the date of the Contract Documents.
1. COE - Army Corps of Engineers; www.usace.army.mil.
 2. CFA - Commission on Fine Arts
 3. CPFMD - Capital Projects and Facilities Management Division
 4. CPSC - Consumer Product Safety Commission; www.cpsc.gov.
 5. DCC - District of Columbia Courts
 6. DCSC - District of Columbia Superior Court
 7. DCCOA - District of Columbia Court of Appeals

8. DCSHPO - District of Columbia State Historic Preservation Office
9. DCWASA - District of Columbia Water and Sewer Authority
10. DGS - Department of General Services; <https://dgs.dc.gov/>
11. DOB - Department of Buildings; <https://dob.dc.gov/>
12. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
13. DOD - Department of Defense; www.quicksearch.dla.mil.
14. DOE - Department of Energy; www.energy.gov.
15. DOJ - Department of Justice
16. EPA - Environmental Protection Agency; www.epa.gov.
17. FAA - Federal Aviation Administration; www.faa.gov.
18. FG - Federal Government Publications; www.gpo.gov/fdsys.
19. GSA - General Services Administration; www.gsa.gov.
20. HUD - Department of Housing and Urban Development; www.hud.gov.
21. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; www.eetd.lbl.gov.
22. NCPC - National Capital Planning Commission
23. OSHA - Occupational Safety & Health Administration; www.osha.gov.
24. SD - Department of State; www.state.gov.
25. TRB - Transportation Research Board; National Cooperative Highway Research Program; The National Academies; www.trb.org.
26. USCAAF - United States Court of Appeals for the Armed Forces
27. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
28. USDA - Department of Agriculture; Rural Utilities Service; www.usda.gov.
29. USDOJ - Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.
30. USMS - United States Marshal Service
31. USP - U.S. Pharmacopeial Convention; www.usp.org.
32. USPS - United States Postal Service; www.usps.com.

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

1. CFR - Code of Federal Regulations; Available from Government Printing Office; www.gpo.gov/fdsys.
2. DOD - Department of Defense; Military Specifications and Standards; Available from DLA Document Services; www.quicksearch.dla.mil.
3. DSCC - Defense Supply Center Columbus; (See FS).
4. FED-STD - Federal Standard; (See FS).
5. FS - Federal Specification; Available from DLA Document Services; www.quicksearch.dla.mil.
 - a. Available from Defense Standardization Program; www.dsp.dla.mil.
 - b. Available from General Services Administration; www.gsa.gov.
 - c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org.
6. MILSPEC - Military Specification and Standards; (See DOD).

7. USAB - United States Access Board; www.access-board.gov.
8. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).

E. State 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. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

SECTION 015000 - TEMPORARY UTILITIES AND FACILITIES

PART 1 - GENERAL

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, and provisions of Request for Proposal (RFP) 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. 011000 "Summary" for work restrictions and limitations on utility interruptions and controls.
 - 2. Section 017419 "Construction Waste Management and Disposal."
 - 3. Section 017700 "Closeout Procedures."

1.3 UTILITY USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, occupants of Project, testing agencies, and authorities having jurisdiction.
- B. Sewer Service: Owner will pay sewer-service use charges for sewer usage by all entities for construction operations.
 - 1. Contractor to provide its own connections and extensions of service as required for construction operations.
- C. Water Service: Owner will pay water-service use charges for water used by all entities for construction operations.
- D. Electric Power Service: Owner will pay electric-power-service use charges for electricity used by all entities for construction operations.
- E. Water from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations. If water needed for construction is not available from Owner's facility, Contractor shall provide, at no addition cost.
- F. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.4 INFORMATIONAL SUBMITTALS

- A. Site Utilization Plan: The Contractor shall submit a complete site staging plan showing the layout of all required temporary construction facilities and controls, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, traffic control plan, and parking areas for construction personnel, including temporary ramp designs and product data for review and approval by the Owner and Construction Manager.
 - 1. Indicate specific location of the Contractor's trailer, material storage and loading areas, security perimeter, locations of construction signage, locations of temporary toilets, and other temporary construction, emergency facilities and resources and any other construction facilities required.
 - 2. Ensure that Fire Hydrants/Hose Connections/Standpipes are not blocked if in staging or scaffold areas and place signs on fence if hydrant is located inside area.
 - 3. Address accessibility and alternate routes.
- B. Implementation and Termination Schedule: Within 15 calendar days of date established for commencement of the Work, submit schedule indicating implementation and termination dates of each temporary utility.
- C. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.
- D. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

1.5 QUALITY ASSURANCE

- A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction, including but not limited to:
 - 1. Comply with the requirements of the Building Code listed on the Contract Documents and with regulations governing construction and local industry standards in the installation and maintenance of temporary services and facilities.
 - 2. NFPA Code 241, "Building Construction and Demolition Operations"
 - 3. ANSI A-10 Series standards for "Safety Requirements for Construction and Demolition."
 - 4. NECA National Joint Guideline NJC-6 "Temporary Job Utilities and Services."
 - a. Refer to "Guidelines for Bid Conditions for Temporary Job Utilities and Services", as prepared jointly by Associated General Contractors of America (AGC) and American Specialty Contractors, Inc. (ASC) for industry recommendations.
 - b. Trade Jurisdictions: The assigned responsibilities for the installation and operation of temporary utilities are not intended to interfere with the normal application of trade regulations and union jurisdictions applicable to the work.
 - 5. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
 - 6. Accessible Temporary Egress: Comply with applicable provisions in the most current version of the ADA Accessibility Guidelines and ICC/ANSI A117.1.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits for temporary utilities and facilities as required.

1.6 CONDITIONS OF USE

- 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.
- B. Install, operate, maintain, and protect temporary utilities and facilities. Provide each temporary service and facility ready for use at each location when the service or facility is first needed to avoid delay in performance of the Work. Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Do not allow hazardous, dangerous or unsanitary conditions or public nuisances to develop or persist on the site.
- C. Existing Equipment and Items: Cover or otherwise protect and provide security for existing equipment and other items that are to remain in place, to prevent soiling, damage and loss.
- D. Temporarily move equipment and other items that interfere with the performance of required Work. Upon completion of the Work, return the equipment and items to their original location and installation condition.
- E. Store equipment and other items that have been temporarily removed. Upon reinstallation, clean and if damaged, repair or replace equipment and items to match their condition prior to removal.
- F. Security and Protection: Maintain site security and protection facilities in a safe, lawful and publicly acceptable manner. Coordinate with US Marshal Services (USMS) and US Capitol Police (USCP) for necessary requirements.

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, with 1-5/8-inch OD top rails, with galvanized barbed-wire top strand.
- B. Portable 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, with 1-5/8-inch OD top and bottom rails. Provide concrete bases for supporting posts.
- C. Fencing Windscreen Privacy Screen: Polyester fabric scrim with grommets for attachment to chain link fence, sized to height of fence, in color selected by Owner from manufacturer's standard colors.
- D. Gypsum wall board and framing: Fire resistive sheets and wood or metal studs for full height of partitions.
- E. Dust-Control Adhesive-Surface Walk-Off Mats: Provide mats minimum 36 by 60 inches.

- F. 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: There will be no separate area, outside of the limits of construction, for a construction field office and storage.
 - 1. Portable or mobile buildings with serviceable finishes, temperature control, and foundation adequate for normal loading
- B. Parking General: There will be no designated on-site parking provided for Contractor or subcontractor personnel.
- C. Sanitary Facilities: Include temporary toilets and wash facilities. Comply with regulations and health codes for the type, number, location, operation, and maintenance of fixtures and facilities. Install where facilities will best serve the Project's needs after coordinating locations with Owner and Construction Manager.
 - 1. Existing Toilets: Use of the Owner's existing toilet facilities is not permitted unless coordinated and accepted by Owner.
- D. Covered Walkway: Erect a structural adequate protective covered walkway for passage of persons along pedestrian ways adjacent to the Work as may be required. Coordinate with Owner and Construction Manager. Comply with regulations of authorities having jurisdiction.

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 13 at each return-air grille in system and remove at end of construction and clean HVAC system.
- 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 TEMPORARY FACILITIES, GENERAL

- A. Conservation: Coordinate construction and use of temporary facilities 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.

3.2 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.
- 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.

3.3 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
 - 1. Arrange with utility company, Owner, 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 or private system indicated and as directed by authorities having jurisdiction.
- C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.
- D. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- E. 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.
- F. Temporary 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.

1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.
- G. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
1. Prior to commencing work, isolate the HVAC system in area where work is to be performed according to Contractor provided coordination drawings.
 - a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
 - b. Maintain negative air pressure within work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete. Contractor provided exhaust fans and temporary ductwork may be required to maintain air circulation and negative pressure. Refer to Mechanical specifications for additional requirements.
 2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
 3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.
- H. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.
- I. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
1. Connect temporary service to Owner's existing power source, as directed by Owner.
- J. 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.
- K. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install WiFi cell phone access equipment.

3.4 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:

1. Maintain support facilities until Owner schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas as indicated 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. Parking: Provide temporary parking areas for construction personnel.
 1. Parking is the responsibility of the Contractor.
- D. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
 1. Identification Signs: Provide Project identification signs as indicated on Drawings.
 2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
- E. Waste Disposal Facilities: Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."
- F. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction.
 1. There is no permanent location for a dumpster. If the Contractor needs to use dumpsters, they must deliver it to the site at 6:00 PM and then remove the dumpster before 6:00 AM the next day unless coordinated and approved by Owner to remain for an extended time duration.
 2. Collect waste from construction areas daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Handle dangerous or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material in a lawful manner.
- G. 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.
- H. Existing Elevator Use: Use of Owner's existing elevators may be permitted, provided elevators are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore elevators to condition existing before initial use, including replacing worn cables, guide shoes, and similar items of limited life.
 1. The use of service elevator has to be shared with the operations of the Owner. Contractor shall schedule and coordinate use of the elevator on daily basis with the Owner.
 2. Do not load elevators beyond their rated weight capacity.
 3. Provide protective coverings, barriers, devices, signs, or other procedures to protect elevator car and entrance doors and frame. If, despite such protection, elevators become damaged, engage elevator Installer to restore damaged work so no evidence remains of

- correction work. Return items that cannot be refinished in field to the shop, make required repairs and refinish entire unit, or provide new units as required.
4. Use of passengers' elevators for construction purpose is not permitted.
- I. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.
- J. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.
1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.
- K. 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, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.
- B. Temporary Erosion and Sedimentation Control: Comply with requirements shown on drawings.
- C. Stormwater Control: Comply with requirements shown on drawings for control of storm water. Provide barriers in and around excavations to prevent flooding by runoff of stormwater from heavy rains.
- D. Tree and Plant Protection: Comply with requirements shown on drawings.
- E. 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 materials approved by authorities having jurisdiction.
- F. Site Enclosure Fence: Before construction operations begin and prior to commencing work, furnish and install site enclosure fence in a manner that will prevent people from easily entering site except by entrance gates.
1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations or as indicated on Drawings.

2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.
- G. 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 workday.
- H. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- I. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- J. Covered Walkway: Erect protective, covered walkway for passage of individuals through or adjacent to Project site. Coordinate with entrance gates, other facilities, and obstructions. Comply with regulations of authorities having jurisdiction and requirements indicated on Drawings.
1. Provide overhead decking, protective enclosure walls, handrails, barricades, warning signs, exit signs, lights, safe and well-drained walkways, and similar provisions for protection and safe passage.
 2. Paint and maintain appearance of walkway for duration of the Work.
 3. Submit plans for all temporary walkways for owner approval.
- K. 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.
- L. 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. This work must follow all code requirements. "Exit Access" must be maintained during construction and comply with jurisdictional requirements.
 2. Where allowed by owner, construct dustproof partitions with two layers of 10-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.
 3. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
 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.
- M. 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. Comply with additional limits on smoking specified in other Sections.
 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 rated Fire Extinguishers of an appropriate size and locations.
 - a. The Contractor shall inspect and check each extinguisher at least once a week during the Contract period and shall affix a dated tag certifying adequacy of charge and workability of each extinguisher.
 - b. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.
 - c. Where exposed electrical and/or telephone equipment occurs, fire extinguishers of dry chemical type for Class B and C fires shall be provided.

3.6 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. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
1. Materials and facilities that constitute temporary facilities are property of the Contractor. Owner 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."

END OF SECTION 015000

PART 1 - SECTION 016000 - PRODUCT REQUIREMENTS

GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- B. Related Requirements:
 - 1. Section 012100 "Allowances" for products selected under an allowance.
 - 2. Section 012500 "Substitution Procedures" for requests for substitutions.
 - 3. Section 012900 "Payment Procedures" for application for payment requirements.
 - 4. Section 017700 "Closeout Procedures" for warranty submittals.
 - 5. 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. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications. Submit a comparable product request, if applicable.

1.3 ACTION SUBMITTALS

- A. Comparable Product Request Submittal (Substitution): Comply with requirements in Section 012500 "Substitution Procedures."
- B. Product Specification Submittal: Comply with requirements in 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.
- B. Identification of Products: Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of products or equipment that 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 following installation, on a visually 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 a visually accessible but inconspicuous surface. Include information essential for operation, including the following:
 - a. Name of product and manufacturer.
 - b. Model and serial number.
 - c. Capacity.
 - d. Speed.
 - e. Ratings.
 - 3. See individual identification sections in Divisions 21, 22, 23, and 26 for additional identification 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: For Application for Payment documentation requirements of stored materials see Section 012900 Payment Procedures.
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.
 7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.6 PRODUCT WARRANTIES

- A. Warranties shall commence upon Substantial Completion or at a date identified and agreed to by Owner for designated portions of the work. See Section 017700 Closeout Procedures.
- B. 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.
- C. 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.
- D. Submittal Time: Comply with requirements in 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.
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 meeting requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected," Owner 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.
 - a. Submit additional documentation required in order to establish equivalency of proposed products. Evaluation of "or equal" product status is by Owner, whose determination is final.
- B. Product Selection Procedures:
1. Sole 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.
 - a. Sole product may be indicated by the phrase: "Subject to compliance with requirements, provide the following."
 2. Sole 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.
 - a. Sole manufacturer/source may be indicated by the phrase: "Subject to compliance with requirements, provide products by the following: ."
 3. Limited List of Products: 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 unless otherwise indicated.
 - a. Limited list of products may be indicated by the phrase: "Subject to compliance with requirements, provide one of the following: ."

4. Non-Limited List of Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, which complies with requirements.
 - a. Non-limited list of products is indicated by the phrase: "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following: ."
 5. Limited List of Manufacturers: 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 unless otherwise indicated.
 - a. Limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, provide products by one of the following: ."
 6. Non-Limited List of Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, which complies with requirements.
 - a. Non-limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following: ."
 7. 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.
- C. Nisual Matching Specification: Where Specifications require "Owner's sample," provide a product that complies with requirements and matches Owner's sample. Owner'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 Section 012500 "Substitution Procedures" for proposal of product.
- D. Nisual Selection Specification: Where Specifications include the phrase "as selected by Owner from manufacturer's full range" or similar phrase, select a product that complies with requirements. The Owner will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

- A. Consideration of Comparable Products: Owner will consider Contractor's request for comparable product (substitution) when applicable. Refer to Section 012500 Substitution Procedures.

- B. Submittal Requirements: Approval by the Owner of Contractor's request for use of comparable product is not intended to satisfy other submittal requirements. Comply with specified submittal requirements.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 017300 - EXECUTION

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, provisions of Request for Proposal (RFP) apply to this Section.

1.2 SUMMARY

- A. Section includes 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. Construction Management Plan
 - 4. Dust and HVAC Control
 - 5. Moisture and Mold Protection
 - 6. Installation of the Work.
 - 7. Cutting and patching.
 - 8. Coordination of Owner-installed products.
 - 9. Progress cleaning.
 - 10. Correction of the Work
 - 11. Starting and adjusting.
 - 12. Protection of installed and existing construction.
- B. Related Requirements:
 - 1. Section 011000 "Summary" for limits on use of Project site.
 - 2. Section 012900 "Payment Procedures" as referenced for the storage of materials to avoid damage from weather.
 - 3. Section 013100 "Project Management and Coordination" for general coordination provisions.
 - 4. Section 013300 "Submittal Procedures" for submitting surveys.
 - 5. Section 014000 "Quality Requirements" as it relates to the Quality Control Portion of the Construction Management Plan
 - 6. Section 015000 "Temporary Utilities and Facilities" for standards on temporary partitions and separation of workspaces
 - 7. Section 017419 "Construction Waste Management and Disposal" relating to coordination and removal of waste as outlined below.
 - 8. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, replacing defective work, and final cleaning.
 - 9. Section 024119 "Selective Demolition" for the disposition of waste resulting from demolition and for the disposition of hazardous waste.

1.3 DEFINITIONS

- A. Owner: District of Columbia Superior Courts
- B. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.
- C. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.
- D. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, demolition, remodeling, renovation, or repair operations. Construction waste including packaging.

1.4 PREINSTALLATION MEETINGS

- A. Cutting and Patching Conference: Conduct conference at Project site. See 013100 Project Management and Coordination for other Preinstallation Conference requirements.
- B. Prior to submitting cutting and patching plan, review extent of cutting and patching anticipated and examine procedures for ensuring satisfactory result from cutting and patching work. Require representatives of each entity directly concerned with cutting and patching to attend, including the following:
 - 1. Owner/Construction Manager.
 - 2. Contractor's superintendent.
 - 3. Trade supervisor responsible for cutting operations.
 - 4. Trade supervisor(s) responsible for patching of each type of substrate.
 - 5. Mechanical, electrical, and utilities subcontractors' supervisors, to the extent each trade is affecting by cutting and patching operations.
- C. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.5 INFORMATIONAL SUBMITTALS

- A. Construction Management Plan: Submit the Construction Management Plan which is to include the analysis of the work, constructability, and a detailed description of the tasks assigned to the Contractor staff performing the work. The Construction Management Plan must address the following items:
 - 1. Noise Control
 - 2. Hours of Construction and Deliveries
 - 3. Site Utilization Plans (Showing Staging Plans, Construction Parking, Logistics, etc.)
 - 4. Traffic Control / Routing Plans
 - 5. Trash and Debris Removal Plans (In coordination with Specification 017419 Construction Waste Management and Disposal)
 - 6. Communication Procedures and Protocols (Including a list of contacts for the project. For relevant Owner's contacts, please coordinate with the Construction Manager)
 - 7. Emergency Procedures and Protocols

8. Quality Control Procedures (In coordination with Specification Section 014000 Quality Requirements)
 9. Project Signage, temporary and permanent, as outlined in Specification 015000 Temporary Utilities and Facilities and as required for way finding during construction, and as required by the AHJ and Owner. Includes code required signage and warnings.
 10. Temporary Fire Protection Measures
- B. Dust and HVAC Control Plan: Submit coordination drawings and narratives that indicate the dust and HVAC control measures proposed for use, proposed locations, and proposed time frame for their operation. These drawings should show all temporary partitions utilized to separate work areas from other areas where Owner's operations will remain. The plans should include the following information:
1. HVAC System Isolation Schematic drawings
 - a. If Contractor is planning on utilizing existing HVAC systems that are to remain, provide a plan for isolation and protection of these existing systems from contamination during construction. Utilization of existing system can only be authorized by the Owner. Work areas must be completely isolated and air from work areas filtrated from cycling into occupied areas of the building. All filters used for this purpose shall be MERV 13 rated.
 - b. If approved by Owner, Contractor can utilize existing HVAC systems but accepts full responsibility for investigation of the integrity of the system and must provide a written assessment including Testing and Balancing of air handling system before construction as a baseline. Upon completion of the work DB shall provide written report including Testing and Balancing that confirms system performs to operable parameters within the tolerances established by the baseline. Any deficiencies shall be corrected by the Contractor at no additional cost to the Owner.
 2. Location of proposed air-filtration system discharge, interior and exterior. This must be done in coordination with other building systems to avoid contamination of outside air intakes. Cover and protect outside air intakes with MERV 13 filters. Cover interior return air ducts in construction area with MERV 13 Filters. Examine filters weekly and replace when dirty.
 3. All dust-control measures required during construction (For standards on temporary partitions and materials, refer to specification Section 015000)
- C. Moisture and Mold Protection Plan: As part of the initial submittals, submit Contractor's procedures and control plans for protecting materials and construction from water absorption, water damage, and mold.
1. Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.
 - a. For storage and handling requirements, refer to Specification Section 016000. For payment of stored materials see Section 012900 Payment Procedures.
 2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged work. Any and all water damaged work shall be removed and replaced complete in place with new materials that match the damaged materials.
 3. Warranty: Existing material and assemblies warranties shall be maintained within the requirements of the warranties when affected by the work.
 4. Indicate sequencing of work that requires water, such as, but not limited to, 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.

5. Indicate methods to be used to avoid trapping water in finished work.
 6. Exposed Construction Period: Before installation of water barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as suggested by manufacturer and as accepted by Owner.
 7. Protect porous material from water damage.
- D. Cutting and Patching Plan: Submit plan describing procedures at least ten (10) calendar 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.
 5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
 - a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.
- E. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
- F. Site Specific Safety Plan: Submit a Site Specific Safety Plan fourteen (14) calendar days from NTP. The Safety Plan shall include the measures that the Contractor shall utilize to ensure safe work on the project site, as well as maintain safety for the DC Courts, their personnel, and site visitors. This plan shall incorporate any and all provisions to ensure safety on the project site that might be necessary as outlined in Section 015000 - Temporary Utilities and Facilities. The Safety Plan shall outline key personnel related to the safe execution of work on the project as well as the safety Responsibility Assignment Matrix (RACI) to document for the Construction Manager and Owner the contact points for safety concerns on site. This plan shall outline the General Contractor's approach to safety and how they track and resolve safety on site, including the orientation requirements of vendors and contractors performing work on site.
- G. Fire protection/ fire watch Plan: Fire-Safety Program: Show compliance with requirements of NFPA 241 and Authorities Having Jurisdiction. (AHJ) Indicate Contractor personnel responsible for management of fire-prevention program.
- 1.6 HOT WORK PERMITS
- A. Coordination with fire Hot Work Permit: Contractors are expected to obtain a written permit from the Owner prior to performing "Hot Work" (i.e. welding or cutting) or operating other flame-producing/spark producing devices. The Contractor and its subcontractors are solely responsible for strict adherence to the requirements outlined in the permit and for providing fire extinguisher for all types of Hot Work. Contractors are required to meet all criteria identified on the permit. Areas shall be surveyed prior to performing any hot work to ensure they are free of fire hazards. Provide at a

minimum at least two 20 lb. ABC rated extinguishers for normal "Hot Work". The extinguishers must be current inspection tagged and contain an approved safety pin and tamper resistant seal. All hot work activities must have a designated Fire watch whose sole activity is fire watch. The Fire Watch must be trained in accordance with NFPA 51B and remain on-site for a minimum of one hour after the completion of the task or as specified on the hot work permit.

1.7 QUALITY ASSURANCE

- A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
- B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

1.8 WARRANTY

- A. 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.

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 sustainable design requirements.
- 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 Owner and Construction Manager for the visual and functional performance of in-place materials.
- C. Temporary Partitions: For materials to be utilized for temporary partitions, refer to Specification 015000 Temporary Utilities and Facilities.

PART 3 - EXECUTION

3.1 ACCESS TO AND USE OF FACILITY

- A. The Contractor shall use only such entrances to the work area as designated by the Owner and coordinated with the Construction Manager.

- B. Only such portions of the premises as required for proper execution of the contract shall be occupied by the Contractor and construction staff.
- C. Access to Building:
 - 1. Contractor will be given access to the portions of the building required to perform the work in accordance with the requirements established by the Owner. The Contractor's access may be further limited by requirements to secure and sensitive areas or where work is specified to be performed only during certain specified periods.
 - 2. Contractor will generally be given access to buildings only on Monday through Friday of each week, or as otherwise allowed by Section 011000 Summary, and the RFP.
 - 3. Contractor shall make all necessary arrangements for access to the building after regular working hours and/or for work on Saturday, Sunday, or Holidays with the Construction Manager.
- D. The Contractor shall not load or permit the loading of any part of any structure to such an extent as to endanger its safety.
- E. All work shall be carried on in an orderly manner and performed in such manner to cause minimum noises or disturbances as outlined and presented in the Construction Management Plan.

3.2 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, mechanical and electrical systems, 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. Field Condition Report: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed 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.

3.3 PREPARATION

- A. 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.
- B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings with provisions of Request for Proposal (RFP).
- C. Review of Final Contract Documents and Field Conditions: Upon discovery of previously unknown condition outside the control of the Contractor, that affect the Contractor and/or cost of construction, submit a request for information to Construction Manager according to requirements in Section 013100 "Project Management and Coordination."

3.4 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 Owner, Construction Manager, and Building Manager/Landlord promptly.
- B. General: Engage a land surveyor or professional engineer 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.

8. Survey existing conditions at locations where physical connections are to be made between new and existing construction, such as between floor elevations and at utility connections.
- 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 Owner and Construction Manager.

3.5 FIELD ENGINEERING

- A. 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 Owner. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- B. Benchmarks: Establish and maintain a minimum of two (2) 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.

3.6 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 spaces and 90 inches in unoccupied spaces.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- 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. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Where possible, select tools or equipment that minimize production of excessive noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. 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 Owner or Construction Manager.
 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.
 4. Coordinate with requirements of OGC supplied FFE, materials, furnishings, and components.
 5. Provide sufficient engineered support for concealed valves.
- I. 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.
- J. Repair or remove and replace damaged, defective, or nonconforming Work.
 1. Comply with Section 017700 "Closeout Procedures" for repairing or removing and replacing defective Work.

3.7 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 Section 011000 "Summary."
- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.
- G. Structural Elements: When cutting and patching structural elements, notify Construction Manager of locations and details of cutting and await directions from Construction Manager 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.
- H. 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 result 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. Plumbing piping systems.
 - f. Mechanical systems piping and ducts.
 - g. Control systems.
 - h. Communication systems.
 - i. Fire-detection and -alarm systems.
 - j. Conveying systems.
 - k. Electrical wiring systems.
 - l. Operating systems of special construction.

- I. 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 wall construction.
 - d. Sprayed fire-resistive material.
 - e. Equipment supports.
 - f. Piping, ductwork, vessels, and equipment.
 - g. Noise- and vibration-control elements and systems.
- J. 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 Construction Manager's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- K. 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. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 6. Proceed with patching after construction operations requiring cutting are complete.
- L. 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.
- M. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.8 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 Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify 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.

3.9 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, 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 hazardous and 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.

4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
- B. Site: Maintain Project site free of waste materials and debris.
- C. 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.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Cutting and Patching: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials prior to application of finish.
- H. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition,
- I. Any volatile materials shall be removed from site or stored in fire rated enclosures at the end of each workday.
- J. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 015000 "Temporary Facilities and Controls and Section 017419 "Construction Waste Management and Disposal."
- K. 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.
- L. 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.
- M. Limiting Exposures: Supervise construction operations to ensure that no part of the construction completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.10 STARTING AND ADJUSTING

- A. Coordinate startup and adjusting of equipment and operating components with requirements in Section 019113 "General 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 Section 014000 "Quality Requirements."

3.11 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. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Ensure that existing items remain undisturbed and unsoiled by construction and are maintained in the condition that existed at commencement of the Work. Repair any damage to existing facilities. See section 017700 Closeout Procedures for additional requirements.
 - 1. Temporarily move equipment and other items that interfere with the performance of required Work. Upon completion of the Work, return the equipment and items to their original location and installation condition.
 - 2. Store equipment and other items that have been temporarily removed at on site location determined by Construction Manager. Upon reinstallation, clean and if damaged, repair or replace equipment and items to match their condition prior to removal.
- C. Comply with manufacturer's written instructions for temperature and relative humidity.

3.12 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Contractor shall be aware that time is of the essence in regard to repairs and replacement of defective or damaged work.
 - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
 - a. See section 012900 "Payment Procedures" for payment adjustments.
- 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 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

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, and provisions of Request for Proposal (RFP) apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:

- 1. Salvaging non-hazardous demolition and construction waste.
- 2. Recycling non-hazardous demolition and construction waste.
- 3. Disposing of non-hazardous demolition and construction waste.

- B. Related Requirements:

- 1. Section 024119 "Selective Demolition" for disposal of waste.
- 2. Section 013100 "Project Management and Coordination."
- 3. Section 015000 "Temporary Facilities and Controls."

1.3 DEFINITIONS

- A. Construction Waste: Building, structure, and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building, structure, and site improvement materials resulting from demolition operations.
- C. Disposal: Removal of demolition or construction waste and subsequent salvage, sale, recycling, or deposit in landfill, incinerator acceptable to authorities having jurisdiction, or designated spoil areas on Owner's property.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition and construction waste becomes property of the Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
 - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 ACTION SUBMITTALS

- A. Waste Management Plan: Submit draft plan within (14) calendar days of Notice to Proceed for construction and prior to any activities which generate waste. Update the plan biweekly during construction until all activities are accounted for.
 - 1. Contractor shall not proceed with the work on the Project site until Waste Management Plan is approved by the Owner.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For waste management coordinator and refrigerant recovery technician. Qualifications to meet requirements in Quality Assurance.
- B. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report.
 - 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 (salvaged plus recycled) in tons.
 - 7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.
- C. Waste Reduction Calculations: Before request for Substantial Completion, submit calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.
- D. 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.
- E. 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.
- F. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerants that were present were recovered and that

recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

- G. Refrigerant Recovery: Comply with requirements in Section 024119 "Selective Demolition" for refrigerant recovery submittals.

1.7 QUALITY ASSURANCE

- A. Waste Management Coordinator Qualifications: Engage an experienced firm, or individual employed and assigned by Contractor, with a record of successful waste management coordination of projects with similar requirements. Superintendent may serve as Waste Management Coordinator. Waste management coordinator is to be responsible for implementing, monitoring, and reporting status of waste management work plan. The Coordinator shall be present at Project site full time for the duration of Project.
- B. Refrigerant Recovery Technician Qualifications: Universal certified by EPA-approved certification program. Universal is for all types of equipment. Comply with requirements in Section 024119 "Selective Demolition."
- C. Regulatory Requirements: Comply with transportation and disposal regulations of authorities having jurisdiction.
- D. Waste Management Conference(s): Conduct conference(s) at Project site to comply with requirements in 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 each contractor and 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.

1.8 WASTE MANAGEMENT PLAN

- A. General: Develop a waste management plan according to requirements in this Section. The plan shall consist of waste identification and waste reduction work plans. 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. 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. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.

1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
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.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

- A. General: Per approved Waste Management Plan, provide handling, containers, storage, signage, transportation, and other items as required during the entire duration of the Contract.
 1. Comply with operation, termination, and removal requirements in Section 015000 "Temporary Facilities and Controls."
- B. Waste Management Coordinator: 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. 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 (3) calendar days of submittal return.
 2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- C. Waste Management Plan Distribution:
 1. Distribute the Waste Management Plan to everyone concerned within three (3) calendar days of approved submittal return.
 2. Distribute the Waste Management Plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- D. Training: The Waste Management Coordinator shall train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
- E. 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 and recycled.

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

3.2 SALVAGING DEMOLITION WASTE

- A. Comply with requirements in Section 024119 "Selective Demolition" for salvaging demolition waste.
- B. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:
 1. Clean salvaged items.
 2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
 3. Store items in a secure area until installation.
 4. Protect items from damage during transport and storage.
 5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.
- C. Salvaged Items for Sale and Donation: Not permitted on Project site.
- D. Salvaged Items for Owner's Use:
 1. Clean salvaged items.
 2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
 3. Store items in a secure area until delivery to Owner.
 4. Transport items to Owner's storage area designated by Owner.
 5. Protect items from damage during transport and storage.
- E. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.
- F. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.
- G. Plumbing Fixtures: Separate by type and size.
- H. Lighting Fixtures: Separate lamps by type and protect from breakage.
- I. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall be shared equally by Owner and Contractor.

- C. 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.
- D. 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. Due to limited space at site Contractor may use "co-mingled" method if acceptable to recycling facility which permits all recyclable waste to be placed in a single container that is separated later at the recycling facility.
 - 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 as often as required to prevent overfilling bins.

3.4 RECYCLING DEMOLITION WASTE

- A. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.
 - 1. Pulverize masonry to maximum 4-inch size.
 - 2. Clean and stack undamaged, whole masonry units on wood pallets.
- B. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.
- C. Metals: Separate metals by type.
 - 1. Structural Steel: Stack members according to size, type of member, and length.
 - 2. Remove and dispose of bolts, nuts, washers, and other rough hardware.
- D. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.
- E. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.
- F. Metal Suspension System: Separate metal members, including trim and other metals from acoustical panels and tile, and sort with other metals.

- G. Carpet and Pad: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.
 - 1. Store clean, dry carpet and pad in a closed container or trailer provided by carpet reclamation agency or carpet recycler.
- H. Carpet Tile: Remove debris, trash, and adhesive.
 - 1. Stack tile on pallet and store clean, dry carpet in a closed container or trailer provided by carpet reclamation agency or carpet recycler.
- I. Piping: Reduce piping to straight lengths and store by material and size. Separate supports, hangers, valves, sprinklers, and other components by material and size.
- J. Conduit: Reduce conduit to straight lengths and store by material and size.
- K. Lamps: Separate lamps by type and store according to requirements in 40 CFR 273.

3.5 RECYCLING CONSTRUCTION WASTE

- A. Packaging:
 - 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
 - 2. Polystyrene Packaging: Separate and bag materials.
 - 3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
 - 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B. Wood Materials:
 - 1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
 - 2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
- C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.
- D. Metals: Separate metal by type.
- E. Paint: Seal containers and store by type.

3.6 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged or recycled, 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. General: Except for items or materials to be salvaged or recycled, remove waste materials and legally dispose of material.
- C. Burning: Do not burn waste materials.

3.7 ATTACHMENTS

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

END OF SECTION 017419

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, provisions of Request for Proposal (RFP) apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Substantial Completion procedures.
 - 2. Final completion procedures.
 - 3. Submittal of Warranties.
 - 4. Final cleaning.
 - 5. Repair of the Work.
- B. Related Requirements:
 - 1. Section 013233 "Photographic Documentation" for submitting final completion construction photographic documentation.
 - 2. Section 017823 "Operation and Maintenance Data" for additional operation and maintenance manual requirements.
 - 3. Section 017839 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
 - 4. Section 017900 "Demonstration and Training" for requirements to train the Owner's maintenance personnel to adjust, operate, and maintain products, equipment, and systems.

1.3 DEFINITIONS

- A. Substantial Completion is defined as the state at which the project, or portion of the project identified in the construction contract, is determined by the Owner and/or Owner's Agent to be sufficiently complete and capable of being occupied and used by Owner for the intended purpose. Substantial Completion / Beneficial Occupancy - The stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents, Including work by Owner's Vendors, Owner's Self-Performed Work, and "Work by Others", to the point where the DC Courts can fully, safely, and securely occupy or utilize the Work or a portion thereof for its intended use.
- B. Final Acceptance or Final Completion: Owner and /or Owner's Agent acceptance of the Work as satisfactorily completed in accordance with Contract Documents. Unless otherwise specified in the contract, the Owner shall accept, as promptly as practicable after completion and

inspection, all work required by the contract. Acceptance shall be final and conclusive except for latent defects, fraud, gross mistakes amounting to fraud, or the Owner's rights under any warranty or guarantee. Contractor duties and responsibility for safety and for protection of Work shall continue until such time as all the Work is completed and Final Acceptance of the Work achieved.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of cleaning agent. Refer to all other specification sections for product Record Submittal requirements.
- B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- C. Certified List of Incomplete Items: Final submittal at final completion.

1.5 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificates for Release of Liens.
- C. Certificate of Insurance: For continuing coverage.
- D. Field Report: For pest control inspection.
- E. Record Documents: As specified in Section 017839 "Project Record Documents"
- F. Operating and Maintenance Manuals: Organize and submit maintenance and operating data as specified in Section 01823 Operation and Maintenance Data. into suitable sets of manageable size.
- G. Commissioning Documentation: Closeout Submittal items specified in Section 019113 "General Commissioning Requirements," including commissioning issues reports.

1.6 MAINTENANCE MATERIAL SUBMITTALS

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

1.7 SUBSTANTIAL COMPLETION PROCEDURES

- A. Preliminary Procedures: Before requesting inspection to determine the date of Substantial Completion, complete the following:
 - 1. Documentation: Provide supporting documentation for completion as indicated elsewhere in the Contract Documents and a statement showing an accounting of changes to the Contract Sum.
 - 2. Prepare a List of Incomplete Item (Punch List).

3. Advise Owner of pending insurance changeover requirements. Contractor is responsible for coordinating with Owner for these requirements to ensure coverage prior to Owner's occupancy.
4. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents. Warranties to be dated to start at the Substantial Completion Date.
5. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
6. Prepare and submit Project Record Documents, operation and maintenance manuals, final completion construction photographic documentation, and similar final record information.
7. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
8. Complete commissioning requirements for operations specified by the Commissioning Agent and at the Project Closeout Meeting. Obtain acknowledgement from Owner's Commissioning Authority that all contractual requirements for Commissioning have been met.
9. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions. Coordinate with Court's Security to confirm key turnover process.

B. List of Incomplete Item (Punch List)

1. Contractor's List of Incomplete Items: As part of the request for Substantial Completion, prepare and submit a list of items to be completed and corrected (to include the Contractor's punch list as a separate attachment), indicating the value of each item on the list and reasons why the Work is incomplete. (The Contractor's punch list shall include all other discipline's punch lists and be submitted prior to scheduling the Owners walk-through.). All incomplete items shall also have a scheduled completion date. Items on this list shall not be eligible for additional retainage reduction until their completion.
2. Organization of 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.
3. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
4. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
5. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Contractor
 - d. Page number.
6. Submit list of incomplete items in the following formats:
7. Electronic Punch List file.
 - a. Contractor shall upload the list to the Courts' PMIS. PMIS shall also be utilized for the Contractor's Punch List and shall utilize the feature for all updates and Owner's acceptance. This Punch List shall be separate and distinguished from Owner Punch List.

- C. Submittals Prior to Substantial Completion: Complete the following a minimum of 14 calendar 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, operation and maintenance manuals.
 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Owner. 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 Owner's signature for receipt of submittals.
 5. Submit testing, adjusting, and balancing records.
 6. Submit sustainable design submittals not previously submitted.
 7. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- D. Procedures Prior to Substantial Completion: A minimum of 14 calendar days prior to requesting inspection to determine the date of Substantial Completion, provide a list of the items below that are incomplete at time of request:
1. If maintenance has been done to installed equipment prior to Substantial Completion provide documentation of all service provided and coordinated to caveats of warranty.
 2. Advise Owner of pending insurance changeover requirements.
 3. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 4. Complete startup and testing of systems and equipment.
 5. Commissioning agent's system performance approval.
 6. Perform preventive maintenance on equipment used prior to Substantial Completion.
 7. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training."
 8. Participate with 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.
 11. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- E. Substantial Completion Inspection by Owner: When the Work, or designated portion thereof, is substantially complete, the Contractor shall prepare a written request for inspection by the Owner. The request shall be accompanied by the List of Incomplete Items and the

responsibilities of all parties. Upon receipt of request, the Owner will either proceed with inspection or notify Contractor of unfulfilled requirements as outlined above. Substantial Completion inspection by the Owner does not relieve the Contractor of their obligations for submittals or duties required by the Contract Documents as it relates to Substantial Completion. The Owner will prepare the Certificate of Substantial Completion upon acceptance.

1. If the Owner and Contractor discover any item, whether or not included in the Contractor's List, which is not sufficiently complete in accordance with the Contract Documents such that the Owner can utilize the Work or portion for its intended use, the Contractor shall complete or correct such item prior to acceptance of the Work as achieving Substantial Completion and shall request an additional inspection by Owner once complete.

1.9 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 Section 012900 "Payment Procedures."
 2. Certified List of Incomplete Items: Submit certified copy of Owner's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Owner. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 4. Submit pest-control final inspection report.
 5. Submit final completion photographic documentation.
- B. Inspection: Submit a written request for final inspection to determine acceptance when the Work is completed and ready for final inspection. On receipt of request, Owner will either proceed with inspection or notify Contractor of unfulfilled requirements. The Owner 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. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.10 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Owner for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Partial Occupancy: Submit properly executed warranties within 14 calendar 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. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
- D. Warranty Electronic File: Provide warranties and bonds in PDF format submitted to the Owner's PMIS. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
- E. Warranties in Paper Form:
 - 1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 - 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark 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 Installer.
 - 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
- F. Provide additional copies of each warranty to include in operation and maintenance manuals.

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 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Repair, or remove and replace, defective construction. 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. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
 4. 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.
- C. Verify labels on fire rated doors have not been painted over. Remove paint if found.

3.2 FINAL CLEANING

- A. General: Perform final cleaning. 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 not planted, mulched, or 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. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
 - j. 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.

- k. Remove labels that are not permanent.
 - l. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - o. 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 ACR. and Section 230130.52 "Existing HVAC Air-Distribution System Cleaning." Provide written report on completion of cleaning.
 - p. Clean luminaires, lamps, globes, and reflectors to function with full efficiency.
 - q. Leave Project clean and ready for occupancy.
- C. Provide a second cleaning complying to above criteria after Substantial Completion is accepted. Coordinate acceptable schedule of cleaning with Owner.
- D. Pest Control: Comply with pest control requirements in Section 015000 "Temporary Utilities and Facilities." Prepare written report identifying types of pests controlled, chemicals and methods of application, and location of application. Include recommended schedule for maintenance applications and product safety sheets.
- E. Final Cleaning Waste Disposal: Comply with waste disposal requirements in Section 015000 "Temporary Utilities and Facilities." and Section 017419 "Construction Waste Management and Disposal."

END OF SECTION 017700

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance documentation directory manuals.
 - 2. Emergency manuals.
 - 3. Systems and equipment operation manuals.
 - 4. Systems and equipment maintenance manuals.
 - 5. Product maintenance manuals.
- B. Related Requirements:
 - 1. Section 013300 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
 - 2. Section 019113 "General Commissioning Requirements" for verification and compilation of data into operation and maintenance manuals.
 - 3. Section 017700 "Closeout Procedures" for submittal of project warranties.

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. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
 - 1. Owner, Construction Manager, and Commissioning Agent will comment on whether content of operation and maintenance submittals is acceptable.
 - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Initial Manual Submittal: Submit draft copy of each manual in PMIS at least 30 calendar days before commencing demonstration and training. Owner and Commissioning Agent will comment on whether general scope and content of manual are acceptable.

- C. Final Manual Submittal: Submit each manual in final form in PMIS prior to requesting inspection for Substantial Completion and at least 30 calendar days before commencing demonstration and training. Owner and Commissioning Agent will return copy with comments.
 - 1. Correct or revise each manual to comply with Owner's, Contractor's Architect and Commissioning Authority's or Agent comments. Submit copies of each corrected manual within 14 calendar days of receipt of Owner's, Contractor's Architect, and Commissioning Agent comments and prior to commencing demonstration and training.
- D. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.4 FORMAT OF OPERATION AND MAINTENANCE MANUALS

- A. 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. Where available provide hyperlink to manufacturer's files.
 - 2. File Names and Bookmarks: Bookmark 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.
- B. Manuals, Paper Copy: Submit manuals in the form of three (3) hard-copy, bound and labeled volumes.
 - 1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
 - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
 - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents, and indicate Specification Section number on bottom of spine. Indicate volume number for multiple-volume sets.
 - 2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.

3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment. Enclose title pages and directories in clear plastic sleeves.
4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
 - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

C. Submission of Manuals: Organize maintenance and operating data into suitable sets of manageable size. Include the following types of information and/or as indicated in specification sections:

1. Emergency instruction.
2. Spare parts list.
3. Wiring diagrams.
4. Recommended "turn around" cycles.
5. Inspection procedures.
6. Shop Drawings and Product Data.
7. Fixture lamping schedule.

1.5 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

A. Organization of Manuals: 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 the Architect.
8. Name and contact information for the Engineer.
9. Name and contact information for Commissioning Agent.
10. Names and contact information for major consultants to the Engineer that designed the systems contained in the manuals.
11. Cross-reference to related systems in other operation and maintenance manuals.

- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
 - 1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- 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."

1.6 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY MANUAL

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals. List items and their location to facilitate ready access to desired information. Include the following:
 - 1. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
 - 2. 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.
 - 3. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

1.7 EMERGENCY MANUALS

- A. 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.
- B. Content: Organize manual into a separate section for each of the following:
 - 1. Type of emergency.
 - 2. Emergency instructions.
 - 3. Emergency procedures.
- C. 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.
- D. 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.
- E. 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.

1.8 SYSTEMS AND EQUIPMENT OPERATION MANUALS

- A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.
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.
- B. 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.
- C. 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.

D. 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.

E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

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

1.9 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.

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.

B. 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 warranties and bonds as described below.

C. 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.

D. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins; 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.
 - a. 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.
 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.
- E. 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.
- F. 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. Format data to integrate into the Courts CMMS system.
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.
- G. 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.
- H. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- I. 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.
- J. 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 maintenance manuals.

1.10 PRODUCT MAINTENANCE MANUALS

- A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- B. 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.
- C. 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.
- D. Product Information: Include the following, as applicable:
 1. Product name and model number.
 2. Manufacturer's name.
 3. Color, pattern, and texture.
 4. Material and chemical composition.
 5. Reordering information for specially manufactured products.
- E. 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.
- F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- G. 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 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 017823

SECTION 017839 - PROJECT RECORD DOCUMENTS

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 and Request for Proposal (RFP), apply to this Section.

1.2 SUMMARY

- A. Section includes 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.
- B. Related Requirements:
 - 1. Section 017300 "Execution" for final property survey.
 - 2. Section 017700 "Closeout Procedures" for general closeout procedures.
 - 3. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 4. Divisions 02 through 35 Sections for specific requirements for project record documents of the Work in those Sections.

1.3 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. The Contractor is required to ensure that as-built drawings are kept current on a daily basis and are marked to show deviations that have been made from the Contract drawings. Ensure that each deviation has been identified with the appropriate modifying information (e.g.: modification number, PC number, RFI number, etc.). The Contractor's Superintendent and QC/QA Manager shall initial each deviation and each revision. Upon the completion of the work, the QC/QA Manager shall furnish a certificate addressed to the Owner attesting to the accuracy of the as-built drawings prior their submission.
 - 2. Number of Copies: Submit copies of record Drawings as follows:
 - a. Initial Submittal:
 - 1) Submit PDF electronic files of scanned record prints and one of file prints.

- 2) Owner and Construction Manager will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
- b. Final Submittal:
 - 1) Submit record digital data files in Native BIM, Word, REVIT, AutoCAD, and PDF's.
 - 2) Submit three set of printed as-built records documents.
 - 3) Plot each drawing file regardless of whether redlines were recorded.
- B. Record Specifications: Submit one paper copy and legible annotated PDF electronic files of Project's Specifications, including addenda and contract modifications. Native and PDF shall be submitted in a searchable format.
- C. Record Product Data: Submit one paper copy and legible annotated PDF electronic files and directories of each submittal.
 1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.
- D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit two paper copy and annotated PDF electronic files and directories of each submittal.

1.4 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. The Owner's representative will periodically review record drawings for compliance.
 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 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.
 - 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 and Construction Change Directive.
 - k. Changes made following Owner'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 Proposed Change Order 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 Owner, Construction Manager, and Architect and Engineers. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
- 1. Format: Same digital data software program, version, and operating system as the original Contract Drawings.
 - 2. Format: Native files (DWG), version operating in, Microsoft Windows operating system.
 - 3. Format: Annotated PDF electronic file with comment function enabled.
 - 4. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
 - 5. Refer instances of uncertainty to Owner and Construction Manager for resolution.
 - 6. Architect will furnish Contractor with one set of digital data files of the Contract Drawings for use in recording information.
 - a. See Section 013100 "Project Management and Coordination" for requirements related to use of Architect's digital data files.
 - b. Architect will provide data file layer information. Record markups in separate layers.
- C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
- 1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 - 2. Format: Annotated PDF electronic file with comment function enabled.
 - 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 Architect, and Engineers, and Construction Manager.
- e. Name of Contractor

1.5 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 and paper copy.

1.6 RECORD PRODUCT DATA

- 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. Preparation: Mark Product Data to indicate the actual product installation where installation varies 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.
- C. Format: Submit record Product Data as annotated PDF electronic file and searchable 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.

1.7 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 searchable 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.

1.8 MAINTENANCE OF RECORD DOCUMENTS

- A. Maintenance of Record Documents: Store record documents 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 Owner, Architect, and Construction Manager's reference during normal working hours.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 017839

SECTION 017900 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
 - 1. Instruction and Training in operation and maintenance of systems, subsystems, and equipment.
 - 2. Demonstration of operation of systems, subsystems, and equipment.
 - 3. Demonstration and training video recordings.
- B. Related Requirements
 - 1. Section 013100 "Project Management and Coordination."
 - 2. Section 014000 "Quality Requirements,"
 - 3. Section 017823 "Operation and Maintenance Data."
 - 4. Section 019113 "General Commissioning Requirements"

1.3 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 or Instructor.
- 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.

1.4 CLOSEOUT SUBMITTALS

- A. Demonstration and Training Video Recordings of demonstration and training: Submit via Procore and two (2) flash drive (USB drive) 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
 - d. Name of Construction Manager.
 - e. Name of Contractor.
 - f. Date of video recording.
2. Transcript: Prepared and bound in format matching operation and maintenance manuals. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as the corresponding video recording. Include name of Project and date of video recording on each page. Include subtitles within the video.
3. 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.
4. At completion of training, submit complete training manual(s) for Owner's use prepared in same paper and PDF file format required for operation and maintenance manuals specified in Section 017823 "Operation and Maintenance Data."

1.5 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 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 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.

1.6 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel. Include accommodation for off-hour training if required to minimize disruption of normal Court operations. Coordinate schedule with Commissioning Authority (CxA) for commissioned systems, refer to 019113 - General Commissioning Requirements for a list of commissioned systems.
- 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 have been reviewed and accepted. At least one (1) paper copy of the complete, approved operation and maintenance manuals, inclusive of emergency manuals, is to be available at the time and location of the training.
- D. The Contractor shall coordinate the agenda and training material for the training modules with the Owner, A/E, and Commissioning Agent.
- E. Contractor shall receive Commissioning Agent's system performance approval prior to scheduling training on those systems.
- F. Where the specifications require start-up and testing of a system, the necessary start-up and testing shall be completed with test reports approved by the Owner prior to scheduling the training on same system.

1.7 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. Submit instruction programs at least fourteen (14) calendar days before training.
- 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. Systems and equipment operation manuals.
 - c. Systems and equipment maintenance manuals.
 - d. Product maintenance manuals.
 - e. Project Record Documents.
 - f. Identification systems.
 - g. Warranties and bonds.
 - h. 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.
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.

1.8 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 Section 017823 "Operation and Maintenance Data."
- B. Set up instructional equipment at instruction location.

1.9 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. The Contractor will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements. The design intent shall be submitted to the design Architect, Engineer, Commissioning Agent, or any other of the Owners consultant that were involved with the original design, for their review and comment.
 - 2. 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 and Commissioning Authority with at least seven (7) calendar 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 accepted 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 and a demonstration 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.

1.10 TRAINING VIDEO RECORDINGS OF DEMONSTRATION AND TRAINING.

- 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.
 - 2. Obtain Owners signed acceptance of individual training programs.
- B. Digital Video Recordings: Provide high-resolution, digital video in MPEG format, produced by a digital camera with minimum sensor resolution of 12 megapixels and capable of recording in full HD mode with vibration reduction technology.
 - 1. Submit video recordings on thumb drive (USB drive) and by uploading to Procore software site.
 - 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 on 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 recording that describes the following for each Contractor involved on the Project, arranged according to Project Manual table of contents:
 - a. Name of Contractor/Installer.
 - b. Business address.
 - c. Business phone number.
 - d. Point of contact.
 - e. Email address.
 - f. Website information
- 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 video recording is recorded. Include description of items being viewed.
- F. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 017900

SECTION 019113 - GENERAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, other Division 01 Specification Sections, and provisions of Request for Proposal (RFP), apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. General administration and procedural requirements for coordinating and scheduling commissioning of building systems, assemblies and equipment as specified for this project.
2. Commissioning meetings.
3. Commissioning reports.
4. Use of commissioning process test equipment, instrumentation, and tools.
5. Construction checklists, including, but not limited to, installation checks, startup, performance tests, and performance test demonstration.
6. Commissioning tests and commissioning test demonstration.
7. Adjusting, verifying, and documenting identified systems and assemblies.
8. Coordination with the Owner's Commissioning Authority.

B. Related Requirements:

1. Section 010000 "Summary" for Commissioning Authority responsibilities.
2. Section 013100 "Project Management and Coordination" for general requirements.
3. Section 013216 "Construction Project Schedule" for Commissioning Integration.
4. Section 013300 "Submittal Procedures" for submittal procedure requirements for commissioning process.
5. Section 017700 "Closeout Procedures" for Certificate of Construction-Phase Commissioning Process Completion submittal requirements.
6. Section 017823 "Operation and Maintenance Data" for preliminary operation and maintenance data submittal requirements.
7. Section 210800 "Commissioning of Fire Suppression" for technical commissioning requirements for fire suppression.
8. Section 220800 "Commissioning of Plumbing" for technical commissioning requirements for plumbing.
9. Section 230800 "Commissioning of HVAC" for technical commissioning requirements for HVAC.
10. Section 260800 "Commissioning of Electrical Systems" for technical commissioning requirements for electrical systems.

1.3 REFERENCE STANDARDS:

- A. American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).
 - 1. ASHRAE 202-2013 Commissioning Process for Buildings and Systems.

1.4 DESCRIPTION:

- A. This section 019113 “GENERAL COMMISSIONING REQUIREMENTS” shall form the basis of the construction phase commissioning process. The Commissioning Authority shall add, modify, and refine the commissioning procedures, as approved by the Owner, to suit field conditions and actual manufacture’s equipment, incorporate test data and procedure results, and provide detailed scheduling for all commissioning tasks.
- B. Various sections of the project specifications require equipment startup, testing, and adjusting services. The Contractor shall coordinate the work required by individual specification sections with the commissioning services requirements specified herein.
- C. Where training is required and specified in other sections of these specifications, those services are intended to be provided in addition to the training and educational services specified in this section.
- D. Commissioning is a systematic process of verifying that the building systems perform interactively according to the construction documents and operational needs. The commissioning process shall encompass and coordinate the system documentation, equipment startup, control system calibration, testing and balancing, performance testing and training. Commissioning during the construction and post-occupancy phases is intended to achieve the objectives specified within the Construction Documents.
- E. The commissioning process does not take away from or reduce the responsibility of the Contractor to provide a finished and full functioning product. Commissioning does not take the place of or duplicate the Contractor’s quality control process.
- F. Whole Building Commissioning is a process that relies upon frequent and direct communications, as well as collaboration between all parties to the construction process. By its nature, a very high level of communication and cooperation between the Commissioning Authority and all other parties (Owner, Contractor, Construction Manager, QA/QC Manager, Subcontractors, Vendors, Manufacturers, testing agencies, code officials, etc.) is essential to the success of the Commissioning effort.
 - 1. No communications from the Commissioning Authority shall be deemed to constitute direction that modifies the terms of any contract between the Owner and the Contractor.
 - 2. All parties to the Commissioning process shall be individually responsible for alerting the Owner of any issues that they deem to constitute a potential contract change prior to acting on that communication.
 - 3. In the event any Commissioning issues and suggestions are deemed by the Owner to require an official interpretation of Construction Documents or require a modification of the Contract Documents, the Owner will issue an official directive for this effort.

1.5 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 Contractor's Architect/Engineer that records concepts, calculations, decisions, and product selections used to comply with Owner's Project Requirements and to suit applicable regulatory requirements, standards, and guidelines.
- C. Commissioning Authority (CxA): An entity engaged by Owner, and identified in Section 010000 "Summary," to evaluate Commissioning-Process Work. The CxA facilitates and coordinates the commissioning activities in concert with the Contractor, Construction Manager, Contractor, and DB A/E. The Commissioning Authority is responsible for directing the Commissioning Team in implementing the Commissioning Process.
- D. Commissioning Plan: A document, prepared by Commissioning Authority, that outlines the organization, schedule, allocation of resources, responsibilities, and documentation of commissioning requirements. The commissioning plan shall identify how commissioning responsibilities are distributed. The intent of this plan is to evoke questions, expose issues, and resolve them with input from the entire commissioning team early in construction.
- E. Commissioning: A quality-focused process for verifying and documenting that the facility and all of its systems and assemblies are planned, designed, installed, and tested to comply with Owner's Project Requirements and construction documents prepared by the Contractor with the input from Commissioning Authority. The commissioning process shall encompass and coordinate the traditionally separate functions of system documentation, equipment start-up, control system calibration, testing and balancing, performance testing and operator training. The requirements highlighted here are pertaining to the construction phase commissioning activities. The scope of the commissioning process is defined in Section 010000 "Summary" and in other sections of the Contract Documents.
- F. Construction-Phase Commissioning-Process Completion: The stage of completion and acceptance of commissioning process when resolution of deficient conditions and issues discovered during commissioning process and retesting until acceptable results are obtained has been accomplished. Owner will establish in writing the date construction-phase commissioning-process completion is achieved. See Section 017700 "Closeout Procedures" for Certificate of Construction-Phase Commissioning Process Completion submittal requirements.
 - 1. Commissioning process is complete when the Work specified of 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. Resolution of issues, as verified by retests performed and documented with acceptance of retest results.
 - c. Comply with requirements in Section 017900 "Demonstration and Training."
 - d. Completion and acceptance of submittals and reports.
- G. Owner's Project Requirements: A document 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. This document is prepared for the Owner by the Architect and/or Commissioning Authority.
- H. Owner's Witness: Commissioning Authority, Owner's Construction Manager, QA/QC Manager or 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. BOD: Basis of Design. A document that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design intent and process.
- K. OPR: Owner's Project Requirements. The documentation of the functional requirements of the facility and Owner's expectations of how it will be used and operated. This includes project and design goals, measurable performance criteria, budgets, schedules and supporting information. This document is analogous to what has traditionally been referred to as the Owner Program. Architect's sustainable design goals for energy and water efficiencies and indoor environmental qualities are articulated in this document.
- L. Test: Performance tests, performance test demonstrations, commissioning tests, and commissioning test demonstrations.
- M. Sampling Procedures and Tables for Inspection by Attributes: As defined in ANSI/ASQ Z1.4. (American Society for Quality Sampling Procedures and Tables)

1.6 COMPENSATION

- A. If Owner, Commissioning Authority, other Owner's witness, or Owner's staff perform additional services or incur additional expenses due to actions of Contractor listed below, Contractor shall 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.

1.7 COMMISSIONING TEAM

- A. Members Appointed by Contractor:
 - 1. Commissioning Coordinator: A person or entity employed by Contractor to manage, schedule, and coordinate commissioning process.
 - 2. Project superintendent and other employees that Contractor may deem appropriate for a particular portion of the commissioning process.
 - 3. Subcontractors, installers, suppliers, and specialists that Contractor may deem appropriate for a particular portion of the commissioning process including , but not limited to:
 - a. Fire Suppression Contractor (SP)
 - b. Plumbing Contractor (PC)
 - c. Mechanical Contractor (MC)
 - d. Electrical Contractor (EC)
 - e. Testing, Adjusting, and Balancing Contractor (TAB)
 - f. Controls Contractor (CC)
 - g. Any other installing subcontractors or suppliers of equipment (particularly HVAC, piping, sheet metal, lighting controls, plumbing, and building enclosure)
 - 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 process.

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 process.
3. Owner to observe and assure compliance with the commissioning requirements.

1.8 INFORMATIONAL SUBMITTALS

- A. Comply with requirements in Section 013300 "Submittal Procedures" for submittal procedure general requirements for commissioning process.
- B. Commissioning Plan Information:
 1. The Contractor shall provide all tests and data as defined in these specifications as well as within the "Commissioning Plan."
 2. The Contractor shall ensure that the commissioning responsibilities outlined in these specifications are included in all contracts and subcontracts and that subcontractors comply with the requirements of these specifications.
 3. List of Contractor-appointed commissioning team members to include specific personnel and subcontractors performing the various commissioning requirements.
 4. Schedule of commissioning activities, integrated with the Construction Schedule. Comply with requirements in Section 013200 "Construction Progress Documentation" for the Construction Schedule general requirements for commissioning process.
 5. Contractor personnel and subcontractors participating in each test.
 6. List of instrumentation required for each test to include identification of parties that will provide instrumentation for each test.
- C. Contractor to coordinate scheduling Commissioning activities.
 1. Provide Construction Manager with a two-week look-ahead schedules for Commissioning activities.
- D. Commissioning Coordinator Letter of Authority:
 1. Within 10 working 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 process.
 - b. Coordinate, schedule, and manage commissioning process of Contractor, subcontractors, and suppliers.
 - c. Obtain documentation required for commissioning process 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.
- E. 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.
- F. Commissioning Documentation: Provide the following information to the CxA:

1. Process and schedule for completing construction checklists, pre-functional and start-up for systems, assemblies, equipment and components to be commissioned.
 2. Completed construction checklists, pre-functional checklists and start-up forms.
 3. Certificate of readiness certifying that plumbing systems, subsystems, equipment and associated controls are ready for testing.
 4. Test and inspection reports and certificates.
 5. Corrective action documents.
 6. Testing, adjusting and balancing reports (preliminary and final copies).
 7. Data trend logs compiled in .XLS format.
- G. Equipment Shop Drawings and Submittals: The following information shall be submitted for systems to be commissioned, in electronic format, with the product shop drawings for review and approval by Owner and the CxA. This information will be used to confirm the product compliance with the contract documents and to establish commissioning requirements and procedures. This information is required to be submitted with product data information. The information shall be specific to each type of equipment herein this specification, being used on the project.
1. Manufacturer's detailed installation requirements and checklists including access and clearance dimensions.
 2. Manufacturer's detailed start-up requirements and checklists.
 3. Operation instructions.
 4. Manufacturer's recommended maintenance and troubleshooting procedures.
 5. Detailed product performance data for each piece of equipment including part load capacities, performance curves, electrical components and requirements, etc.
 6. Manufacturer's certified test reports on each piece of equipment.
 7. Logic flow diagrams for temperature control systems and sequences of operation.
 - a. Include applicable sections of the Sequence of Operation for related function groups.
 - b. Annotate function groups for clarity.
 - c. Indicate initial setpoints, reset schedules, etc.
 8. Calibration certificates for test instruments.
- H. List test instrumentation, equipment, and monitoring devices. Include the following information:
1. Make, model, serial number, and application for each instrument, equipment, and monitoring device.
 2. Brief description of intended use.
 3. Calibration record showing the following:
 - a. Calibration agency, including name and contact information.
 - b. Last date of calibration.
 - c. Range of values for which calibration is valid.
 - d. Certification of accuracy.
 - e. Certification for calibration equipment traceable to NIST.
 - f. Due date of the next calibration.
- I. Test Reports:
1. Pre-Startup Report: Prior to startup of equipment or a system, submit signed, completed construction checklists.
 2. Test Data Reports: At the end of each day in which tests are conducted, submit test data for tests performed.
 3. Commissioning Issue Reports: Daily, at the end of each day in which tests are conducted, submit commissioning issue reports for tests for which acceptable results were not achieved.

4. Weekly Progress Report: Weekly, at the end of each week in which tests are conducted, submit a progress report.
5. Data Trend Logs: Submit data trend logs at the end of the trend log period.
6. System Alarm Logs: Daily, at the start of days following a day in which tests were performed, submit printout of log of alarms that occurred since the last log was printed.

J. Construction Checklists:

1. Material checks.
2. Installation checks.
3. Startup procedures, where required.

1.9 RESPONSIBILITIES

A. The responsibilities of various parties in the commissioning process are provided in this Section. The responsibilities of the trade contractors are identified in each Division in addition to this section.

1. Division 21: Fire Suppression
2. Division 22: Plumbing.
3. Division 23: Mechanical.
4. Division 26: Electrical.
5. Division 27: Communications.
6. Division 28: Electronic Safety and Security.

B. All Parties:

1. Follow the Commissioning Plan.
2. Attend commissioning scoping meeting and additional meetings, as requested by the CxA.

C. Architect (of A/E):

1. Construction and Acceptance Phase
 - a. Provide support to the Commissioning Team who must provide a service as a part of the commissioning process. This shall include providing adequate space for equipment installation and maintenance.
 - b. Conduct periodic inspections of work in progress to ensure that all systems and equipment are installed according to specifications.
 - c. PM manages the CxA contract for the Owner, including copying the CxA on all relevant documentation and communication.
 - d. Attend the commissioning scoping meeting and selected commissioning team meetings as requested by the CxA.
 - e. Perform normal submittal review, and copy the CxA for construction observations, as-built drawing preparation, O&M manual preparation, etc., as contracted.
 - f. Provide any design narrative documentation requested by the CxA, including BOD and OPR.
 - g. Coordinate resolution of system deficiencies identified during commissioning, according to the contract documents.
 - h. Coordinate resolution of design deficiencies identified during the construction phase.
 - i. Prepare and submit final as-built design intent documentation for inclusion in the O&M manuals. Review and approve the O&M manuals.

2. Warranty Period

- a. Coordinate resolution of design non-conformance and design deficiencies identified during warranty-period commissioning.

D. Mechanical, Electrical, and Plumbing Designers/Engineers (of the A/E)

1. Construction and Acceptance Phase:

- a. Provide documentation of initial design concepts, and Design Intent based on the Owner's program.
 - b. Provide mechanical system design parameters and obtain approval of Owner.
 - c. Prepare contract documents incorporating the Commissioning Specification requirements, and description of mechanical system.
 - d. Attend initial meeting with TAB representative as schedules by the Commissioning Authority.
 - e. Review TAB report and verification data sheets for system conformance to contract documents. Issue a report noting deficiencies requiring correction to the Commissioning Authority.
 - f. Review functional performance testing report for deficiencies in meeting the finalized design intent.
 - g. Review as-built records as required by contract documents and turn them over to the CxA for inclusion in the final project documentation.
 - h. Review and comment on the final commissioning report.
 - i. Perform normal submittal review, construction observation, as-built drawing preparation, etc., as contracted. One site observation should be completed just prior to system startup.
 - j. Provide any design narrative and sequences documentation requested by the CxA. The designers shall assist (along with the contractors) in clarifying the operation and control of commissioned equipment in areas where the specifications, control drawings or equipment documentation is not sufficient for writing detailed testing procedures.
 - k. Attend commissioning scoping meetings and other selected commissioning team meetings, as required or requested by CxA.
 - l. Participate in the resolution of system deficiencies identified during commissioning, according to the contract documents.
 - m. Prepare and submit the final as-built design intent and operating parameters documentation for inclusion in the O&M manuals. Review and approve the O&M manuals.
 - n. Sign-off (final approval) on individual commissioning tests as completed and passing. Recommend completion of the commissioning process to the Project Manager.
 - o. Participate in Owner training and provide overview of systems and intended operation.
2. Warranty Period
 - a. Participate in the resolution of non-compliance, non-conformance and design deficiencies identified during commissioning during warranty-period commissioning.

E. Commissioning Authority (CxA)

1. The CxA is not responsible for design concept, design criteria, compliance with codes, design or general construction scheduling, cost estimating, or construction management. The CxA may assist with problem-solving non-conformance or deficiencies, but ultimately that responsibility resides with the Contractor, subcontractors, and the A/E. The primary role of the CxA is to develop and coordinate the execution of a testing plan, observe and document performance—that systems are functioning in accordance with the documented design intent and in accordance with the Contract Documents. The Contractors will provide all tools to start, check-out, and functionally test equipment and systems.
2. Construction and Acceptance Phase
 - a. Coordinates and directs the commissioning activities in a logical, sequential and efficient manner using consistent protocols and forms, centralized documentation, clear and regular communications and consultations with all necessary parties, frequently updated timelines, schedules, and technical expertise.
 - b. Coordinate the commissioning work with the PM, GC, and CA, who ensure that commissioning activities are being scheduled into the master schedule.
 - c. Revise, as necessary, the Commissioning Plan - Construction Phase.

- d. Plan and conduct a commissioning scoping meeting and other commissioning meetings.
 - e. Request and review additional information required to perform commissioning tasks, including O&M manuals, contractor startup and checkout procedures.
 - f. Before startup, gather and review the current control sequences and interlocks and work with contractors and design engineers until sufficient clarity has been obtained, in writing, to be able to write detailed testing procedures.
 - g. Review normal Contractor submittals applicable to systems being commissioned for compliance with commissioning needs, concurrent with the A/E reviews.
 - h. Write and distribute pre-functional tests and checklists.
 - i. Perform site visits to observe component and system installations. Attend selected planning and job-site meetings to obtain information on construction progress. Review construction meeting minutes for revisions/substitutions relating to the commissioning process. Assist in resolving any discrepancies.
 - j. May witness the HVAC&R piping tests and flushing procedures, sufficient to be confident that proper procedures were followed. Notify owner's project manager of any deficiencies in results or procedures.
 - k. May witness ductwork testing and cleaning procedures, sufficient to be confident that proper procedures were followed. Notify owner's project manager of any deficiencies in results or procedures.
 - l. Approve pre-functional tests and checklist completion by reviewing pre-functional checklist reports and by selected site observations and spot checking.
 - m. Verify systems startup by reviewing startup reports and by selected site observation.
 - n. Review TAB execution plan.
 - o. Verify air and water systems balancing by spot testing, by reviewing completed reports, and by selected site observation.
 - p. With necessary assistance and review from installing contractors, write the functional performance test procedures for equipment and systems. This may include energy management control system trending, stand-alone data logger monitoring or manual functional testing. Submit to PM for review, and for approval if required.
 - q. Analyze any functional performance trend logs and monitoring data to verify performance or equipment and systems.
 - r. Coordinate, witness, and approve manual functional performance tests performed by installing contractors. Request retesting as necessary.
 - s. Maintain a master deficiency and resolution log and a separate testing record. Provide the PM with written progress reports and test results with recommended actions.
 - t. Witness the training of the Owner's operating personnel.
 - u. Review of the O&M manuals.
 - v. Provide a final commissioning report (as described in this section).
3. Warranty Period
- a. Coordinate and witness required Function Performance Testing and deficiency corrections.
- F. Construction Administrator of Architect and Engineer (A/E)
- 1. Construction and Acceptance Phase
 - a. Facilitate the coordination of the commissioning work by the CxA for design related components and clarifications, as requested by the CxA.
 - b. Provide support to the Commissioning Team who must provide a service as a part of the commissioning process. This shall include providing adequate space for equipment and maintenance.
 - c. Review and approve the final Commissioning Plan - Construction Phase.
 - d. Attend a commissioning scoping meeting and other commissioning team meetings, as requested by the CxA.
 - e. Perform the normal review of Contractor submittals.

- f. Furnish a copy of all construction documents, addenda, change orders and approved submittals and shop drawings related to commissioned equipment to the CxA.
 - g. When necessary, observe and witness pre-functional checklists, startup and functional testing of selected equipment.
 - h. Review commissioning progress and deficiency reports.
 - i. Coordinate the resolution of non-compliance and design deficiencies identified in all phases of commissioning.
2. Warranty Period
- a. Assist the CxA as necessary in the seasonal or deferred testing and deficiency corrections required by the specifications.

G. Contractor

1. Construction and Acceptance Phase
- a. Include cost of commissioning requirements in the contract price. In each purchase order or subcontract written, include requirements for submittal data, O&M data, commissioning tasks and training.
 - b. Include commissioning requirements in the mechanical, electrical, plumbing, controls, TAB, and all other sub-contractor's contracts, to ensure full cooperation of all parties in the mechanical commissioning program.
 - c. Ensure acceptable representation, with the means and authority to prepare and coordinate execution of the commissioning program as described in the contract documents.
 - d. Submit the following information for each Contractor and sub-discipline assigned as representatives to the commissioning team within two weeks of contract award.
 - 1) Company Name
 - 2) Name
 - 3) Years of Experience
 - 4) Phone Number
 - 5) Email address
 - e. Submit a complete list of project submittals required to the Owner by Division 01. The CxA will issue comments directly to the Contractor for incorporation into one set of review comments to be issued to the Contractor.
 - f. Submit to the CxA all Division 21, 22, 23, 26, 27, and 28 Quality Control Submittals in accordance with the requirements of individual sections.
 - g. Coordinate with CxA to incorporate all commissioning events in the Master Construction Schedule. The CM shall ensure that all testing requirements for the project are incorporated into the Master Schedule and are distributed to the Owner, CxA, A/E, and all other relevant parties.
 - h. Include the CxA on the construction meeting minutes distribution list.
 - i. Furnish a copy of all construction documents, addenda, change orders, test reports, and approved submittals and shop drawings related to commissioned equipment to the CxA.
 - j. Coordinate all construction meetings requested by the CxA, and ensure all Subcontractors and other applicable parties are in attendance.
 - k. Issue a statement that TAB work has been completed, and submit the final TAB reports for review.
 - l. Ensure checklists are completed during construction.
 - m. Provide all manufacturer equipment startup sheets with submittals for each piece of equipment being commissioned.
 - n. Issue a statement that controls systems have been calibrated, and point to point checks have been completed.
 - o. Coordinate the remediation of deficiencies identified in verifications tests, start-ups, pre-functional checklists, punch lists, and other deficiencies noted during construction.

- p. Facilitate the coordination of the commissioning work by the CxA, and with the Subs to ensure that commissioning activities are being scheduled and being completed based on the master schedule.
 - q. Coordinate as scheduled all subcontractors and startup testing.
 - r. Evaluate any performance deficiencies identified in the FPT report for non-conformance with contract documents.
 - s. Coordinate the preparation of O&M manuals with the installing contractors and Subs, according to the Contract Documents, including clarifying and updating the original sequences of operation to as-built conditions.
 - t. Arrange for facility operating and maintenance personnel to attend various field commissioning activities and field training sessions according to the Commissioning Plan - Construction Phase.
 - u. Provide final approval for the completion of the commissioning work.
2. Warranty Period
- a. Ensure that Subs execute seasonal or deferred functional performance testing, witnessed by the CxA, according to the specifications.
 - b. Ensure that Subs correct deficiencies and make necessary adjustments to O&M manuals and as-built drawings for applicable issues identified in any seasonal testing.

1.10 SYSTEMS TO BE COMMISSIONED

A. The systems to be commissioned in the project include but are not limited to:

- 1. Division 21: FIRE SUPPRESSION COMMISSIONING, SECTION 210800
- 2. Division 22: PLUMBING COMMISSIONING, SECTION 220800
- 3. Division 23: HVAC COMMISSIONING, SECTION 230800
- 4. Division 26: ELECTRICAL COMMISSIONING, SECTION 260800
- 5. Division 27: COMMUNICATIONS COMMISSIONING, SECTION 270800
- 6. Division 28: SAFETY AND SECURITY COMMISSIONING, SECTION 280800

B. Commissioning Report:

1. At Construction-Phase Commissioning Completion, include the following:

- a. Pre-startup reports.
- b. Approved test procedures.
- c. Test data forms, completed and signed.
- d. Progress reports.
- e. Commissioning issue report log.
- f. Commissioning issue reports showing resolution of issues.
- g. Correspondence or other documents related to resolution of issues.
- h. Other reports required by commissioning process.
- i. List unresolved issues and reasons they remain unresolved and should be exempted from the requirements for Construction-Phase Commissioning Completion.
- j. Report shall include commissioning work of Contractor.

C. Request for Certificate of Construction-Phase Commissioning Process Completion.

D. Operation and Maintenance Data: For proprietary test equipment, instrumentation, and tools to include in operation and maintenance manuals.

1.11 QUALITY ASSURANCE

A. Commissioning Coordinator Qualifications:

1. Documented experience commissioning systems of similar complexity to those contained in these documents on at least five 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. Commissioning-Process Management Professional, by American Society of Heating, Refrigerating and Air-Conditioning Engineers.
 - b. Certified Commissioning Professional, by Building Commissioning Association.

B. Calibration Agency Qualifications: Certified by The American Association for Laboratory Accreditation that the calibration agency complies with minimum requirements of ISO/IEC 17025.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT, INSTRUMENTATION, AND TOOLS

A. Test equipment and instrumentation required to perform the commissioning process shall remain the property of the Commissioning Authority unless otherwise indicated.

B. Test equipment and instrumentation required to perform commissioning process shall comply with the following criteria:

1. Be manufactured for the purpose of testing and measuring tests for which they are being used and have an accuracy to test and measure system performance within the tolerances required to determine acceptable performance.
2. Calibrated and certified.
 - a. Calibration performed and documented by a qualified calibration agency according to national standards applicable to the tools and instrumentation being calibrated. Calibration shall be current according to national standards or within test equipment and instrumentation manufacturer's recommended intervals, whichever is more frequent, but not less than within six months of initial use on Project. Calibration tags shall be permanently affixed.
 - 1) Submit record of calibration dates and serial numbers for test equipment used for project.
 - b. Repair and recalibrate test equipment and instrumentation if dismantled, dropped, or damaged since last calibrated.
3. Maintain test equipment and instrumentation.
4. Use test equipment and instrumentation only for testing or monitoring Work for which they are designed.

2.2 PROPRIETARY EQUIPMENT, INSTRUMENTATION, AND TOOLS

A. Proprietary equipment, instrumentation, and tools are those manufactured or prescribed by equipment manufacturer and required for work on its equipment as a condition of equipment warranty, or as otherwise required to test, service, repair, adjust, calibrate, or perform work on its equipment.

1. Identify proprietary equipment, instrumentation, and tools required in the test equipment identification list submittal.
2. Proprietary equipment, instrumentation, and tools shall become the property of Owner at Substantial Completion.

2.3 REPORT FORMAT AND ORGANIZATION

A. General Format and Organization:

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. Record report on compact disk.
4. 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. Pre-startup reports.
 - c. Approved test procedures.
 - d. Test data forms, completed and signed.
 - e. 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: Contractor shall 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. CxA is to review results.
1. Service connection requirements, including configuration, size, location, and other pertinent characteristics.
 2. Included optional features.

3. 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.
4. 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. Access clearance to allow for maintenance, service, repair, removal, and replacement without the need to disassemble or remove other equipment or building elements. Access coordinated with other building elements and equipment, including, but not limited to, ceiling and wall access panels, in a manner consistent with OSHA fall-protection regulations and safe work practices.
 - f. Utility connections are of the correct characteristics, as applicable.
 - g. Correct labeling and identification.
 - h. Startup Checks: Verify readiness of equipment to be energized. Include manufacturer's standard startup procedures and forms.
- D. Startup: CxA shall direct, witness and document initial operation of equipment to prove that it is installed properly and operates as intended according to manufacturer's standard startup procedures, at minimum.
- E. Performance Tests:
 1. Static Tests: As specified elsewhere, including, but not limited to, duct and pipe leakage tests, insulation-resistance tests, and water-penetration tests.
 2. Component Performance Tests: Tests evaluate the performance of an input or output of components under a full range of operating conditions.
 3. Equipment and Assembly Performance Tests: Test and evaluate performance of equipment and assemblies under a full range of operating conditions and loads.
 4. System Performance Tests: Test and evaluate performance of systems under a full range of operating conditions and loads.
 5. Intersystem Performance Tests: Test and evaluate the interface of different systems under a full range of operating conditions and loads.
- F. Deferred Construction Checklists: Obtain Owner approval of Contractor's proposed deferral of construction checklists, including proposed schedule of completion of each deferred construction checklist, before submitting request for Certificate of Construction-Phase Commissioning Process Completion. When approved by Owner, deferred construction checklists may be completed after date of Construction-Phase Commissioning Completion. Include the following in a request for Certificate of Construction-Phase Commissioning Process 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.
- G. Delayed Construction Checklists: Obtain Owner approval of Contractor's proposed delayed construction checklists, including proposed schedule of completion of each delayed construction checklist, before submitting request for Certificate of Construction-Phase Commissioning Process Completion. When approved, delayed construction checklists may be completed after date of

Construction-Phase Commissioning Completion. Include the following in a request for Certificate of Construction-Phase Commissioning Process 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 process 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.
 1. Where sampling is specified, the sampling plan and procedure for the test demonstration shall be determined using ASQ Z1.4.
 2. The "lot size" in ASQ Z1.4 is the sum of the number of items to which the test demonstration applies, as described in the scope subparagraph of each test.
 3. On determination of the sample size, the samples shall be selected randomly by Owner's witness at the time of the test demonstration.
 4. Include in the Commissioning Plan a detailed list of the test demonstrations with lot and sample quantities for each test.
- 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:
 1. Operating the equipment and systems they install during tests.
 2. In addition, installing Contractors may be required to assist in tests of equipment and systems with which their work interfaces.

3.4 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 process.
- 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 weekly for work performed during the preceding week.
 4. Provide Commissioning Authority access to construction checklists.
- D. Installation Compliance Issues: Record as an installation compliance issue any Work that is found to be incomplete, inaccessible, at variance with the Contract Documents, nonfunctional, or that does 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.
1. Provide list of Compliance Issues within 5 working days of discovery. Maintain list with weekly updates until resolution. Coordinate or integrate compliance issues with final punch lists.
- E. Pre-Startup Audit: Prior to executing startup procedures, review completed installation checks to determine readiness for startup and operation. Report conditions, which, if left uncorrected, adversely impact the ability of systems or equipment to operate satisfactorily or to comply with acceptance criteria. Prepare pre-startup report for each system.
- F. 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. Test procedures shall be specific to the make, model, and application of the equipment and systems being tested.
 3. Completed test data forms are the official records of the test results.
 4. 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.
 5. Review preliminary test procedures and test data forms and provide comments within 14 days of receipt from Commissioning Authority. Review shall address the following:
 - a. Equipment protection and warranty issues, including, but not limited to, manufacturers' installation and startup recommendations, and operation and maintenance instructions.
 - b. Applicability of the procedure to the specific software, equipment, and systems approved for installation.
 6. After Contractor has reviewed and commented on the preliminary test procedures and test data forms, Commissioning Authority will revise and reissue the approved revised test procedures and test data forms marked "Approved for Testing."
 7. Use only approved test procedures and test data forms marked "Approved for Testing" to perform and document tests and test demonstrations.
- G. Performance of Tests:
1. Provide signed letter of completion from Contractor stating that installations are complete and ready for functional testing from CxA.

2. The sampling rate for tests is 100 percent. The sampling rate for test demonstrations is 100 percent unless otherwise indicated.
3. Perform and complete each step of the approved test procedures in the order listed.
4. Record data observed during performance of tests on approved data forms at the time of test performance and when the results are observed.
5. Record test results that are not within the range of acceptable results on commissioning issue report forms in addition to recording the results on approved test procedures and data forms according to the "Commissioning Compliance Issues" Paragraph in this Article.
6. On completion of a test, sign the completed test procedure and data form. Tests for which test procedures and data forms are incomplete, not signed, or which indicate performance that does not comply with acceptance criteria will be rejected. Tests for which test procedures and data forms are rejected shall be repeated and results resubmitted.

H. Performance of Test Demonstration:

1. Perform test demonstrations on a sample of tests after test data submittals are approved. The sampling rate for test demonstrations shall be 100 percent unless otherwise indicated in the individual test specification.
2. Notify Owner's at least **five working 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.
7. False load test requirements are specified in related sections.
 - a. Where false load testing is specified, provide temporary equipment, power, controls, wiring, piping, valves, and other necessary equipment and connections required to apply the specified load to the system. False load system shall be capable of steady-state operation and modulation at the level of load specified. Equipment and systems permanently installed in this work shall not be used to create the false load without Commissioning Authority's written approval.

I. Deferred Tests:

1. Deferred Test List: Identify, in the request for Certificate of Construction-Phase Commissioning Process Completion, proposed deferred tests or other tests approved for deferral until specified seasonal or other conditions are available. When approved, deferred tests may be completed after the date of Construction-Phase Commissioning Completion. Identify proposed deferred tests in the request for Certificate of Construction-Phase Commissioning Process Completion as follows:

- a. Identify deferred tests by number and title.
 - b. Provide a target schedule for completion of deferred tests.
2. Schedule and coordinate deferred tests. Schedule deferred tests when specified conditions are available. Notify Owner and Commissioning Authority at least three working days (minimum) in advance of tests.
3. Where deferred tests are specified, coordinate participation of necessary personnel and of Owner's witness. Schedule deferred tests to minimize occupant and facility impact. Obtain Owner's approval of the proposed schedule.

J. Delayed Tests:

1. Delayed Test List: Identify, in the request for Certificate of Construction-Phase Commissioning Process Completion, proposed delayed tests. Obtain Owner approval of proposed delayed tests, including proposed schedule of completion of each delayed test, before submitting request for Certificate of Construction-Phase Commissioning Process Completion. Include the following in the request for Certificate of Construction-Phase Commissioning Process Completion:
 - a. Identify delayed tests by test number and title.
 - b. Written approval of proposed delayed tests, including approved schedule of completion of delayed tests.
2. Schedule and coordinate delayed tests. Schedule delayed tests when conditions that caused the delay have been rectified. Notify Owner and Commissioning Authority at least three working days (minimum) in advance of tests.
3. Where delayed tests are approved, coordinate participation of necessary personnel and of Owner, Commissioning Authority, and Owner's witness. Schedule delayed tests to minimize occupant and facility impact. Obtain Owner's approval of the proposed schedule.

K. 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 24 hours of the test.
 - c. Determine the cause of the failure.
 - 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.
 - a. Exception: If an entire class of devices is determined to exhibit the identical issue, they may be reported on a single commissioning compliance issue report. (For example, if all

return-air damper actuators that are specified to fail to the open position are found to fail to the closed position, they may be reported on a single commissioning issue report. If a single commissioning issue report is used for multiple commissioning compliance issues, each device shall be identified in the report, and the total number of devices at issue shall be identified.

- b. Complete and submit Part 1 of the commissioning compliance issue report immediately when the condition is observed.
 - c. Record the commissioning compliance issue report number and describe the deficient condition on the data form.
 - d. Resolve commissioning compliance issues promptly. Complete and submit Part 2 of the commissioning compliance issue report when issues are resolved.
6. Diagnose and correct failed test demonstrations as follows:
 - a. Perform diagnostic tests and activities required to determine the fundamental cause of issues observed.
 - b. Record each step of the diagnostic procedure prior to performing the procedure. Update written procedure as changes become necessary.
 - c. Record the results of each step of the diagnostic procedure.
 - d. Record the conclusion of the diagnostic procedure on the fundamental cause of the issue.
 - e. Determine and record corrective measures.
 - f. Include diagnosis of fundamental cause of issues in commissioning compliance issue report.
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."
8. Do not correct commissioning compliance issues during test demonstrations.
 - a. Exceptions will be allowed if the cause of the issue is obvious, and resolution can be completed in less than ten minutes. If corrections are made under this exception, note the deficient conditions on the test data form and issue a commissioning compliance issue report. A new test data form marked "Retest," shall be initiated after the resolution has been completed.

3.5 COMMISSIONING MEETINGS

- A. Contractor shall schedule Commissioning meetings. Commissioning Authority will conduct commissioning meetings. Comply with requirements in Section 013100 "Project Management and Coordination."

3.6 SEQUENCING

- A. Sequencing of Commissioning Verification Activities: For a particular material, item of equipment, assembly, or system, perform the following in the order listed unless otherwise indicated:
 1. Construction Checklists:

- a. Material checks.
- b. Installation checks.
- c. Startup, as appropriate. Some startup may depend on component performance. Such startup may follow component performance tests on which the startup depends.
- d. Performance Tests:
 - 1) Static tests, as appropriate.
 - 2) Component performance tests. Some component performance tests may depend on completion of startup. Such component performance tests may follow startup.
 - 3) Equipment and assembly performance tests.
 - 4) System performance tests.
 - 5) Intersystem performance tests.

2. Commissioning tests.

- B. Before performing commissioning tests, verify that materials, equipment, assemblies, and systems are delivered, installed, started, and adjusted to perform according to construction checklists.
- C. Verify readiness of materials, equipment, assemblies, and systems by performing tests prior to performing test demonstrations. Notify Owner and Commissioning Authority if acceptable results cannot be achieved due to conditions beyond Contractor's control or responsibility.
- D. Commence tests as soon as installation checks for materials, equipment, assemblies, or systems are satisfactorily completed. Tests of a particular system may proceed prior to completion of other systems, provided the incomplete work does not interfere with successful execution of test.

3.7 SCHEDULING

- A. Commence commissioning process as early in the construction period as possible.
- B. Commissioning Schedule: Integrate commissioning activities into Construction Schedule. See Section 013216 "Construction Project Schedule."
 - 1. Include detailed commissioning activities in monthly updated 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. Startup, where required.
 - e. Performance tests.
 - f. Performance test demonstrations.
 - g. Commissioning tests.
 - h. Commissioning test demonstrations.
 - 3. Schedule shall include a line item for each installation check, startup, and test activity specific to the equipment or systems involved.
 - 4. Determine milestones and prerequisites for commissioning process. 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:

GENERAL COMMISSIONING REQUIREMENTS

1. Two weeks prior to the beginning of tests, submit a detailed two-week look-ahead schedule. Thereafter, submit updated two-week look-ahead schedules weekly for the duration of commissioning process.
2. Two-week look-ahead schedules shall identify the date, time, beginning location, Contractor personnel required, and anticipated duration for each startup or test activity.
3. Use two-week look-ahead schedules to notify and coordinate participation of Owner's witnesses.

D. Owner's Witness Coordination:

1. Coordinate Owner's witness participation.
2. Notify Owner and Commissioning Authority of commissioning schedule changes at least five work days in advance for activities requiring the participation of Owner's witness.

3.8 PHASED COMMISSIONING

- A. The project may require startup and initial checkout to be executed in phases. The phasing shall be planned and scheduled in a coordination meeting of the Owner, Commissioning Authority, and the Contractor. Results will be added to the master construction schedule and commissioning schedule.

3.9 FUNCTIONAL PERFORMANCE TESTING

- A. This sub-section applies to all commissioning functional testing for all divisions.
- B. The general list of equipment to be commissioned is found in Section 017500, Part 1.7 and referenced Sections. Samples of the equipment and modes to be tested are found in Section 23 08 19 and other sections where tests requirements are found.
- C. The parties responsible to execute each test are listed with each test in Sections XX 08 00 and other sections where test requirements are found.
- D. Objectives and Scope: The objective of functional performance testing is to demonstrate that each system is operating according to the documented Owner's Project Requirements and Contract Documents. Additionally, during the testing process, areas of deficient performance are identified and corrected, improving the operation and functioning of the systems. In general, each system should be operated through all modes of operation (seasonal, occupied, unoccupied, warm-up, cool-down, part- and full-load) where there is a specified system response. Verifying each sequence in the sequences of operation is required. Proper responses to such modes and conditions as power failure, freeze condition, low oil pressure, no flow, equipment failure, etc. shall also be tested. Specific modes required in this project are given in Sections XX 08 00 and other sections where test requirements are found.
- E. Development of Test Procedures: Before test procedures are written, the CxA shall obtain all requested documentation and a current list of change orders affecting equipment or systems, including an updated points list, program code, control sequences and parameters. Using the testing parameters and requirements in Sections XX 08 00 and other sections where test requirements are found, the CxA shall develop specific test procedures and forms to verify and document proper operation of each piece of equipment and system. Each Sub or vendor responsible to execute a test shall provide assistance to the CxA in developing the procedures review (answering questions about equipment, operation, sequences, etc.). Prior to execution, the CxA shall provide a copy of the test procedures to the Sub(s) who shall review the tests for feasibility, safety, equipment and warranty protection. The CxA may submit the tests to the A/E for review, if requested. The purpose of any given specific test is to verify and document compliance with the stated criteria of acceptance given on the test form.
- F. Representative test formats and examples (not designed for this project) are found in the Section 23 08 19. The test procedure forms developed by the CxA shall include (but not be limited to) the following information:

1. System and equipment or component name(s)
2. Equipment location and ID number
3. Unique test ID number, and reference to unique pre-functional checklist and start-up documentation ID numbers for the piece of equipment
4. Date
5. Project name
6. Participating parties
7. A copy of the specification section describing the test requirements
8. A copy of the specific sequence of operations or other specified parameters being verified.
9. Formulas used in any calculations.
10. Required pre-test field measurements.
11. Instructions for setting up the test.
12. Special cautions, alarm limits, etc.
13. Specific step-by-step procedures to execute the test, in a clear, sequential and repeatable format.
14. Acceptance criteria of proper performance with a Yes/No check box to allow for clearly marking whether or not proper performance of each part of the test was achieved.
15. A section for comments
16. Signatures and date block for the CxA

G. Test Methods

1. Functional performance testing and verification may be achieved by manual testing (persons manipulate the equipment and observe performance) or by monitoring the performance and analyzing the results using the control system's trend log capabilities or by stand-alone data loggers. Sections XX 08 00 specify which methods shall be used for each test. The CxA may substitute specified methods or require an additional method to be executed, other than what was specified, with no additional cost to the Owner. The CxA will determine which method is most appropriate for tests that do not have a method specified.
2. Simulated Conditions: Simulating conditions (not by an overwritten value) shall be allowed, though timing the testing to experience actual conditions is encouraged wherever practical.
3. Overwritten Values: Overwriting sensor values to simulate a condition, such as overwriting the outside air temperature reading in a control system to be something other than it really is, shall be allowed, but shall be used with caution and avoided when possible. Such testing methods often can only test a part of a system, as the interactions and responses of other systems will be erroneous or not applicable. Simulating a condition is preferable. e.g., for the above case, by heating the outside air sensor with a heat gun, rather than overwriting the value or by altering the appropriate set point to see the desired response. Before simulating conditions or overwriting values, sensors, transducers and devices shall have been calibrated.
4. Simulated Signals: Using a signal generator which creates a simulated signal to test and calibrate transducers and DDC constants is generally recommended over using the sensor to act as the signal generator via simulated conditions or overwritten values.
5. Altering Set points: Rather than overwriting sensor values, and when simulating conditions is difficult, altering set points to test a sequence is acceptable. For example, to see the AC compressor lockout work at an outside air temperature below 55°F, when the outside air temperature is above 55°F, temporarily change the lockout set point to be 2°F above the current outside air temperature.
6. Indirect Indicators: Relying on indirect indicators for responses or performance shall be allowed only after visually and directly verifying and documenting, over the range of the tested parameters, that the indirect readings through the control system represent actual conditions and responses. Much of this verification is completed during pre-functional testing.
7. Set-up: Each function and test shall be performed under conditions that simulate actual conditions as close as is practically possible. The Sub executing the test shall provide all necessary materials, system modifications, etc. to produce the necessary flows, pressures, temperatures, etc. necessary to execute the test according to the specified conditions. At completion of the test, the Sub shall

return all affected building equipment and systems, due to these temporary modifications, to their pre-test condition.

8. Sampling: Multiple identical pieces of non-life-safety or otherwise non-critical equipment may be functionally tested using a sampling strategy. Significant application differences and significant sequence of operation differences in otherwise identical equipment invalidates their common identity. A small size or capacity difference, alone, does not constitute a difference. The specific recommended sampling rates are specified with each type of equipment in Sections XX 08 00. It is noted that no sampling by Subs is allowed in pre-functional checklist execution.
 - a. A common sampling strategy referenced in the Specifications as the “xx% Sampling—yy% Failure Rule” is defined by the following example.
 - 1) xx = the percent of the group of identical equipment to be included in each sample.
 - 2) yy = the percent of the sample that if failing, will require another sample to be tested.
 - b. The example below describes a 20% Sampling—10% Failure Rule.
 - 1) Randomly test at least 20% (xx) of each group of identical equipment. In no case test less than three units in each group. This 20%, or three, constitute the “first sample.”
 - 2) If 10% (yy) of the units in the first sample fail the functional performance tests, test another 20% of the group (the second sample).
 - 3) If 10% of the units in the second sample fail, test all remaining units in the whole group.
 - 4) If at any point, frequent failures are occurring and testing is becoming more troubleshooting than verification, the CxA may stop the testing and require the responsible Sub to perform and document a checkout of the remaining units, prior to continuing with functionally testing the remaining units.
- H. Coordination and Scheduling: The Subs shall provide two (2) week notice to the CxA regarding their completion schedule for the pre-functional checklists and startup of all equipment and systems. The CxA will schedule functional tests through the CM or CM. The CxA shall direct, witness and document the functional testing of all equipment and systems. The Subs shall execute the tests.
- I. In general, functional testing is conducted after pre-functional testing and startup has been satisfactorily completed. The control system shall be sufficiently tested and approved by the CM or CM before it is used for TAB or to verify performance of other components or systems. The air balancing and water balancing is completed and debugged before functional testing of air-related or water-related equipment or systems. Testing proceeds from components to subsystems to systems. When the proper performance of all interacting individual systems has been achieved, the interface or coordinated responses between systems is checked.
- J. Test Equipment: Refer to Section 017500, Part 2 for test equipment requirements.
- K. Problem Solving: The CxA will recommend solutions to problems found, however the burden of responsibility to solve, correct and retest problems is with the CM, Subs and A/E.

3.10 DEFERRED TESTING

- A. Unforeseen Deferred Tests: If any check or test cannot be completed due to the building structure, required occupancy condition or other deficiency, execution of checklists and functional testing may be delayed upon approval of the CM. These tests will be conducted in the same manner as the seasonal tests as soon as possible. Services of necessary parties will be negotiated.

3.11 COMMISSIONING REPORTS

- A. Test Reports:

1. Pre-startup reports include observations of the conditions of installation, organized into the following sections:
 - a. Equipment Model Verification: Compare contract requirements, approved submittals, and provided equipment. Note inconsistencies.
 - b. 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.
 - c. Preinstallation Component Verification Checks: Verify components supplied with the equipment, preinstalled or field installed, are correctly installed and functional. Verify external components required for proper operation of equipment correctly installed and functional. Note missing, improperly configured, improperly installed, or nonfunctional components.
 - d. 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.
 - e. Evaluation of System Readiness for Startup: For each item of equipment for each system for which startup is anticipated, document in summary form acceptable to Owner completion of equipment model verification, preinstallation physical condition checks, preinstallation component verification checks, and completion of corrective actions for installation compliance issues.
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.
 - d. Data trend logs accumulated overnight from the previous day of testing.
3. Commissioning Compliance Issue 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 Owner. 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. Equipment identification and 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.

- j. When issues have been resolved, update and resubmit the commissioning issue report forms by completing Part 2. Identify resolution taken and the dates and initials of the persons making the entries.
 - k. Schedule for retesting.
4. Weekly progress reports include information for tests conducted since the preceding report and the following:
- a. Completed data forms.
 - b. Equipment or system tested, including test number, system or equipment tag number and location, and notation about the apparent acceptability of results.
 - c. Activities scheduled but not conducted per schedule.
 - d. Commissioning compliance issue report log.
 - e. Schedule changes for remaining Commissioning-Process Work, if any.
5. Data trend logs shall be initiated and running prior to the time scheduled for the test demonstration.
- a. Trend log data format shall be multiple data series graphs. Where multiple data series are trend logged concurrently, present the data on a common horizontal time axis. Individual data series may be presented on a segmented vertical axis to avoid interference of one data series with another, and to accommodate different axis scale values. Graphs shall be sufficiently clear to interpret data within the accuracy required by the acceptance criteria.
 - b. Attach to the data form printed trend log data collected during the test or test demonstration.
 - c. Record, print out, and attach to the data form operator activity during the time the trend log is running. During the time the trend log is running, operator intervention not directed by the test procedure invalidates the test results.
6. System Alarm Logs: Record and print out a log of alarms that occurred since the last log was printed. Evaluate alarms to determine if the previous day's work resulted in any conditions that are not considered "normal operation."
- a. Conditions that are not considered "normal operation" shall be reported on a commissioning issue report attached to the alarm log. Resolve as necessary. The intent of this requirement is to discover control system points or sequences left in manual or disabled conditions, equipment left disconnected, set points left with abnormal values, or similar conditions that may have resulted from failure to fully restore systems to normal, automatic control after test completion.

3.12 CERTIFICATE OF CONSTRUCTION-PHASE COMMISSIONING PROCESS COMPLETION

- A. When Contractor considers that construction-phase commissioning process, or a portion thereof which Owner agrees to accept separately, is complete, Contractor shall prepare and submit to Owner and Commissioning Authority 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 complete commissioning process.
- B. On receipt of Contractor's list, Commissioning Authority will make an inspection to determine whether the construction-phase commissioning process 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 Process Completion" Paragraph in the "Definitions" Article, Contractor shall, before issuance of the Certificate of Construction-Phase Commissioning Process 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 process completion.

- C. Contractor shall promptly correct deficient conditions and issues discovered during commissioning process. Costs of correcting such deficient conditions and issues, including additional testing and inspections, the cost of uncovering and replacement, and compensation for Owner's Consultants and Commissioning Authority's services and expenses made necessary thereby, shall be at Contractor's expense.
- D. When construction-phase commissioning process or designated portion is complete, Commissioning Authority will prepare a Certificate of Construction-Phase Commissioning Process Completion that shall establish the date of completion of construction-phase commissioning process. Certificate of Construction-Phase Commissioning Process Completion shall be submitted prior to requesting inspection for determining date of Substantial Completion.

END OF SECTION 019113