



Project Manual

CMU FORMATION DISTRICT RESIDENCE HALL

868 Bunting Avenue, Grand Junction, Colorado 81501

BID PACKAGE #1

June 1, 2026

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DOCUMENT 003119 - EXISTING CONDITION INFORMATION

1.01 EXISTING CONDITION INFORMATION

- A. This Document with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of the Bidders' own investigations. They are made available for Bidders' convenience and information. This Document and its attachments are not part of the Contract Documents.
- B. Survey information that includes information on existing conditions, prepared by Chris Rancier, dated May 11, 2026, is available for viewing at the office of Owner.

END OF DOCUMENT 003119

DOCUMENT 003132 - GEOTECHNICAL DATA

1.01 GEOTECHNICAL DATA

- A. This Document, with its referenced attachments, is part of the Procurement and Contracting Requirements for the Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of Bidders' own investigations. They are made available for Bidders' convenience and information. This Document and its attachments are not part of the Contract Documents.
- B. Because subsurface conditions indicated by the soil borings are a sampling in relation to the entire construction area, and for other reasons, Owner, Architect, Architect's consultants, and the firm reporting the subsurface conditions do not warranty the conditions below the depths of the borings or that the strata logged from the borings are necessarily typical of the entire site. Any party using the information described in the soil borings and geotechnical report accepts full responsibility for its use.
- C. A Geotechnical Investigation Report including Soil-Boring Data and Soil Resistivity for Project, obtained by Huddleston-Berry Engineering and Testing, LLC, dated May 9, 2026, is available for viewing as appended to this Project Manual.

END OF DOCUMENT 003132

SECTION 01 10 00 - SUMMARY

PART 1 GENERAL

1.01 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.

1.02 SUMMARY

- A. Section Includes:
 - 1. Project information.
 - 2. Work covered by Contract Documents.
 - 3. Phased construction.
 - 4. Work performed by Owner.
 - 5. Multiple Work Packages.
 - 6. Work under Owner's separate contracts.
 - 7. Future work not part of this Project.
 - 8. Owner's product purchase contracts.
 - 9. Owner-furnished/Contractor-installed (OFCI) products.
 - 10. Owner-furnished/Owner-installed (OFOI) products.
 - 11. Contractor-furnished/Owner-installed (CFOI) products.
 - 12. Contractor's use of site and premises.
 - 13. Coordination with occupants.
 - 14. Work restrictions.
 - 15. Specification and Drawing conventions.
 - 16. Miscellaneous provisions.
- B. Related Requirements:
 - 1. Section 01 50 00 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.
 - 2. Section 01 73 00 "Execution" for coordination of Owner-installed products.

1.03 DEFINITIONS

- A. Work Package: A group of specifications, drawings, and schedules prepared by the design team to describe a portion of the Project Work for pricing, permitting, and construction.

1.04 PROJECT INFORMATION

- A. Project Identification: CMU Formation District Residence Hall.CMU Formation District Residence Hall.
 - 1. Project Location: 868 Bunting Avenue, Grand Junction, Colorado 81501.868 Bunting Avenue, Grand Junction, Colorado 81501.
- B. Owner: Colorado Mesa University. Colorado Mesa University.
 - 1.

- C. Architect: Stantec Architecture Inc..
1. Architect's Representative: Kurt Bastord, (720) 778-4043, kurt.bastord@stantec.com.
- D. Architect's Consultants: Architect has retained the following design professionals, who have prepared designated portions of the Contract Documents:
1. **<Insert title of design discipline>: <Insert name of Architect's consultant firm>.**
 - a. **<Insert title of design discipline> Representative: <Insert name and contact information for Architect's consultant representative>.**
 2. **<Insert title of design discipline>: <Insert name of Architect's consultant firm>.**
 - a. **<Insert title of design discipline> Representative: <Insert name and contact information for Architect's consultant representative>.**
 3. **<Insert title of design discipline>: <Insert name of Architect's consultant firm>.**
 - a. **<Insert title of design discipline> Representative: <Insert name and contact information for Architect's consultant representative>.**
 4. **<Insert title of design discipline>: <Insert name of Architect's consultant firm>.**
 - a. **<Insert title of design discipline> Representative: <Insert name and contact information for Architect's consultant representative>.**
 5. **<Insert title of design discipline>: <Insert name of Architect's consultant firm>.**
 - a. **<Insert title of design discipline> Representative: <Insert name and contact information for Architect's consultant representative>.**
- E. Other Owner Consultants: Owner has retained the following design professionals who have prepared designated portions of the Contract Documents:
1. **<Insert title of design discipline>: <Insert name for consultant firm> has prepared the following portions of the Contract Documents:**
 - a. **<Insert title of design discipline> Representative: <Insert name and contact information of Owner consultant representative>.**
 - b. **Scope of Service: <Insert description of scope of service for Owner consultant>.**
- F. Contractor: **<Insert name of Contractor firm>** has been engaged as Contractor for this Project.
1. Contractor Representative: **<Insert name and contact information for Contractor representative>.**
 2. Construction Manager for this Project is Project's constructor. The terms "Construction Manager" and "Contractor" are synonymous.
 - 3.
- G.
- 1.
- H. Web-Based Project Software: Project software will be used for purposes of managing communication and documents during the construction stage.
1. See Section 01 31 00 "Project Management and Coordination" for requirements for using web-based Project software.

1.05 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and includes, but is not limited to, the following:
 - 1. **<Insert a brief description of Project indicating the size, code classification for occupancy and construction type, and general description of major building assemblies>** and other Work indicated in the Contract Documents.
- B. Type of Contract:
 - 1. Project will be constructed under a single prime contract.

1.06 PHASED CONSTRUCTION

- A. Construct the Work in phases, with each phase substantially complete as indicated **[on Drawings] [below]**.
 - 1. Phase **<Insert designation>**: **<Briefly describe work of this phase>**.
 - a. Commencement of Construction:
 - 1) Notice to Proceed: Work of this phase shall commence within **<Insert number of days>** after the Notice to Proceed.
 - 2) Start Date: Work of this phase shall commence by **<Insert date>**.
 - b. Substantial Completion:
 - 1) Within **<Insert number of days>** after **[commencement of construction of this phase] [after the Notice to Proceed]**.
 - 2) By **<Insert date>**.
 - 2. Phase **<Insert designation>**: Perform the remaining Work. The remaining Work shall be substantially complete at time of Substantial Completion of the Work.
- B. Before commencing Work of each phase, submit an updated copy of Contractor's construction schedule, showing the sequence, commencement and completion dates[, **and move-out and -in dates of Owner's personnel]** for all phases of the Work.

1.07 WORK PERFORMED BY OWNER

- A. 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. **<Insert a brief description of work performed by Owner>**.
- C. Concurrent Work: Owner will perform the following construction operations at Project site. Those operations will be conducted simultaneously with Work under this Contract.
 - 1. **<Insert a brief description of work performed by Owner>**.
- D. 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. **<Insert a brief description of work performed by Owner>**.

1.08 MULTIPLE WORK PACKAGES

- A. Construction Documents for this Project will be issued in a series of Work Packages, each defining the Work under individual Contracts. Coordinate the Work under this Contract with separate contracts defined by other work packages. **[Work Packages consist of the following:]**
1. **[Early Site Package]** <Insert Work Package title>: <Insert description of Work>. To be issued <Insert date of anticipated issue>.
 2. **[Foundations and Structure Package]** <Insert Work Package title>: <Insert description of Work>. To be issued <Insert date of anticipated issue>.
 3. **[General Building Package]** <Insert Work Package title>: <Insert description of Work>. To be issued <Insert date of anticipated issue>.
 4. **[Interior Upfit Package]** <Insert Work Package title>: <Insert description of Work>. To be issued <Insert date of anticipated issue>.

1.09 WORK UNDER OWNER'S SEPARATE CONTRACTS

- A. Work with Separate Contractors: Cooperate fully with Owner's separate contractors, so work on those contracts may be carried out smoothly, without interfering with or delaying Work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under Owner's separate contracts.
- B. Preceding Work: Owner **[has awarded]** **[or]** **[will award]** separate contract(s) for the following construction operations at Project site. Those operations **[are scheduled to be substantially complete before Work under this Contract begins]** **[may be substantially complete or may be partially conducted simultaneously with Work under this Contract]**.
1. <Insert name of the Contract>: To <Insert name of Owner's separate Contractor> **[to]** **[for]** <Insert a brief description of work performed under Owner's separate contract>.
- C. Concurrent Work: Owner **[has awarded]** **[will award]** **[and will assign to Contractor]** separate contract(s) for the following construction operations at Project site. Those operations will be conducted simultaneously with Work under this Contract.
1. <Insert name of the Contract>: To <Insert name of Owner's separate Contractor> **[to]** **[for]** <Insert a brief description of work performed under Owner's separate contract>.
- D. Subsequent Work: Owner **[has awarded]** **[will award]** separate contract(s) for the following additional work to be performed at site following Substantial Completion. Completion of that work will depend on successful completion of preparatory Work under this Contract.
1. <Insert name of the Contract>: To <Insert name of Owner's separate Contractor> **[to]** **[for]** <Insert a brief description of work performed under Owner's separate contract>.
- E. Future Work Not Part of this Contract: The Contract Documents include requirements that will allow Owner to carry out future work following completion of this Project; provide for the following future work:
1. <Insert description of future work requiring consideration during construction of the Work of this Contract>.

1.10 OWNER'S PRODUCT PURCHASE CONTRACTS

- A. Owner has negotiated Product Purchase contracts with suppliers of material and equipment to be incorporated into the Work. Owner will assign these Product Purchase contracts to Contractor. Include costs for purchasing, receiving, handling, storage if required, and installation of material and equipment in the Contract Sum unless otherwise indicated.
 - 1. Contractor's responsibilities are same as if Contractor had negotiated Product Purchase contracts, including responsibility to renegotiate purchase and to execute final purchasing agreements.
- B. Owner's Product Purchase Contracts Information:
 - 1. **<Insert product name>**: See Section **<Insert Section number>** "**<Insert Section title>**."
 - a. Purchase Contract Firm and Representative: **<Insert name and contact information of Product Purchase contract firm and representative>**.
 - b. Product Purchase Contract Scope: **[Furnishing material] [Material and installation labor] <Insert description of contract>**.
 - c. Product Purchase Status: **[Price negotiated by Owner, to be incorporated into the Contract Sum by Contractor; see Section 01 21 00 "Allowances" for cash allowance for Product Purchase contract] [Price negotiated and incorporated into the Contract Sum by Contractor] [Product reserved by Owner] [Order placed and deposit paid by Owner] [Order to be placed by Contractor] <Insert description of status of Product Purchase contract>**.
 - d. Quantity: **<Insert quantity ordered>**.
 - e. Other Requirements: **<Insert special requirements>**.

1.11 OWNER-FURNISHED/CONTRACTOR-INSTALLED (OFCI) PRODUCTS

- A. Owner's Responsibilities: Owner will furnish products indicated and perform the following, as applicable:
 - 1. Provide to Contractor Owner-reviewed Product Data, Shop Drawings, and Samples.
 - 2. Provide for delivery of Owner-furnished products to Project site.
 - 3. Upon delivery, inspect, with Contractor present, delivered items.
 - a. If Owner-furnished products are damaged, defective, or missing, arrange for replacement.
 - 4. Obtain manufacturer's inspections, service, and warranties.
 - 5. Inform Contractor of earliest available delivery date for Owner-furnished products.
- B. Contractor's Responsibilities: The Work includes the following, as applicable:
 - 1. Designate delivery dates of Owner-furnished products in Contractor's construction schedule, utilizing Owner-furnished earliest available delivery dates.
 - 2. Review Owner-reviewed Product Data, Shop Drawings, and Samples, noting discrepancies and other issues in providing for Owner-furnished products in the Work.
 - 3. Receive, unload, handle, store, protect, and install Owner-furnished products.
 - 4. Make building services connections for Owner-furnished products.
 - 5. Protect Owner-furnished products from damage during storage, handling, and installation and prior to Substantial Completion.
 - 6. Repair or replace Owner-furnished products damaged following receipt.
- C. Owner-Furnished/Contractor-Installed (OFCI) Products:

1. **<Insert description, in separate subparagraphs, for each Owner-furnished/Contractor-installed product>.**

1.12 OWNER-FURNISHED/OWNER-INSTALLED (OFOI) PRODUCTS

- A. The Owner will furnish and install products indicated.
- B. Owner-Furnished/Owner-Installed (OFOI) Products:
 1. **<Insert description, in separate subparagraphs, for each Owner-furnished/Owner-installed product>.**

1.13 CONTRACTOR-FURNISHED/OWNER-INSTALLED (CFOI) PRODUCTS

- A. Contractor shall furnish products indicated. The Work includes unloading, handling, storing, and protecting Contractor-furnished products as directed and turning them over to Owner at Project closeout.
- B. Contractor-Furnished/Owner-Installed (CFOI) Products:
 1. **<Insert description, in separate subparagraphs, for each Contractor-furnished/Owner-installed product>.**

1.14 CONTRACTOR'S USE OF SITE AND PREMISES

- A. Unrestricted Use of Site: **[Each]** Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.
- B. Restricted Use of Site: **[Each]** 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.
- C. Limits on Use of Site: Limit use of Project site to **[Work in areas] [areas within the Contract limits]** indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 1. Limits on Use of Site: Confine construction operations to **<Insert description of areas where work is permitted>.**
 2. Limits: Limit site disturbance, including earthwork and clearing of vegetation, to 40 feet beyond building perimeter; 10 feet beyond surface walkways, patios, surface parking, and utilities less than 12 inches in diameter; 15 feet beyond primary roadway curbs and main utility branch trenches; and 25 feet beyond constructed areas with permeable surfaces (such as pervious paving areas, stormwater detention facilities, and playing fields) that require additional staging areas in order to limit compaction in the constructed area.
 3. Limits: Limit site disturbance, including earthwork and clearing of vegetation, to 40 feet beyond building perimeter; 15 feet beyond surface walkways, patios, surface parking, and utilities; and 25 feet beyond constructed areas with permeable surfaces that require additional staging areas to limit compaction in the constructed areas.
 4. 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.
- D. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.
- E. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.

1.15 COORDINATION WITH OCCUPANTS

- A. Full Owner Occupancy: Owner will occupy Project site and **[existing]** **[adjacent]** 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 facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.
 - 2. Notify Owner not less than **[72]** **<Insert number>** hours in advance of activities that will affect Owner's operations.
- B. Partial Owner Occupancy: Owner will occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits unless otherwise indicated.
 - 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.
 - 2. Provide not less than **[72]** **<Insert number>** hours' notice to Owner of activities that will affect Owner's operations.
- C. Owner Limited Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed portions of the Work, prior to Substantial Completion of the Work, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and limited occupancy shall not constitute acceptance of the total Work.
 - 1. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied prior to Owner acceptance of the completed Work.
 - 2. Obtain a Certificate of Occupancy from authorities having jurisdiction before limited Owner occupancy.
 - 3. Before limited Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will operate and maintain mechanical and electrical systems serving occupied portions of Work.
 - 4. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of Work.

1.16 WORK RESTRICTIONS

- A. Comply with restrictions on construction operations.
 - 1. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work to between **<Insert time>** a.m. to **<Insert time>** p.m., Monday through Friday, unless otherwise indicated. Work hours may be modified to meet Project requirements if approved by Owner and authorities having jurisdiction.
 - 1. Weekend Hours: **<Insert restrictions on times permitted for weekend work>**.
 - 2. Early Morning Hours: **<Insert restrictions or references to regulations by authorities having jurisdiction for restrictions on noisy work>**.
 - 3. Work in Existing Building: **<Insert restrictions on times permitted and other Owner's restrictions>**.
 - 4. Hours for Utility Shutdowns: **<Insert Owner's restrictions>**.
 - 5. Hours for **[Core Drilling]** **<Insert noisy activity>**: **<Insert Owner's restrictions>**.
- C. On-Site Work Day Restrictions: Do not perform work **[resulting in utility shutdowns]** **[or]** **[resulting in noisy activity]** on-site during work black-out days indicated in Document 003113 "Preliminary Schedules."
- D. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging for temporary utility services according to requirements indicated:
 - 1. Notify **[Architect]** **[Construction Manager]** **[Owner]** not less than **[two]** **<Insert number>** days in advance of proposed utility interruptions.
 - 2. Obtain **[Architect's]** **[Construction Manager's]** **[Owner's]** written permission before proceeding with utility interruptions.
- E. Noise, Vibration, Dust, and Odors: Coordinate operations that may result in high levels of noise and vibration, dust, odors, or other disruption to Owner occupancy with Owner.
 - 1. Notify **[Architect]** **[Construction Manager]** **[Owner]** not less than **[two]** **<Insert number>** days in advance of proposed disruptive operations.
 - 2. Obtain **[Architect's]** **[Construction Manager's]** **[Owner's]** written permission before proceeding with disruptive operations.
- F. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet of entrances, operable windows, or outdoor-air intakes.
- G. Smoking and Controlled Substance Restrictions: Use of tobacco products **[, alcoholic beverages,]** and other controlled substances **[within the existing building]** **[on Project site]** **[on Owner's property]** is not permitted.
- H. Employee Identification: **[Provide]** **[Owner will provide]** identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.
- I. Employee Screening: Comply with Owner's requirements for **[drug]** **[and]** **[background]** screening of Contractor personnel working on Project site.
 - 1. Maintain list of approved screened personnel with Owner's representative.

1.17 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. Text Color: Text used in the Specifications, including units of measure, manufacturer and product names, and other text may appear in multiple colors or underlined as part of a hyperlink; no emphasis is implied by text with these characteristics.
 - 3. Hypertext: Text used in the Specifications may contain hyperlinks. Hyperlinks may allow for access to linked information that is not residing in the Specifications. Unless otherwise indicated, linked information is not part of the Contract Documents.
 - 4. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 00 Contracting Requirements: General provisions of the Contract, including General and Supplementary Conditions, apply to all Sections of the Specifications.
- C. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- D. 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 **[scheduled on Drawings] [and] [published as part of the U.S. National CAD Standard]**.
 - 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

1.18 MISCELLANEOUS PROVISIONS

- A. **<Insert miscellaneous provisions>.**

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01 21 00 - ALLOWANCES

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements governing allowances.
- B. Types of allowances include the following:
 - 1. Quantity allowances.
 - 2. Contingency allowances.
 - 3. Testing and inspecting allowances.

1.02 DEFINITIONS

- A. Allowance: A quantity of work or dollar amount included in the Contract, 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.

1.03 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Architect 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 Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by Architect from the designated supplier.

1.04 ACTION SUBMITTALS

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

1.05 INFORMATIONAL SUBMITTALS

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

1.06 QUANTITY ALLOWANCES

- A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.

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

1.07 CONTINGENCY ALLOWANCES

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

1.08 TESTING AND INSPECTING ALLOWANCES

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

1.09 ADJUSTMENT OF ALLOWANCES

- A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, required maintenance materials, and similar margins.
 - 1. Include installation costs in purchase amount only where indicated as part of the allowance.
 - 2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other 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 due to a change in the 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

3.01 EXAMINATION

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

3.02 PREPARATION

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

3.03 SCHEDULE OF ALLOWANCES

- A. Allowance No. 01: Quantity Allowance: Include 2000 cu. yd. of unsatisfactory soil excavation and disposal off-site and replacement with satisfactory soil material from off-site, as specified in Section 31 20 00 "Earth Moving."
- B. Allowance No. 02: Quantity Allowance: Include 1000 cu. yd. of mass rock removal and replacement with satisfactory soil material, as specified in Section 31 20 00 "Earth Moving."
- C. Allowance No. 03: Quantity Allowance: Include 10 cu. yd. of trench rock removal and replacement with satisfactory soil material, as specified in Section 31 20 00 "Earth Moving."
- D. Allowance No. 04: Quantity Allowance: Include MVE-Control System installed for entire slab in scope of Work, as specified in Division 09 Section "Moisture Vapor Emission Control."

END OF SECTION

SECTION 01 22 00 - UNIT PRICES

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for unit prices.

1.02 DEFINITIONS

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

1.03 PROCEDURES

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.
- B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
- C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.
- D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the Part 3 "Schedule of Unit Prices" Article contain requirements for materials described under each unit price.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.01 SCHEDULE OF UNIT PRICES

- A. Unit Price No. 01: Removal of unsatisfactory soil and replacement with satisfactory soil material.
 - 1. Description: Unsatisfactory soil excavation and disposal off-site and replacement with satisfactory fill material or engineered fill from off-site, as required, in accordance with Section 31 20 00 "Earth Moving."
 - 2. Unit of Measurement: 10 cubic yard (cubic meter) of soil excavated, based on in-place surveys of volume before and after removal.
 - 3. Quantity Allowance: Coordinate unit price with allowance adjustment requirements in Section 01 21 00 "Allowances."
- B. Unit Price No. 02: Mass rock excavation and replacement with satisfactory soil material.

1. Description: Classified mass rock excavation and disposal off-site and replacement with satisfactory fill material or engineered fill from off-site, as required, in accordance with Section 31 20 00 "Earth Moving."
 2. Unit of Measurement: 10 cubic yard (cubic meter) of rock excavated, based on in-place surveys of volume before and after removal.
 3. Quantity Allowance: Coordinate unit price with allowance adjustment requirements in Section 01 21 00 "Allowances."
- C. Unit Price No. 03: Trench rock excavation and replacement with satisfactory soil material.
1. Description: Classified trench rock excavation and disposal off-site and replacement with satisfactory fill material or engineered fill from off-site, as required, in accordance with Section 31 20 00 "Earth Moving."
 2. Unit of Measurement: 10 cubic yard (cubic meter) of rock excavated, based on survey of in-place surveys volume of before and after removal.
 3. Quantity Allowance: Coordinate unit price with allowance adjustment requirements in Section 01 21 00 "Allowances."
- D. Unit Price No. 04: Cutting and patching of concrete slabs-on-grade.
1. Description: Cutting of new or existing concrete slabs-on-grade up to 8 inches thick, removal and excavation as required, and subsequent backfill, compaction, and patching of concrete in accordance with Section 01 73 00 "Execution." not otherwise indicated in the Contract Documents.
 2. Unit of Measurement: Square feet (square meters) of concrete removed.
- E. Unit Price No. 05: Miscellaneous and structural steel.
1. Description: Miscellaneous lintels and other supports not otherwise indicated in the Contract Documents, in accordance with Section 05 12 00 "Structural Steel Framing" and Section 05 50 00 "Metal Fabrications."
 2. Unit of Measurement: Cost in place of one ton of fabricated steel, as indicated on itemized invoice of steel supplier.
- F. Unit Price No. 06: Elevator jack hole rock.
1. Description: Subsurface soil conditions that refuse conventional auger excavation of the elevator jack hole, in accordance with Section 14 24 00 "Hydraulic Elevators."
 2. Unit of Measurement: Depth in 30 feet (meters) of drilling required, as indicated on the elevator Installer's invoice.
- G. Unit Price No. 07: Moisture vapor emission control.
1. Description: Moisture mitigation treatment according to Section 09 "Moisture Vapor Emission Control," when preconstruction testing performed on concrete floor slabs scheduled to receive adhered floor coverings determine that moisture content, vapor emission levels, or pH levels of concrete floor slabs exceeds adhesive and floor covering manufacturer's recommended maximum levels.
 2. Unit of Measurement: Square feet of floor area treated.

END OF SECTION

SECTION 01 23 00 - ALTERNATES

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for alternates.

1.02 DEFINITIONS

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

1.03 PROCEDURES

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include, as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation, whether or not indicated as part of alternate.
- B. Execute accepted alternates under the same conditions as other Work of the Contract.
- C. Schedule: A Part 3 "Schedule of Alternates" Article is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.01 SCHEDULE OF ALTERNATES

- A. Alternate No. **<Insert number>**: **<Insert title of alternate>**.
 - 1. Base Bid: **<Insert brief description of base-bid requirement>** as indicated on Drawing **<Insert title of Drawing>** and as specified in Section **<Insert Section number>** "**<Insert Section title>**."
 - 2. Alternate: **<Insert brief description of alternate requirement>** as indicated on Drawing **<Insert title of Drawing>** and as specified in Section **<Insert Section number>** "**<Insert Section title>**."

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GRAND JUNCTION, COLORADO

BID PACKAGE #1
JUNE 1, 2026

END OF SECTION

SECTION 01 25 00 - SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.01 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.

1.02 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
 - 1. Document 002600 "Procurement Substitution Procedures" for requirements for substitution requests prior to award of Contract.
 - 2. Section 01 21 00 "Allowances" for products selected under an allowance.
 - 3. Section 01 23 00 "Alternates" for products selected under an alternate.
 - 4. Section 01 60 00 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.03 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.

1.04 ACTION SUBMITTALS

- A. Substitution Requests: Submit documentation identifying product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use form **[provided in Project Manual] [that is part of web-based Project management software] [acceptable to Architect]**.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
 - b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.

- c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
 - h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
 - i. Research reports evidencing compliance with building code in effect for Project, from [ICC-ES] <Insert applicable code organization>.
 - j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - k. Cost information, including a proposal of change, if any, in the Contract Sum.
 - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
 - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within [seven] <Insert number> days of receipt of a request for substitution. Architect will notify Contractor[**through Construction Manager**] of acceptance or rejection of proposed substitution within [15] <Insert number> days of receipt of request, or [seven] <Insert number> days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.05 QUALITY ASSURANCE

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

1.06 PROCEDURES

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

1.07 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than **[15] <Insert number>** 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. Requested substitution provides sustainable design characteristics that specified product provided for compliance with LEED requirements.
 - c. Requested substitution provides sustainable design characteristics that specified product provided for compliance with IgCC requirements.
 - d. Requested substitution provides sustainable design characteristics that specified product provided for compliance with ASHRAE 189.1 requirements.
 - e. Requested substitution provides sustainable design characteristics that specified product provided for compliance with Green Globes requirements.
 - f. Substitution request is fully documented and properly submitted.
 - g. Requested substitution will not adversely affect Contractor's construction schedule.
 - h. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - i. Requested substitution is compatible with other portions of the Work.
 - j. Requested substitution has been coordinated with other portions of the Work.
 - k. Requested substitution provides specified warranty.
 - l. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Not allowed[**unless otherwise indicated**].
- C. Substitutions for Convenience: Architect will consider requests for substitution if received within **[60] <Insert number>** days after **[commencement of the Work] [the Notice to Proceed] [the Notice of Award]**. 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. Requested substitution provides sustainable design characteristics that specified product provided for compliance with LEED requirements.
 - e. Requested substitution provides sustainable design characteristics that specified product provided for compliance with IgCC requirements.

- f. Requested substitution provides sustainable design characteristics that specified product provided for compliance with ASHRAE 189.1 requirements.
- g. Requested substitution provides sustainable design characteristics that specified product provided for compliance with Green Globes requirements.
- h. Substitution request is fully documented and properly submitted.
- i. Requested substitution will not adversely affect Contractor's construction schedule.
- j. Requested substitution has received necessary approvals of authorities having jurisdiction.
- k. Requested substitution is compatible with other portions of the Work.
- l. Requested substitution has been coordinated with other portions of the Work.
- m. Requested substitution provides specified warranty.
- n. 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 01 32 33 - PHOTOGRAPHIC DOCUMENTATION

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Preconstruction photographs.
 - 2. Concealed Work photographs.
 - 3. Periodic construction photographs.
 - 4. Time-lapse sequence construction photographs.
 - 5. Final Completion construction photographs.
 - 6. Preconstruction video recordings.
 - 7. Periodic construction video recordings.
 - 8. Time-lapse sequence construction video recordings.
 - 9. Construction webcam.
- B. Related Requirements:
 - 1. Section 01 77 00 "Closeout Procedures" for submitting photographic documentation as Project Record Documents at Project closeout.
 - 2. Section 01 79 00 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.
 - 3. Section 02 41 16 "Structure Demolition" for photographic documentation before building demolition operations commence.
 - 4. Section 02 41 19 "Selective Demolition" for photographic documentation before selective demolition operations commence.
 - 5. Section 31 10 00 "Site Clearing" for photographic documentation before site clearing operations commence.

1.02 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] <Insert number>** days of taking photographs.
 - 1. Submit photos **[on CD-ROM or thumb-drive] [by uploading to web-based Project management software site]**. 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] [in web-based Project management software site]**:
 - a. Name of Project.
 - b. Name and contact information for photographer.
 - c. Name of Architect **[and Construction Manager]**.
 - d. Name of Contractor.
 - e. Date photograph was taken.

- f. Description of location, vantage point, and direction.
 - g. Unique sequential identifier keyed to accompanying key plan.
- C. Printed Photographs: Submit **[two]** <Insert number> sets of prints of each photographic view within **[seven]** <Insert number> days of taking photographs.
 - 1. Format: 8-by-10-inch smooth-surface matte prints on single-weight, paper; enclosed back to back in clear plastic sleeves punched for three-ring binder. Include copy of key plan indicating each photograph's location and direction. Provide one binder for each set of prints.
 - 2. Identification: On back of each print, label with the following information:
 - a. Name of Project.
 - b. Name and contact information for photographer.
 - c. Name of Architect[**and Construction Manager**].
 - d. Name of Contractor.
 - e. Date photograph was taken if not date stamped by camera.
 - f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
 - g. Unique sequential identifier keyed to accompanying key plan.
- D. Video Recordings: Submit video recordings within **[seven]** <Insert number> days of recording.
 - 1. Submit video recordings **[on CD-ROM or thumb drive]** **[by uploading to web-based Project management software site]**. Include copy of key plan indicating each video's location and direction.
 - 2. Identification: With each submittal, provide the following information **[in file metadata tag]** **[on web-based Project management software site]**:
 - a. Name of Project.
 - b. Name and contact information for photographer.
 - c. Name of Architect[**and Construction Manager**].
 - d. Name of Contractor.
 - e. Date video recording was recorded.
 - f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
 - 3. Transcript: Prepared on 8-1/2-by-11-inch paper, punched and bound in three-ring binders. Provide label on front and spine. Include a cover sheet with label information. Include name of Project and date of video recording on each page.
- E. Time-Lapse Video: Submit time-lapse sequence video recordings within <Insert number> days of recording.
 - 1. Submit time-lapse sequence video recordings **[monthly]** <Insert frequency> **[on CD-ROM or thumb drive]** **[by uploading to web-based Project management software site]**.
 - 2. Identification: For each recording, provide the following information **[in file metadata tag]** **[on web-based Project management software site]**:
 - a. Name of Project.
 - b. Name and contact information for photographer.
 - c. Name of Architect[**and Construction Manager**].
 - d. Name of Contractor.
 - e. Date(s) and time(s) video recording was recorded.
 - f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.

1.03 QUALITY ASSURANCE

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

1.04 FORMATS AND MEDIA

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

1.05 CONSTRUCTION PHOTOGRAPHS

- A. Photographer: Engage a qualified photographer to take construction photographs.
- B. 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.
- C. Preconstruction Photographs: Before commencement of the Work, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect Construction Manager.
 - 1. Flag [excavation areas] [construction limits] before taking construction photographs.
 - 2. Take [20] <Insert number> photographs to show existing conditions adjacent to property before starting the Work.
 - 3. Take [20] <Insert number> 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.
- D. Concealed Work Photographs: Before proceeding with installing work that will conceal other work, take photographs sufficient in number, with annotated descriptions, to record nature and location of concealed Work, including, but not limited to, the following:
 - 1. Underground utilities.

2. Underslab services.
 3. Piping.
 4. Electrical conduit.
 5. Waterproofing and weather-resistant barriers.
 6. **<Insert description of Work>**.
- E. Periodic Construction Photographs: Take 20 50 Insert number photographs weekly monthly Insert time interval coinciding with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.
- F. Time-Lapse Sequence Construction Photographs: Take 20 Insert number photographs as indicated, to show status of construction and progress since last photographs were taken.
1. Frequency: Take photographs monthly, on the same date each month weekly, on the same day each week Insert time interval.
 2. Vantage Points: Following suggestions by Architect Construction Manager and Contractor, photographer to select vantage points. During each of the following construction phases, take not less than two Insert number of the required shots from same vantage point each time, to create a time-lapse sequence as follows:
 - a. Commencement of the Work, through completion of subgrade construction.
 - b. Above-grade structural framing.
 - c. Exterior building enclosure.
 - d. Interior Work, through date of Substantial Completion.
 - e. **<Insert vantage point>**.
- G. Final Completion Construction Photographs: Take 20 50 100 Insert number photographs after date of Substantial Completion for submission as Project Record Documents. Architect Construction Manager will inform photographer of desired vantage points.
- H. Additional Photographs: Architect[**or Construction Manager**] may request photographs in addition to periodic photographs specified. Additional photographs will be paid for by Change Order and are not included in the Contract Sum[**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 are to be taken at fabrication locations away from Project site. These photographs are not subject to unit prices or unit-cost allowances.
 - d. Substantial Completion of a major phase or component of the Work.
 - e. Extra record photographs at time of final acceptance.
 - f. Owner's request for special publicity photographs.

1.06 CONSTRUCTION VIDEO RECORDINGS

- A. Video Recording Photographer: Engage a qualified videographer to record construction video recordings.

- B. Narration: Describe scenes on video recording by **[audio narration by microphone while]** **[or]** **[dubbing audio narration off-site after]** video recording is recorded. Include description of items being viewed, recent events, and planned activities. At each change in location, describe vantage point, location, direction (by compass point), and elevation or story of construction.
 - 1. Confirm date and time at beginning and end of recording.
 - 2. Begin each video recording with name of Project, Contractor's name, videographer's name, and Project location.
- C. Transcript: Provide a typewritten transcript of the narration. Display images and running time captured from video recording opposite the corresponding narration segment.
- D. Preconstruction Video Recording: Before starting excavation demolition construction, record video recording of Project site and surrounding properties from different vantage points, as directed by Architect Construction Manager.
 - 1. Flag **[excavation areas]** **[construction limits]** before recording construction video recordings.
 - 2. Show existing conditions adjacent to Project site before starting the Work.
 - 3. Show existing buildings either on or adjoining Project site to accurately record physical conditions at the start of **[excavation]** **[demolition]** **[construction]**.
 - 4. Show protection efforts by Contractor.
- E. Periodic Construction Video Recordings: Record video recording monthly weekly Insert time interval coinciding with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last video recordings were recorded. Minimum recording time to be 30 Insert number minutes(s).
- F. Time-Lapse Sequence Construction Video Recordings: Record video recording to show status of construction and progress.
 - 1. Frequency: During each of the following construction phases, set up video recorder to automatically record one frame of video recording every five Insert time minutes, from same vantage point each time, to create a time-lapse sequence of 30 minutes Insert time in length as follows:
 - a. Commencement of the Work, through completion of subgrade construction.
 - b. Above-grade structural framing.
 - c. Exterior building enclosure.
 - d. **<Insert construction phase>**.
 - 2. Timer: Provide timer to automatically start and stop video recorder, so recording occurs only during **[daylight]** **[construction work]** hours.
 - 3. Vantage Points: Following suggestions by **[Architect]** **[Construction Manager]** and Contractor, photographer to select vantage points.

1.07 CONSTRUCTION WEBCAM

- A. Webcam: Provide one two Insert number fixed-location camera(s) with weatherproof housing, mounted to provide unobstructed view of construction site from location approved by Architect, with the following characteristics:
 - 1. Static view Remotely controllable view with mouse-click user navigation for horizontal pan, vertical tile, and optical zoom of 500 percent minimum.
 - 2. Capable of producing minimum 8 12 Insert number megapixel images.

3. Provide pole mount, parapet mount, power supply, solar power station, active high-speed data connection to service provider's network, and static public IP address for each camera.
- B. Live Streaming Images: Provide web-accessible image of current site image, updated at five 15 Insert number-minute intervals during daytime operation when construction is underway.
- C. Web-Based Interface: Provide online interface to allow viewing of each high-definition digital still image captured and stored during construction, from the Internet.
 1. Access Control: Provide password-protected access for Project team administered by Contractor, providing current image access and archival image access by date and time, with images downloadable to viewer's device.
 2. Software: Provide responsive software interface for use on computer, tablet, and mobile screens with accompanying iPhone/iPad app and Android apps.
 3. Storage: Maintain images on the website for reference during entire construction period, and for not less than 30 days after Final Completion. Provide sufficient memory on remote server to store all Project images.
 4. Online Interface: Provide website interface with Project and client information and logos, calendar-based navigation interface for selecting images, and pan and zoom capability within high-definition images.
 5. Forward and Reverse: Provide capability to browse through images, moving forward and backward in time by individual image and by day.
 6. Slideshow: Provide capability to automatically display current images from sites when there are three or more cameras used.
 7. Time-Lapse: Provide capability for online display of project time-lapse.
 8. Dashboard: Provide capability to view thumbnails of all cameras on one screen.
 9. Weather: Provide corresponding weather data for each image captured.
 10. Provide public viewer open access[**to most recent Project camera image**].
- D. Maintain cameras and web-based access in good working order, in accordance with web-based construction photographic documentation service provider's written instructions until Final Completion. Provide for service of cameras and related networking devices and software.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01 33 00 - SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Submittal schedule requirements.
 - 2. Administrative and procedural requirements for submittals.

1.02 DEFINITIONS

- A. 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."
- B. 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."

1.03 SUBMITTAL SCHEDULE

- A. 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.
 - 1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
 - 2. Initial Submittal Schedule: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 - 3. 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.
 - 4. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal Category: Action; informational.
 - d. Name of subcontractor.
 - e. Description of the Work covered.
 - f. Scheduled date for Architect's final release or approval.
 - g. Scheduled dates for purchasing.
 - h. Scheduled date of fabrication.
 - i. Scheduled dates for installation.
 - j. Activity or event number.

1.04 SUBMITTAL FORMATS

- A. Submittal Information: Include the following information in each submittal:
1. Project name.
 2. Date.
 3. Name of Architect.
 4. Name of Construction Manager.
 5. Name of Contractor.
 6. Name of firm or entity that prepared submittal.
 7. Names of subcontractor, manufacturer, and supplier.
 8. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier and alphanumeric suffix for resubmittals.
 9. Category and type of submittal.
 10. Submittal purpose and description.
 11. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
 12. Drawing number and detail references, as appropriate.
 13. Indication of full or partial submittal.
 14. Location(s) where product is to be installed, as appropriate.
 15. Other necessary identification.
 16. Remarks.
 17. Signature of transmitter.
- B. Options: Identify options requiring selection by Architect.
- C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.
- D. Paper Submittals:
1. Place a permanent label or title block on each submittal item for identification; include name of firm or entity that prepared submittal.
 2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
 3. Action Submittals: Submit three paper copies of each submittal unless otherwise indicated. Architect copies.
 4. Informational Submittals: Submit two paper copies of each submittal unless otherwise indicated. Architect will not return copies.
 5. Additional Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
 6. Transmittal for Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using transmittal form.
- E. Electronic Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.

- F. Submittals Utilizing Web-Based Project Software: Prepare submittals as PDF files or other format indicated by Project management software.

1.05 SUBMITTAL PROCEDURES

- A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
1. Web-Based Project Management Software: Prepare submittals in PDF form, and upload to web-based Project management software website. Enter required data in web-based software site to fully identify submittal.
- B. 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 submittals for related parts of the Work specified in different Sections, so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's 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 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Allow 15 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 21 days for initial review of each submittal.
 5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 15 days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.
 - a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.
- D. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
1. Note date and content of previous submittal.
 2. Note date and content of revision in label or title block, and clearly indicate extent of revision.
 3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.

- E. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

1.06 SUBMITTAL REQUIREMENTS

- A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 - 1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
 - 2. Mark each copy of each submittal to show which products and options are applicable.
 - 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance with specified referenced standards.
 - e. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.
 - g. Notation of coordination requirements.
 - h. Availability and delivery time information.
 - 4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams that show factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 - 5. Submit Product Data before Shop Drawings, and before or concurrently with Samples.
- B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data unless submittal based on Architect's digital data drawing files is otherwise permitted.
 - 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. Paper Sheet Size: Except for templates, patterns, and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 30 by 42 inches.
 - a. Three opaque copies of each submittal. Architect will retain one copy; remainder will be returned.
 - 3. BIM Incorporation: Develop and incorporate Shop Drawing files into BIM established for Project.

- C. Samples: Submit Samples for review of type, color, pattern, and texture for a check of these characteristics with other materials.
1. Transmit Samples that contain multiple, related components, such as accessories together in one submittal package.
 2. Identification: Permanently attach label on unexposed side of Samples that includes the following:
 - a. Project name and submittal number.
 - b. Generic description of Sample.
 - c. Product name and name of manufacturer.
 - d. Sample source.
 - e. Number and title of applicable Specification Section.
 - f. Specification paragraph number and generic name of each item.
 3. Paper Transmittal: Include paper transmittal, including complete submittal information indicated.
 4. 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.
 5. 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.
 6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit three sets of Samples. Architect will retain one Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record Sample.
 - 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.
- D. 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.
- E. 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.
- F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.
- 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. Installer Certificates: Submit written statements on manufacturer's letterhead, certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
 3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead, certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
 4. Material Certificates: Submit written statements on manufacturer's letterhead, certifying that material complies with requirements in the Contract Documents.
 5. Product Certificates: Submit written statements on manufacturer's letterhead, certifying that product complies with requirements in the Contract Documents.
 6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of AWS B2.1/B2.1M on AWS forms. Include names of firms and personnel certified.
- H. Test and Research Reports:
1. 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 substrate preparation and primers required.
 2. 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.
 3. 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.
 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. 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.

6. 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.

1.07 DELEGATED DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file paper copies 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. 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 Incorporation: Incorporate delegated design drawing and data files into BIM established for Project.
 1. Prepare delegated design drawings in the following format: Same digital data software program, version, and operating system as original Drawings.

1.08 CONTRACTOR'S REVIEW

- A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
 1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval, and will return them without action.

1.09 ARCHITECT'S REVIEW

1. Submittals: Architect will review each submittal, indicate corrections or revisions required via markup on each submittal and the appropriate action, as follows, and return.
 - a. Final Release: Where submittals are marked "REVIEWED", that part of the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.

- b. Final But Restricted Release: When submittals are marked "REVIEWED, AS NOTED", that part of the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.
 - c. Returned for Resubmittal: When submittal is marked "REVISE AND RESUBMIT", do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action mark.
 - a) Do not permit submittals marked "REVISE AND RESUBMIT" to be used at the Project site, or elsewhere where Work is in progress.
 - d. Unsolicited Submittals: Submittals not required by the Contract Documents may not be reviewed and may be discarded. If they are returned they may be marked "NOT REVIEWED".
- B. Informational Submittals: 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.
- C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Architect will discard submittals received from sources other than Contractor.
- F. Submittals not required by the Contract Documents will be returned by Architect without action.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01 40 00 - QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 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 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 Architect, Owner, [**Commissioning Authority**,] [**Construction Manager**,] or authorities having jurisdiction are not limited by provisions of this Section.
- C. Related Requirements:
 - 1. Section 01 21 00 "Allowances" for testing and inspection allowances.

1.02 DEFINITIONS

- A. Experienced: When used with an entity or individual, "experienced," unless otherwise further described, means having successfully completed a minimum of [five] <Insert number> 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 and Inspections: 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 Work result does not require that certain construction activities specified apply exclusively to specific trade(s).
- D. Mockups: Physical assemblies of portions of the Work constructed to establish the standard by which the Work will be judged. Mockups are not Samples.
 - 1. Mockups are used for one or more of the following:
 - a. Verify selections made under Sample submittals.
 - b. Demonstrate aesthetic effects.
 - c. Demonstrate the qualities of products and workmanship.
 - d. Demonstrate successful installation of interfaces between components and systems.
 - e. Perform preconstruction testing to determine system performance.

2. Product Mockups: Mockups that may include multiple products, materials, or systems specified in a single Section.
 3. In-Place Mockups: Mockups constructed on-site in their actual final location as part of permanent construction.
- E. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria. Unless otherwise indicated, copies of reports of tests or inspections performed for other than the Project do not meet this definition.
- F. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) in accordance with 29 CFR 1910.7, by a testing agency accredited in accordance with 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.
- G. Source Quality-Control Tests and Inspections: Tests and inspections that are performed at the source (e.g., plant, mill, factory, or shop).
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. The term "testing laboratory" has the same meaning as the term "testing agency."
- I. 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.
- J. 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 Architect[**or Construction Manager**].

1.03 DELEGATED DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated Design Services Statement: Submit a statement signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.04 CONFLICTING REQUIREMENTS

- A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements is specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, inform the Architect regarding the conflict and obtain clarification prior to proceeding with the Work. Refer conflicting requirements that are different, but apparently equal, to Architect for clarification before proceeding.

- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified is 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 Architect for a decision before proceeding.

1.05 ACTION SUBMITTALS

- A. Mockup Shop Drawings:
 - 1. Include plans, sections, elevations, and details, 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.

1.06 INFORMATIONAL SUBMITTALS

- A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.
- B. Qualification Data: For Contractor's quality-control personnel.
- C. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility 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. Primary 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.

1.07 CONTRACTOR'S QUALITY-CONTROL PLAN

- A. Quality-Control Plan, General: Submit quality-control plan within **[10] <Insert number>** days of **[Notice of Award] [Notice to Proceed]**, and not less than **[five] <Insert number>** days prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities and to coordinate Owner's quality-assurance and quality-control activities. 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.
 - 1. Project quality-control manager **[may also serve as Project superintendent] [does not have other Project responsibilities]**.
 - 2. **<Insert qualifications appropriate to 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: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:
 - 1. Contractor-performed tests and inspections, including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections. 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 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 the Work into compliance with standards of workmanship established by Contract requirements and approved mockups.
- F. Monitoring and Documentation: Maintain testing and inspection reports, including log of approved and rejected results. Include Work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming Work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.08 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 of 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 of whether conditions, products, and installation will affect warranty.
 5. Other required items indicated in individual Specification Sections.

1.09 QUALITY ASSURANCE

- A. 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 is similar in material, design, and extent to those indicated for this Project.
- F. Specialists: Certain Specification Sections require that specific construction activities be performed by entities who are recognized experts in those operations. Specialists will satisfy qualification requirements indicated and engage in the activities indicated.
 - 1. Requirements of authorities having jurisdiction supersede requirements for specialists.
- G. Testing and Inspecting Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented in accordance with 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, demonstrate, repair, and perform service on installations 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's Responsibilities:
 - 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. When testing is complete, remove test specimens and test assemblies[, **and mockups**]; do not reuse products on Project.
 - 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect[**and Commissioning Authority**][, **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.

- K. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups of size indicated.
 2. Build mockups in location indicated or, if not indicated, as directed by Architect[**or Construction Manager**].
 3. Notify Architect[**and Construction Manager**] [seven] <Insert number> days in advance of dates and times when mockups will be constructed.
 4. Employ supervisory personnel who will oversee mockup construction. Employ workers who will be employed to perform same tasks during the construction at Project.
 5. Demonstrate the proposed range of aesthetic effects and workmanship.
 6. Obtain Architect's[**and Construction Manager's**] approval of mockups before starting corresponding Work, fabrication, or construction.
 - a. Allow [seven] <Insert number> days for initial review and each re-review of each mockup.
 7. Promptly correct unsatisfactory conditions noted by Architect's preliminary review, to the satisfaction of the Architect, before completion of final mockup.
 8. Approval of mockups by the Architect does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 9. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 10. Demolish and remove mockups when directed unless otherwise indicated.
- L. Specialty Mockups: See Section 01 43 39 "Mockups" for additional construction requirements for [integrated exterior mockups] [preconstruction laboratory mockups] [and] [room mockups].

1.10 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control 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 specified in Section 01 21 00 "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[, **and the Contract Sum will be adjusted by Change Order**].
- 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 will not employ same entity engaged by Owner, unless agreed to in writing by Owner.

3. Notify testing agencies at least [24] <Insert number> 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 Architect[, **Commissioning Authority**] [, **Construction Manager**,] and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect[, **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 01 33 00 "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. Contractor's Associated Requirements and 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. Delivery of samples to testing agencies.

6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 7. Security and protection for samples and for testing and 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 and submit with each Application for Payment.
1. Schedule Contents: Include tests, inspections, and quality-control services, including Contractor- and Owner-retained services, commissioning activities, and other Project-required services paid for by other entities.
 2. Distribution: Distribute schedule to Owner, Architect,[**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: Owner will engage a qualified [**testing agency**] [**special inspector**] to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner[, **as indicated in the Statement of Special Inspections attached to this Section**], 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 Architect[, **Commissioning Authority**,] [, **Construction Manager**,] and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect[**and Commissioning Authority**][, **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. **<Insert requirements>**.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.01 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
1. Date test or inspection was conducted.

2. Description of the Work tested or inspected.
 3. Date test or inspection results were transmitted to Architect.
 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's[, **Commissioning Authority's**,][**and Construction Manager's**] [and] [authorities' having jurisdiction] reference during normal working hours.
1. Submit log at Project closeout as part of Project Record Documents.

3.02 REPAIR AND PROTECTION

- A. General: On completion of testing, inspection, sample-taking, and similar services, repair damaged construction and restore substrates and finishes.
1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 01 73 00 "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

SECTION 01 42 00 - REFERENCES

PART 1 GENERAL

1.01 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. Other terms, including "requested," "authorized," "selected," "required," and "permitted," have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms, including "shown," "noted," "scheduled," and "specified," have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.02 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.
 - 1. For standards referenced by applicable building codes, comply with dates of standards as listed in building codes.
- 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.

1.03 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they are to 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."
- B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they are to 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. DIN - Deutsches Institut für Normung e.V.; www.din.de.
 2. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
 3. ICC - International Code Council; www.iccsafe.org.
 4. 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 are to 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. CPSC - U.S. Consumer Product Safety Commission; www.cpsc.gov.
 2. DOC - U.S. Department of Commerce; www.commerce.gov.
 3. DOD - U.S. Department of Defense; www.defense.gov.
 4. DOE - U.S. Department of Energy; www.energy.gov.
 5. DOJ - U.S. Department of Justice; www.ojp.usdoj.gov.
 6. DOS - U.S. Department of State; www.state.gov.
 7. EPA - United States Environmental Protection Agency; www.epa.gov.
 8. FAA - Federal Aviation Administration; www.faa.gov.
 9. GPO - U.S. Government Publishing Office; www.gpo.gov.
 10. GSA - U.S. General Services Administration; www.gsa.gov.
 11. HUD - U.S. Department of Housing and Urban Development; www.hud.gov.
 12. LBNL - Lawrence Berkeley National Laboratory; Energy Technologies Area; www.lbl.gov/.
 13. NIST - National Institute of Standards and Technology; www.nist.gov.
 14. OSHA - Occupational Safety & Health Administration; www.osha.gov.
 15. TRB - Transportation Research Board; National Cooperative Highway Research Program; The National Academies; www.trb.org.
 16. USACE - U.S. Army Corps of Engineers; www.usace.army.mil.
 17. USDA - U.S. Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
 18. USDA - U.S. Department of Agriculture; Rural Utilities Service; www.usda.gov.
 19. USP - U.S. Pharmacopeial Convention; www.usp.org.
 20. 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 are to 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 U.S. Government Publishing Office; www.govinfo.gov.

2. DOD - U.S. Department of Defense; Military Specifications and Standards; Available from DLA Document Services; www.dsp.dla.mil/Specs-Standards/.
 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.dsp.dla.mil/Specs-Standards/.
 - a. Available from Defense Standardization Program; www.dsp.dla.mil.
 - b. Available from U.S. General Services Administration; www.gsa.gov.
 - c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org.
 6. MILSPEC - Military Specifications 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 are to 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.
1. BEARHFTI; California Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation; (see BHGS).
 2. BHGS; State of California Bureau of Household Goods and Services; (Formerly: California Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation); www.bhgs.dca.ca.gov.
 3. CCR; California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; www.oal.ca.gov/publications/ccr/.
 4. CDPH; California Department of Public Health; Indoor Air Quality Program; www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHLB/IAQ/Pages/Main-Page.aspx.
 5. CPUC; California Public Utilities Commission; www.cpuc.ca.gov.
 6. SCAQMD; South Coast Air Quality Management District; www.aqmd.gov.
 7. TFS; Texas A&M Forest Service; Sustainable Forestry and Economic Development; <https://tfsweb.tamu.edu/>.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
 - 1. Section 01 10 00 "Summary" for work restrictions and limitations on utility interruptions.
 - 2. Section 01 12 00 "Multiple Contract Summary" for responsibilities for temporary facilities and controls for projects utilizing multiple contracts.
 - 3. Section 01 21 00 "Allowances" for allowance for metered use of temporary utilities.

1.02 USE CHARGES

- A. Installation, removal, and use charges for temporary facilities to 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,]** Architect, **[occupants of Project,]** testing agencies, and authorities having jurisdiction.
- B. Sewer Service: **[Pay]** **[Owner will pay]** sewer-service use charges for sewer usage by all entities for construction operations.
- C. Water Service: **[Pay]** **[Owner will pay]** water-service use charges for water used by all entities for construction operations.
- D. Electric Power Service: **[Pay]** **[Owner will pay]** electric-power-service use charges for electricity used by all entities for construction operations.
- E. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use **[with metering]** **[without metering and without payment of use charges]**. Provide connections and extensions of services **[and metering]** as required for construction operations.
- F. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use **[with metering]** **[without metering and without payment of use charges]**. Provide connections and extensions of services **[and metering]** as required for construction operations.
- G. Sewer, Water, and Electric Power Service: Use charges are specified in Section 01 12 00 "Multiple Contract Summary."

1.03 INFORMATIONAL SUBMITTALS

- A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.

- B. Implementation and Termination Schedule: Within **[15]** <Insert number> 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. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
- E. Erosion and Sedimentation Control Plan: Show compliance with requirements of 2003 EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
- F. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- G. Moisture- and Mold-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage and mold. Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.
 - 1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and requirements for replacing water-damaged Work.
 - 2. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
 - 3. Indicate methods to be used to avoid trapping water in finished work.
- H. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Include the following:
 - 1. Locations of dust-control partitions at each phase of work.
 - 2. HVAC system isolation schematic drawing.
 - 3. Location of proposed air-filtration system discharge.
 - 4. Waste-handling procedures.
 - 5. Other dust-control measures.
- I. Noise and Vibration Control Plan: Identify construction activities that may impact the occupancy and use of existing spaces within the building or adjacent existing buildings, whether occupied by others, or occupied by Owner. Include the following:
 - 1. Methods used to meet the goals and requirements of Owner.
 - 2. Concrete cutting method(s) to be used.
 - 3. Location of construction devices on the site.
 - 4. Show compliance with the use and maintenance of quieted construction devices for the duration of the Project.
 - 5. Indicate activities that may disturb building occupants and that are planned to be performed during non-standard working hours as coordinated with Owner.

6. Indicate locations of sensitive **[research]** **[patient]** **[equipment]** **<Insert item>** areas or other areas requiring special attention as identified by Owner. Indicate means for complying with Owner's requirements.

1.04 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
- C. Accessible Temporary Egress: Comply with applicable provisions in **[the DOJ's "2010 ADA Standards for Accessible Design"]** **[and]** **[ICC A117.1]** **<Insert accessibility regulation>**.

1.05 PROJECT CONDITIONS

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

PART 2 PRODUCTS

2.01 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 galvanized-steel 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 Architect from manufacturer's standard colors.
- D. Wood Enclosure Fence: Plywood, 6 feet 8 feet high, framed with four 2-by-4-inch rails, with preservative-treated wood posts spaced not more than 8 feet apart.
- E. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil minimum thickness, with flame-spread rating of 15 or less in accordance with ASTM E84 and passing NFPA 701 Test Method 2.
- F. Dust-Control Adhesive-Surface Walk-Off Mats: Provide mats, minimum 36 by 60 inches.
- G. 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.

2.02 TEMPORARY FACILITIES

- A. Field Offices:
 - 1. Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
- B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Architect[, **Construction Manager**], and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:
 - 1. Furniture required for Project-site documents, including file cabinets, plan tables, plan racks, and bookcases.
 - 2. Conference room of sufficient size to accommodate meetings of [10] <Insert number> individuals. Provide electrical power service and 120-V ac duplex receptacles, with no fewer than one receptacle on each wall. Furnish room with conference table, chairs, and 4-foot- square tack and marker boards.
 - 3. Drinking water and private toilet.
 - 4. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F.
 - 5. Lighting fixtures capable of maintaining average illumination of 20 fc at desk height.
- C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
 - 1. Store combustible materials apart from building.

2.03 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, Cooling, and Dehumidifying Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
 - 3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 Insert number at each return-air grille in system and remove at end of construction and clean HVAC system as required in Section 01 77 00 "Closeout Procedures."
- 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

3.01 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.

3.02 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
 - 1. Locate facilities to limit site disturbance as specified in Section 01 10 00 "Summary."
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.
- C. 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[**in accordance with 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.
 - 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.

3.03 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**] [**private system indicated**] as directed by authorities having jurisdiction.
- C. Water Service:
 - 1. Install water service and distribution piping in sizes and pressures adequate for construction.

2. 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.
- D. Sanitary Facilities: Provide temporary toilets, wash facilities, safety shower and eyewash 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.
 1. Use of Permanent Toilets: Use of Owner's existing or new toilet facilities **[is not permitted] [will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use]**.
- E. 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.
- F. Electric Power Service:
 1. Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.
 2. Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
 - a. Install electric power service **[overhead] [underground]** unless otherwise indicated.
 - b. Connect temporary service to Owner's existing power source, as directed by Owner.
- G. 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.
- H. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install **[WiFi cell phone access equipment] [and] [one] <Insert number>** land-based telephone line(s) for each field office.
 1. Provide additional telephone lines for the following:
 - a. Provide **[one] <Insert number>** telephone line(s) for Owner's use.
 2. At each telephone, post a list of important telephone numbers.
 - a. Police and fire departments.
 - b. Ambulance service.
 - c. Contractor's home office.
 - d. Contractor's emergency after-hours telephone number.
 - e. Architect's office.
 - f. **[Construction Manager's home office]**.
 - g. Engineers' offices.
 - h. Owner's office.
 - i. Principal subcontractors' field and home offices.
- I. Electronic Communication Service: Provide secure WiFi wireless connection to internet with provisions for access by Architect and Owner.

- J. Project Computer: Provide a desktop computer in the primary field office adequate for use by Architect and Owner to access Project electronic documents and maintain electronic communications. Equip computer with not less than the following:
1. Processor: Intel Core i5 or i7.
 2. Memory: [16] <Insert number> gigabyte.
 3. Disk Storage: [1] <Insert number> -terabyte hard-disk drive and combination DVD-RW/CD-RW drive.
 4. Display: 24-inch LCD monitor with 256-Mb dedicated video RAM.
 5. Full-size keyboard and mouse.
 6. Network Connectivity: [10/100BaseT Ethernet] [Gigabit].
 7. Operating System: Microsoft Windows 10 Professional.
 8. Productivity Software:
 - a. Microsoft Office Professional, 2013 or higher, including Word, Excel, and Outlook.
 - b. Adobe Reader DC.
 - c. WinZip 10.0 or higher.
 9. Printer: "All-in-one" unit equipped with printer server, combining color printing, photocopying, scanning, and faxing, or separate units for each of these three functions.
 10. Internet Service: Broadband modem, router, and ISP, equipped with hardware firewall, providing minimum [10.0] <Insert number> -Mbps upload and [15] <Insert number> -Mbps download speeds at each computer.
 11. Internet Security: Integrated software, providing software firewall, virus, spyware, phishing, and spam protection in a combined application.
 12. Backup: External hard drive, minimum [2] <Insert number> terabytes, with automated backup software providing daily backups.

3.04 SUPPORT FACILITIES INSTALLATION

- A. Comply with the following:
1. Provide construction for temporary field offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible in accordance with ASTM E136. Comply with NFPA 241.
 2. Utilize designated area within existing building for temporary field offices.
 3. Maintain support facilities until Architect 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 nontracking. Reapply treatment as required to minimize dust.
- C. Temporary Use of Planned Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.

1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
 2. Prepare subgrade and install subbase and base for temporary roads and paved areas in accordance with Section 31 20 00 "Earth Moving."
 3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.
 4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course in accordance with Section 32 12 16 "Asphalt Paving."
- D. Traffic Controls: Comply with requirements of authorities having jurisdiction.
1. Protect existing site improvements to remain, including curbs, pavement, and utilities.
 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- E. Parking: **[Provide temporary offsite] [Use designated areas of Owner's existing]** parking areas for construction personnel.
- F. Storage and Staging: **[Provide temporary offsite area] [Use designated areas of Project site]** for storage and staging needs.
- G. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
 2. Remove snow and ice as required to minimize accumulations.
- H. 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.
 - a. Provide temporary, directional signs for construction personnel and visitors.
 3. Maintain and touch up signs, so they are legible at all times.
- I. Waste Disposal Facilities:
1. Comply with requirements specified in Section 01 74 19 "Construction Waste Management and Disposal."
 2. Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 01 73 00 "Execution."
- J. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- K. Temporary Elevator Use: **[Use of elevators is not permitted] [See Division 14 elevator Section for temporary use of new elevators]**.
- L. Existing Elevator Use: Use of Owner's existing elevators will 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. Do not load elevators beyond their rated weight capacity.
 2. 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.
- M. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.
- N. 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.
- O. 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.

3.05 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. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
1. Comply with work restrictions specified in Section 01 10 00 "Summary."
- C. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- D. Tree and Plant Protection:
1. Comply with requirements specified in Section 01 56 39 "Temporary Tree and Plant Protection."
 2. Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- 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] [Prior to commencing earthwork]**, 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] [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: Provide temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction. Provide signage directing occupants to temporary egress.
- 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.
- 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.
 - 2. Construct dustproof partitions with two layers of 6-mil polyethylene sheet on each side. Cover floor with two layers of 6-mil polyethylene sheet, extending sheets 18 inches up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant-treated plywood.
 - a. Construct vestibule and airlock at each entrance through temporary partition with not less than 48 inches between doors. Maintain water-dampened foot mats in vestibule.
 - 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 in accordance with 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.

3.06 MOISTURE AND MOLD CONTROL

- A. Moisture and Mold Protection: Protect stored materials and installed Work in accordance with Moisture and Mold Protection Plan.
- B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
1. Protect porous materials from water damage.
 2. Protect stored and installed material from flowing or standing water.
 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 4. Remove standing water from decks.
 5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 2. Keep interior spaces reasonably clean and protected from water damage.
 3. Periodically collect and remove waste containing cellulose or other organic matter.
 4. Discard or replace water-damaged material.
 5. Do not install material that is wet.
 6. Discard and replace stored or installed material that begins to grow mold.
 7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.
- D. Controlled Construction Period: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
 2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
 3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.

- a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for [48] <Insert time period> hours are considered defective and require replacing.
- b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for [48] <Insert time period> hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
- c. Remove and replace materials that cannot be completely restored to their manufactured moisture level within [48] <Insert time period> hours.

3.07 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 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 01 77 00 "Closeout Procedures."

END OF SECTION

SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

- A. The Work of This 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.

1.02 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
 2. New Products: Items that have not previously been incorporated into another project or facility. Salvaged items or items reused from other projects are not considered new products. Items that are manufactured or fabricated to include recycled content materials are considered new products unless otherwise indicated.
 3. Comparable Product: Product by named manufacturer that is demonstrated and approved through the comparable product submittal process described in "Comparable Products" Article, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. Published attributes and characteristics of basis-of-design product establish salient characteristics of products.
1. Evaluating Comparable Products: In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification. **Manufacturer's published attributes and characteristics of basis-of-design product also establish salient characteristics of products for purposes of evaluating comparable products.]**
- C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications; submit a comparable product request or substitution request, if applicable.
- D. Comparable Product Request Submittal: An action submittal requesting consideration of a comparable product, including the following information:

1. Identification of basis-of-design product or fabrication or installation method to be replaced, including Specification Section number and title and Drawing numbers and titles.
 2. Data indicating compliance with the requirements specified in "Comparable Products" Article.
- E. Basis-of-Design Product Specification Submittal: An action submittal complying with requirements in Section 01 33 00 "Submittal Procedures."
- F. Substitution: Refer to Section 01 25 00 "Substitution Procedures" for definition and limitations on substitutions.

1.03 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
1. Resolution of Compatibility Disputes between Multiple Contractors:
 - a. Contractors are responsible for providing products and construction methods compatible with products and construction methods of other contractors.
 - b. If a dispute arises between the multiple contractors over concurrently selectable but incompatible products, Architect will determine which products will be used.
- 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 inconspicuous.
 2. Equipment Nameplates: Provide a permanent nameplate on each item of service- 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 equipment identification requirements.

1.04 COORDINATION

- A. Modify or adjust affected work as necessary to integrate work of approved comparable products and approved substitutions.

1.05 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 that products are undamaged and properly protected.

C. Storage:

1. Provide a secure location and enclosure at Project site for storage of materials and equipment.
2. Store products to allow for inspection and measurement of quantity or counting of units.
3. Store materials in a manner that will not endanger Project structure.
4. Store products that are subject to damage by the elements under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation and with adequate protection from wind.
5. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
7. Protect stored products from damage and liquids from freezing.
8. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.06 PRODUCT WARRANTIES

- A. Warranties specified in other Sections are to 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 standard warranty form furnished by individual manufacturer for a particular product and issued in the name of Owner or endorsed by manufacturer to Owner.
 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner and issued in the name of Owner or endorsed by manufacturer to Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. Specified Form: When specified forms are included in the Project Manual, prepare a written document, using indicated form properly executed.
 3. See other Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Section 01 77 00 "Closeout Procedures."

PART 2 PRODUCTS

2.01 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," Architect will make selection.
 5. Descriptive, performance, and reference standard requirements in Specifications establish salient characteristics of products.
 6. Or Equal: For products specified by name and accompanied by the term "or equal," "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 by Architect[**through Construction Manager**] in order to establish equivalency of proposed products. Unless otherwise indicated, evaluation of "or equal" product status is by Architect, 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 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 that 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."

- b. Provision of an unnamed product is not considered a substitution, if the product complies with requirements.
 - 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 that 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."
 - b. Provision of products of an unnamed manufacturer is not considered a substitution, if the product complies with requirements.
 - 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 may additionally 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.
 - a. For approval of products by unnamed manufacturers, comply with requirements in Section 01 25 00 "Substitution Procedures" for substitutions for convenience.
- C. Visual Matching Specification: Where Specifications require the phrase "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
 - 1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 01 25 00 "Substitution Procedures" for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or a similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.02 COMPARABLE PRODUCTS

- A. Conditions for Consideration of Comparable Products: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with the following requirements:
 - 1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work.
 - 2. Detailed comparison of significant qualities of proposed product with those of the named basis-of-design product. Significant product qualities include attributes such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
 - 3. Evidence that proposed product provides specified warranty.

4. List of similar installations for completed projects, with project names and addresses and names and addresses of architects and owners, if requested.
 5. Samples, if requested.
- B. Architect's Action on Comparable Products Submittal: If necessary, Architect will request additional information or documentation for evaluation within seven Insert number days of receipt of a request for a comparable product. Architect will notify Contractor through Construction Manager of approval or rejection of proposed comparable product within 15 Insert number days of receipt of request, or seven Insert number days of receipt of additional information or documentation, whichever is later.
1. Architect's Approval of Submittal: Marked with approval notation from Architect's action stamp Marked with approval notation from Architect's and Construction Manager's action stamp Indication of approval in web-based Project management software Insert method. See Section 01 33 00 "Submittal Procedures."
 2. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- C. Submittal Requirements, Two-Step Process: Approval by Architect 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

SECTION 01 74 19 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.01 SUMMARY

- A. The Work of this Section includes administrative and procedural requirements for the following:
 - 1. Salvaging nonhazardous demolition construction waste.
 - 2. Recycling nonhazardous demolition construction waste.
 - 3. Disposing of nonhazardous demolition construction waste.

1.02 DEFINITIONS

- A. CMU: Concrete masonry units.
- B. Construction Waste: Building, structure, and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- C. Demolition Waste: Building, structure, and site improvement materials resulting from demolition operations.
- D. 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.
- E. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- F. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- G. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.03 MATERIALS OWNERSHIP

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

1.04 ACTION SUBMITTALS

- A. Waste Management Plan: Submit plan within [7] [30] <Insert number> days of date established for [commencement of the Work] [the Notice to Proceed] [the Notice of Award]. Plan must include the following:

1. Strategies to reduce the generation of waste during Project design and construction.
2. Waste diversion goals for Project, identifying the materials (both structural and nonstructural) targeted for recycling, reuse, or salvage and identifying the target diversion percentage (at least 50 percent).
3. Where materials will be taken, including expected diversion rates for each material.

1.05 INFORMATIONAL SUBMITTALS

- A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Use **[Form CWM-7 for construction waste] [and] [Form CWM-8 for demolition waste] <Insert Owner's form designation>**. Include the following information:
 1. Material category.
 2. Generation point of waste.
 3. Total quantity of waste in tons.
 4. Quantity of waste salvaged, both estimated and actual in tons.
 5. Quantity of waste recycled, both estimated and actual in tons.
 6. Total quantity of waste recovered (salvaged plus recycled) in tons.
 7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.
- B. 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.
- C. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
- D. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
- E. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- F. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- G. LEED Submittal: Submit documentation to GBCI, signed by Contractor, tabulating total waste material, quantities diverted, and means by which it is diverted, along with a statement that requirements for the credit have been met. Respond to questions and requests from USGBC regarding construction waste management and disposal until the GBCI Reviewer has made its determination on Project's LEED certification application. Document correspondence with USGBC as informational submittals.
- H. Sustainable Design Submittal: Submit documentation to GBI-authorized Assessor signed by Contractor, tabulating total waste material, quantities diverted, and means by which it is diverted, along with a statement that requirements for the credit have been met. Respond to questions and requests from GBI-authorized Assessor until GBI-authorized Assessor has made its determination on Project's Green Globes certification application. Document correspondence with GBI-authorized Assessor as informational submittals.

- I. Qualification Statements: For **[waste management coordinator] [and] [refrigerant recovery technician]**.
- J. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed in accordance with EPA regulations. Include name and address of technician and date refrigerant was recovered.
- K. Refrigerant Recovery: Comply with requirements in **[Section 02 41 16 "Structure Demolition"] [Section 02 41 19 "Selective Demolition"]** for refrigerant recovery submittals.

1.06 QUALITY ASSURANCE

- A. Waste Management Coordinator Qualifications: Experienced firm, or individual employed and assigned by General Contractor, with a record of successful waste management coordination of projects with similar requirements. Superintendent **[may] [may not]** serve as Waste Management Coordinator.
 - 1. Firm employs a LEED Accredited Professional, certified by USGBC, as waste management coordinator.
 - 2. Waste management coordinator may also serve as LEED coordinator.
- B. Refrigerant Recovery Technician Qualifications:
 - 1. Type I Type II Type III Universal, certified by EPA-approved certification program.
 - 2. Comply with requirements in Section 02 41 16 "Structure Demolition." Section 02 41 19 "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 01 31 00 "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.

1.07 WASTE MANAGEMENT PLAN

- A. General: Develop a waste management plan in accordance with requirements in this Section. Plan must include provisions for waste identification, waste reduction work plan, and cost/revenue analysis. 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 construction waste generated by the Work. Use Form CWM-1 for construction waste Form CWM-2 for demolition waste Insert Owner's form designation. Include estimated quantities and assumptions for estimates.
- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Use Form CWM-3 for construction waste Form CWM-4 for demolition waste Insert Owner's form designation. 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 in compliance with [Section 02 41 16 "Structure Demolition."] [Section 02 41 19 "Selective Demolition."]
 2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
 3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
 4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
 5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
 6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.
- D. Cost/Revenue Analysis: Indicate total cost of waste disposal as if there were no waste management plan and net additional cost or net savings resulting from implementing waste management plan. Use Form CWM-5 for construction waste reduction work plan Form CWM-6 for demolition waste reduction work plan Insert Owner's form designation. Include the following:
1. Total quantity of waste.
 2. Estimated cost of disposal (cost per unit). Include transportation and tipping fees and cost of collection containers and handling for each type of waste.
 3. Total cost of disposal (with no waste management).
 4. Revenue from salvaged materials.
 5. Revenue from recycled materials.
 6. Savings in transportation and tipping fees by donating materials.
 7. Savings in transportation and tipping fees that are avoided.
 8. Handling and transportation costs. Include cost of collection containers for each type of waste.
 9. Net additional cost or net savings from waste management plan.

PART 2 PRODUCTS

2.01 RECYCLING RECEIVERS AND PROCESSORS

- A. Subject to compliance with requirements, available recycling receivers and processors include, but are not limited to, the following:

1. **<Insert, in separate subparagraphs, names and telephone numbers of local recycling receivers and processors of recyclable materials>.**

2.02 PERFORMANCE REQUIREMENTS

- A. General: Achieve end-of-Project rates for salvage/recycling of 50 75 Insert number percent by weight of total nonhazardous solid waste generated by the Work. Practice efficient waste management in use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials[.], **including the following:**

1. Demolition Waste:
 - a. Asphalt paving.
 - b. Concrete.
 - c. Concrete reinforcing steel.
 - d. Brick.
 - e. CMU.
 - f. Wood studs.
 - g. Wood joists.
 - h. Plywood and oriented strand board.
 - i. Wood paneling.
 - j. Wood trim.
 - k. Structural and miscellaneous steel.
 - l. Rough hardware.
 - m. Roofing.
 - n. Insulation.
 - o. Doors and frames.
 - p. Door hardware.
 - q. Windows.
 - r. Glazing.
 - s. Metal studs.
 - t. Gypsum board.
 - u. Acoustical tile and panels.
 - v. Carpet.
 - w. Carpet pad.
 - x. Demountable partitions.
 - y. Equipment.
 - z. Cabinets.
 - aa. Plumbing fixtures.
 - bb. Piping.
 - cc. Supports and hangers.
 - dd. Valves.
 - ee. Sprinklers.
 - ff. Mechanical equipment.
 - gg. Refrigerants.
 - hh. Electrical conduit.
 - ii. Copper wiring.
 - jj. Lighting fixtures.
 - kk. Lamps.
 - ll. Ballasts.
 - mm. Electrical devices.

- nn. Switchgear and panelboards.
- oo. Transformers.
- pp. **<Insert materials required>.**
- 2. Construction Waste:
 - a. Masonry and CMU.
 - b. Lumber.
 - c. Wood sheet materials.
 - d. Wood trim.
 - e. Metals.
 - f. Roofing.
 - g. Insulation.
 - h. Carpet and pad.
 - i. Gypsum board.
 - j. Piping.
 - k. Electrical conduit.
 - l. Packaging: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following uncontaminated packaging materials:
 - 1) Paper.
 - 2) Cardboard.
 - 3) Boxes.
 - 4) Plastic sheet and film.
 - 5) Polystyrene packaging.
 - 6) Wood crates.
 - 7) Wood pallets.
 - 8) Plastic pails.
 - m. Construction Office Waste: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following construction office waste materials:
 - 1) Paper.
 - 2) Aluminum cans.
 - 3) Glass containers.
 - n. **<Insert materials required>.**

PART 3 EXECUTION

3.01 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during entire duration of the Contract.
 - 1. Comply with operation, termination, and removal requirements in Section 01 50 00 "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 must be present at Project site full time for duration of Project.]

- C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
 - 1. Distribute waste management plan to everyone concerned within **[three]** <Insert number> days of submittal return.
 - 2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged and recycled.
 - 2. Comply with Section 01 50 00 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.
- E. Waste Management in Historic Zones or Areas: Transportation equipment and other materials are to be of sizes that clear surfaces within historic spaces, areas, rooms, and openings, by **[12 inches]** <Insert dimension> or more.

3.02 SALVAGING DEMOLITION WASTE

- A. Comply with requirements in **[Section 02 41 16 "Structure Demolition"]** **[Section 02 41 19 "Selective Demolition"]** **[Section 02 42 96 "Historic Removal and Dismantling]** for salvaging demolition waste.
- B. Salvaged Items for Reuse in the Work: 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 or Donation: **[Permitted]** **[Not permitted]** on Project site.
- D. Salvaged Items for Owner's Use: 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 delivery to Owner.
 - 4. Transport items to Owner's storage area **[on-site]** **[off-site]** **[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.

3.03 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 to **[accrue to Owner] [accrue to Contractor] [be shared equally by Owner and Contractor]**.
- C. Preparation of Waste: Prepare and maintain recyclable waste materials in accordance with 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 maximum extent practical in accordance with approved construction waste management plan.
 - 1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
 - a. Inspect containers and bins for contamination, and remove contaminated materials if found.
 - 2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
 - 4. Store components off the ground and protect from the weather.
 - 5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor as often as required to prevent overfilling bins.

3.04 RECYCLING DEMOLITION WASTE

- A. Asphalt Paving for Fill: Grind asphalt to maximum [1-1/2-inch] [4-inch] size.
 - 1. Crush asphaltic concrete paving and screen to comply with requirements in Section 31 20 00 "Earth Moving" for use as general fill.
- B. Asphalt Paving Recycling: Break up and transport paving to asphalt-recycling facility.
- C. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
 - 1. Pulverize concrete to maximum [1-1/2-inch] [4-inch] size.
 - 2. Crush concrete and screen to comply with requirements in Section 31 20 00 "Earth Moving" for use as satisfactory soil for fill or subbase.
- D. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.
 - 1. Pulverize masonry to maximum [3/4-inch] [1-inch] [1-1/2-inch] [4-inch] size.

- a. Crush masonry and screen to comply with requirements in Section 31 20 00 "Earth Moving" for use as **[general fill] [satisfactory soil for fill or subbase]**.
 - b. Crush masonry and screen to comply with requirements in Section 32 93 00 "Plants" for use as mineral mulch.
2. Clean and stack undamaged, whole masonry units on wood pallets.
- E. Wood Materials: Sort and stack members per size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.
- F. Metals: Separate metals by type.
 1. Structural Steel: Stack members per size, type of member, and length.
 2. Remove and dispose of bolts, nuts, washers, and other rough hardware.
- G. Asphalt Shingle Roofing: Separate organic and glass-fiber asphalt shingles and felts. Remove and dispose of nails, staples, and accessories.
- H. Gypsum Board: Stack large clean pieces on wood pallets or in containers and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.
- I. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.
- J. Metal Suspension System: Separate metal members, including trim and other metals from acoustical panels and tile, and sort with other metals.
- K. 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.
- L. 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.
- M. Piping: Reduce piping to straight lengths and store by material and size. Separate supports, hangers, valves, sprinklers, and other components by material and size.
- N. Conduit: Reduce conduit to straight lengths and store by material and size.
- O. Lamps: Separate lamps by type and store in accordance with requirements in 40 CFR 273.

3.05 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 Cutoffs of Lumber: Grind or chip into small pieces.
2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
 - a. Comply with requirements in Section 32 93 00 "Plants" for use of clean sawdust as organic mulch.

C. Gypsum Board: Stack large clean pieces on wood pallets or in containers and store in a dry location.

1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.
 - a. Comply with requirements in Section 32 93 00 "Plants" for use of clean ground gypsum board as inorganic soil amendment.

D. Paint: Seal containers and store by type.

3.06 DISPOSAL OF WASTE

A. 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. Unless 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. Except for items or materials to be salvaged or recycled, remove waste materials and legally dispose of at designated spoil areas on Owner's property.

C. Burning:

1. Do not burn waste materials.
2. Burning of waste materials is permitted only at designated areas on Owner's property, provided required permits are obtained. Provide full-time monitoring for burning materials until fires are extinguished.

3.07 ATTACHMENTS

- A. Form CWM-1 for construction waste identification.
- B. Form CWM-2 for demolition waste identification.
- C. Form CWM-3 for construction waste reduction work plan.
- D. Form CWM-4 for demolition waste reduction work plan.
- E. Form CWM-5 for cost/revenue analysis of construction waste reduction work plan.
- F. Form CWM-6 for cost/revenue analysis of demolition waste reduction work plan.
- G. Form CWM-7 for construction waste reduction progress report.
- H. Form CWM-8 for demolition waste reduction progress report.

FORMATION DISTRICT RESIDENCE HALL
COLORADO MESA UNIVERSITY
GRAND JUNCTION, COLORADO

BID PACKAGE #1
JUNE 1, 2026

END OF SECTION

SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1 GENERAL

1.01 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. List of incomplete items.
 - 4. Submittal of Project warranties.
 - 5. Final cleaning.
- B. Related Requirements:
 - 1. Section 01 29 00 "Payment Procedures" for requirements for Applications for Payment for Substantial Completion and Final Completion.
 - 2. Section 01 32 33 "Photographic Documentation" for submitting Final Completion construction photographic documentation.
 - 3. Section 01 78 23 "Operation and Maintenance Data" for additional operation and maintenance manual requirements.
 - 4. Section 01 78 39 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
 - 5. Section 01 79 00 "Demonstration and Training" for requirements to train Owner's maintenance personnel to adjust, operate, and maintain products, equipment, and systems.

1.02 DEFINITIONS

- A. List of Incomplete Items: Contractor-prepared list of items to be completed or corrected, prepared for the Architect's use prior to Architect's inspection, to determine if the Work is substantially complete.

1.03 ACTION SUBMITTALS

- A. Product Data: For each type of cleaning agent.
- B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- C. Certified List of Incomplete Items: Final submittal at Final Completion.

1.04 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.
- C. Field Report: For pest-control inspection.

1.05 MAINTENANCE MATERIAL SUBMITTALS

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

1.06 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's "punch list"), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of **[10] <Insert number>** 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, damage or settlement surveys, property surveys, and similar final record information.
 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 **[Architect] [Construction Manager]**. Label with manufacturer's name and model number.
 - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain **[Architect's] [Construction Manager's] [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.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of **[10] <Insert number>** days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Advise Owner of pending insurance changeover requirements.
 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 3. Complete startup and testing of systems and equipment.
 4. Perform preventive maintenance on equipment used prior to Substantial Completion.
 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 01 79 00 "Demonstration and Training."
 6. Advise Owner of changeover in utility services.
 7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.

8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 9. Complete final cleaning requirements.
 10. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of **[10] <Insert number>** days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect **[and Construction Manager]** will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, 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.
 2. Results of completed inspection will form the basis of requirements for Final Completion.

1.07 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 in accordance with Section 01 29 00 "Payment Procedures."
 2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list will 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 a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect **[and Construction Manager]** will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect 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.

1.08 LIST OF INCOMPLETE ITEMS

- A. 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.
1. Organize list of spaces in sequential order, **[starting with exterior areas first] [and] [proceeding from lowest floor to highest floor]**, listed by room or space number.
 2. Organize items applying to each space by major element, including categories for ceilings, individual walls, floors, equipment, and building systems.
 3. Include the following information at the top of each page:

- a. Project name.
 - b. Date.
 - c. Name of Architect[**and Construction Manager**].
 - d. Name of Contractor.
 - e. Page number.
4. Submit list of incomplete items in the following format:
- a. MS Excel Electronic File: Architect[, **through Construction Manager,**] will return annotated file.
 - b. PDF Electronic File: Architect[, **through Construction Manager,**] will return annotated file.
 - c. Web-Based Project Software Upload: Utilize software feature for creating and updating list of incomplete items (punch list).
 - d. **[Three] <Insert number> Paper Copies:** Architect[, **through Construction Manager,**] will return **[two] <Insert number> copies.**

1.09 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect 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 **[15] <Insert number>** 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. 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.
 1. Submit **[on digital media acceptable to Architect] [by uploading to web-based project software site] [by email to Architect]**.
- 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

2.01 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

3.01 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 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. Clean flooring, removing debris, dirt, and staining; clean in accordance with manufacturer's instructions.
 - i. Vacuum and mop concrete.
 - j. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean in accordance with manufacturer's instructions if visible soil or stains remain.
 - k. 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.
 - l. Remove labels that are not permanent.
 - m. Wipe surfaces of mechanical and electrical equipment[, **elevator equipment,**] and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.

- n. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - o. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - p. 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.] [Section 23 01 30.52 "Existing HVAC Air-Distribution System Cleaning.]** Provide written report on completion of cleaning.
 - q. Clean luminaires, lamps, globes, and reflectors to function with full efficiency.
 - r. Clean strainers.
 - s. Leave Project clean and ready for occupancy.
- C. Pest Control: Comply with pest control requirements in Section 01 50 00 "Temporary Facilities and Controls." Prepare written report.
- D. Construction Waste Disposal: Comply with waste-disposal requirements in **[Section 01 50 00 "Temporary Facilities and Controls."] [Section 01 74 19 "Construction Waste Management and Disposal.]**

3.02 CORRECTION OF THE WORK

- A. Complete repair and restoration operations required by "Correction of the Work" Article in Section 01 73 00 "Execution" before requesting inspection for determination of Substantial Completion.

END OF SECTION

SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA

PART 1 GENERAL

1.01 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 01 12 00 "Multiple Contract Summary" for coordinating operation and maintenance manuals covering the Work of multiple contracts.
 - 2. Section 01 33 00 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
 - 3. Section 01 91 13 "General Commissioning Requirements" for verification and compilation of data into operation and maintenance manuals.
 - 4. Section 26 00 10 "Supplemental Requirements for Electrical" for requirements for Electrical Preventative Maintenance (EPM) Program binders that form part of the operation and maintenance data of this Section and include additional requirements for operation, maintenance, and emergency procedures, for electrical systems and equipment.

1.02 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.

1.03 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. Architect[**and Commissioning Authority**] 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. Format: Submit operation and maintenance manuals in the following format:
 - 1. Submit [**on digital media acceptable to Architect**] [**by uploading to web-based project software site**] [**by email to Architect**]. Enable reviewer comments on draft submittals.

2. Submit [**three**] <Insert number> paper copies. Architect[, **through Construction Manager,**] will return [**two**] <Insert number> copies.
- C. Initial Manual Submittal: Submit draft copy of each manual at least [**30**] <Insert number> days before commencing demonstration and training. Architect[**and Commissioning Authority**] will comment on whether general scope and content of manual are acceptable.
- D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least [**15**] <Insert number> days before commencing demonstration and training. Architect[**and Commissioning Authority**] will return copy with comments.
 1. Correct or revise each manual to comply with Architect's[**and Commissioning Authority's**] comments. Submit copies of each corrected manual within [**15**] <Insert number> days of receipt of Architect's[**and Commissioning Authority's**] comments and prior to commencing demonstration and training.
- E. Comply with Section 01 77 00 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.04 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.
 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 hard-copy, bound and labeled volumes.
 1. Binders: Heavy-duty, three-ring, vinyl-covered, [**loose-leaf**] [**post-type**] 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.

1.05 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 to contain the following materials, in the order listed:
 1. Title page.
 2. Table of contents.
 3. Manual contents.
- B. Title Page: Include the following information:
 1. Subject matter included in manual.
 2. Name and address of Project.
 3. Name and address of Owner.
 4. Date of submittal.
 5. Name and contact information for Contractor.
 6. Name and contact information for Construction Manager.
 7. Name and contact information for Architect.
 8. Name and contact information for Commissioning Authority.
 9. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
 10. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in 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 in accordance with ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

1.06 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.

1.07 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.

1.08 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.

1.09 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.
 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

SECTION 01 78 39 - PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.01 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.

1.02 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 01 12 00 "Multiple Contract Summary" for coordinating Project Record Documents covering the Work of multiple contracts.
 2. Section 01 73 00 "Execution" for final property survey.
 3. Section 01 77 00 "Closeout Procedures" for general closeout procedures.
 4. Section 01 78 23 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.03 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
1. Number of Copies: Submit **[one]** <Insert number> set(s) of marked-up record prints.
 2. Number of Copies: Submit copies of Record Drawings as follows:
 - a. Initial Submittal:
 - 1) Submit **[one]** <Insert number> paper-copy set(s) of marked-up record prints.
 - 2) Submit PDF electronic files of scanned record prints and **[one]** <Insert number> set(s) of file prints.
 - 3) Submit Record Digital Data Files and **[one]** <Insert number> set(s) of plots.
 - 4) Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
 - b. Final Submittal:
 - 1) Submit **[three]** <Insert number> paper-copy set(s) of marked-up record prints.
 - 2) Submit PDF electronic files of scanned Record Prints and **[three]** <Insert number> set(s) of file prints.
 - 3) Print each drawing, whether or not changes and additional information were recorded.
 - c. Final Submittal:
 - 1) Submit **[one]** <Insert number> paper-copy set(s) of marked-up record prints.

- 2) Submit Record Digital Data Files and **[three]** **<Insert number>** set(s) of Record Digital Data File plots.
 - 3) Plot each drawing file, whether or not changes and additional information were recorded.
- B. Record Specifications: Submit **[annotated PDF electronic files]** **[and]** **<Insert number>** **[paper copies]** of Project's Specifications, including addenda and Contract modifications.
- C. Record Product Data: Submit **[annotated PDF electronic files and directories]** **[and]** **<Insert number>** **[paper copies]** 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 **[annotated PDF electronic files and directories]** **[and]** **<Insert number>** **[paper copies]** of each submittal.
- E. Reports: Submit written report **[weekly]** indicating items incorporated into Project Record Documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

1.04 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
1. Preparation: Mark record prints to show the actual installation, where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an acceptable drawing technique.
 - c. Record data as soon as possible after obtaining it.
 - d. Record and check the markup before enclosing concealed installations.
 - e. Cross-reference record prints to corresponding 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 or **[Construction]** **[Work]** Change Directive.
 - k. Changes made following Architect'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 prints with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 6. Note Construction Change Directive 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 Architect[**and Construction Manager**]. 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 for the original Contract Drawings.
 2. Format: [DWG] [DXF] [DGN], Version <Insert designation>, [Microsoft Windows] [Apple Macintosh] 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 Architect[**through 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 01 31 00 "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 Construction Manager**].
 - e. Name of Contractor.

1.05 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] [paper copy] [scanned PDF electronic file(s) of marked-up paper copy of Specifications]**.

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

1.07 MISCELLANEOUS RECORD SUBMITTALS

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

1.08 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 Architect's[**and Construction Manager's**] reference during normal working hours.

FORMATION DISTRICT RESIDENCE HALL
COLORADO MESA UNIVERSITY
GRAND JUNCTION, COLORADO

BID PACKAGE #1
JUNE 1, 2026

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01 79 00 - DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
 - 1. Instruction in operation and maintenance of systems, subsystems, and equipment.
 - 2. Demonstration and training video recordings.
- B. Allowances: Furnish demonstration and training instruction time under the demonstration and training allowance as specified in Section 01 21 00 "Allowances."
- C. Unit Price for Instruction Time: Length of instruction time will be measured by actual time spent performing demonstration and training in required location. No payment will be made for time spent assembling educational materials, setting up, or cleaning up. See requirements in Section 01 22 00 "Unit Prices."

1.02 INFORMATIONAL SUBMITTALS

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

1.03 CLOSEOUT SUBMITTALS

- A. Demonstration and Training Video Recordings: Submit **[two]** **<Insert number>** copies within **[seven]** **<Insert number>** days of end of each training module.
 - 1. Identification: On each copy, provide an applied label with the following information:
 - a. Name of Project.
 - b. Name and address of videographer.
 - c. Name of Architect.
 - d. Name of Construction Manager.
 - e. Name of Contractor.
 - f. Date of video recording.
 - 2. Transcript:

- a. 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.
 - b. Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project and date of video recording on each page.
3. At completion of training, submit complete training manual(s) for Owner's use prepared in same **[paper]** **[and]** **[PDF file]** format required for operation and maintenance manuals specified in Section 01 78 23 "Operation and Maintenance Data."

1.04 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 01 40 00 "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. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 "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.

1.05 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.
- 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 approved by Architect.

1.06 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.

- 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.

1.07 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 01 78 23 "Operation and Maintenance Data."
- B. Set up instructional equipment at instruction location.

1.08 INSTRUCTION

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 - 1. Architect will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
 - 2. Owner will furnish an instructor to describe Owner's operational philosophy.
 - 3. Owner will furnish Contractor with names and positions of participants.
- C. Scheduling: Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
 - 1. Schedule training with Owner[, through Architect,][, through Construction Manager,] with at least **[seven]** <Insert number> days' advance notice.
- D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

- E. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of **[an oral] [a written] [a demonstration]** performance-based test.
- F. Cleanup: Collect used and leftover educational materials and **[remove from Project site] [give to Owner]**. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

1.09 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

- A. General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
 - 1. At beginning of each training module, record each chart containing learning objective and lesson outline.
- B. Digital Video Recordings: Provide high-resolution, digital video in MPEG format, produced by a digital camera with minimum sensor resolution of **[12] <Insert number>** megapixels and capable of recording in full HD mode **[with vibration reduction technology]**.
 - 1. Submit video recordings **[on CD-ROM or thumb drive] [by uploading to web-based Project software site]**.
 - 2. File Hierarchy: Organize folder structure and file locations in accordance with 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 in accordance with Project Manual table of contents:
 - a. Name of Contractor/Installer.
 - b. Business address.
 - c. Business phone number.
 - d. Point of contact.
 - e. Email address.
- C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.
 - 1. Film training session(s) in segments not to exceed 15 minutes.
 - a. Produce segments to present a single significant piece of equipment per segment.
 - b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.
 - c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.
- D. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.
 - 1. Furnish additional portable lighting as required.
- E. Narration: Describe scenes on video recording by **[audio narration by microphone while] [dubbing audio narration off-site after]** video recording is recorded. Include description of items being viewed.

- F. Transcript: Provide a transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.
- G. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01 91 13 - GENERAL COMMISSIONING REQUIREMENTS

PART 1 GENERAL

1.01 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.
- B. Owner's Project Requirements and Basis-of-Design Document are included by reference for information only.

1.02 SUMMARY

- A. Section Includes:
 - 1. General requirements for coordinating and scheduling commissioning activities.
 - 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.
- B. Related Requirements:
 - 1. Section 01 10 00 "Summary" for Commissioning Authority responsibilities.
 - 2. Section 01 12 00 "Multiple Contract Summary" for Commissioning Authority responsibilities.
 - 3. Section 01 33 00 "Submittal Procedures" for submittal procedure requirements for commissioning process.
 - 4. Section 01 77 00 "Closeout Procedures" for Certificate of Construction-Phase Commissioning Process Completion submittal requirements.
 - 5. Section 01 78 23 "Operation and Maintenance Data" for preliminary operation and maintenance data submittal requirements.
 - 6. Section 01 91 19.43 "Exterior Enclosure Commissioning" for technical commissioning requirements for exterior closure.
 - 7. Section 21 08 00 "Commissioning of Fire Suppression" for technical commissioning requirements for fire suppression.
 - 8. Section 22 08 00 "Commissioning of Plumbing" for technical commissioning requirements for plumbing.
 - 9. Section 23 08 00 "Commissioning of HVAC" for technical commissioning requirements for HVAC.
 - 10. Section 26 08 00 "Commissioning of Electrical Systems" for technical commissioning requirements for electrical systems.
 - 11. Section 27 08 00 "Commissioning of Communications" for technical commissioning requirements for communications systems.
 - 12. Section 28 08 00 "Commissioning of Electronic Safety and Security" for technical commissioning requirements for electronic safety and security systems.

1.03 ALLOWANCES

- A. Labor and management costs for the performance of commissioning process.
- B. The following are excluded from the commissioning allowance:
 - 1. Equipment and systems installation, startup, and field quality-control testing indicated in the Contract Documents.
 - 2. Test equipment, instrumentation, and tools (including, but not limited to, proprietary test equipment, instrumentation, and tools) required to perform tests.
 - 3. Work to correct commissioning issues.
 - 4. Work to repeat tests when equipment and systems fail acceptance criteria.
 - 5. **<Insert requirements>**.

1.04 UNIT PRICES

- A. Commissioning allowance may be adjusted up or down by the "List of Unit Prices" Article in Section 01 22 00 "Unit Prices" when actual labor hours are computed at the end of commissioning process. See Section 01 21 00 "Allowances" for commissioning allowance.
- B. The following are excluded from the computation for the adjustment of the commissioning allowance for technician labor hours:
 - 1. Work to correct commissioning issues.
 - 2. Work to repeat tests when equipment and systems fail acceptance criteria.

1.05 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 Architect 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: An entity engaged by Owner, and identified in Section 01 10 00 "Summary," to evaluate Commissioning-Process Work.
- D. Commissioning Plan: A document, prepared by Commissioning Authority, that outlines the organization, schedule, allocation of resources, and documentation of commissioning requirements.
- 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. The requirements specified here are limited to the construction phase commissioning activities. The scope of the commissioning process is defined in **[Section 01 10 00 "Summary."]** **[Section 01 12 00 "Multiple Contract Summary."]**

- 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 01 77 00 "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 01 79 00 "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 either by the Owner or for the Owner by the Architect or Commissioning Authority.
- H. Owner's Witness: Commissioning Authority, Owner's Project Manager, or Architect-designated witness authorized to authenticate test demonstration data and to sign completed test data forms.
- I. "Systems," "Assemblies," "Subsystems," "Equipment," and "Components": Where these terms are used together or separately, they shall mean "as-built" systems, assemblies, subsystems, equipment, and components.
- J. Test: Performance tests, performance test demonstrations, commissioning tests, and commissioning test demonstrations.
- K. Sampling Procedures and Tables for Inspection by Attributes: As defined in ASQ Z1.4.

1.06 COMPENSATION

- A. If Architect, Commissioning Authority, other Owner's witness, or Owner's staff perform additional services or incur additional expenses due to actions of Contractor listed below, compensate Owner for such additional services and expenses.
 - 1. Failure to provide timely notice of commissioning activities schedule changes.
 - 2. Failure to meet acceptance criteria for test demonstrations.
- B. Contractor shall compensate Owner for such additional services and expenses at the rate of <Insert billing rate> per labor hour, plus <Insert rate> per round trip for personnel travelling more than [200] <Insert distance> miles, plus per diem allowances for meals and lodging according to current U.S. General Services Administration (GSA) Per Diem Rates.

1.07 COMMISSIONING TEAM

- A. Members Appointed by Contractor(s):
 - 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.
 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. Architect, plus employees and consultants that Architect may deem appropriate for a particular portion of the commissioning process.

1.08 INFORMATIONAL SUBMITTALS

- A. Comply with requirements in Section 01 33 00 "Submittal Procedures" for submittal procedure general requirements for commissioning process.
- B. Commissioning Plan Information:
1. List of Contractor-appointed commissioning team members to include specific personnel and subcontractors performing the various commissioning requirements.
 2. Schedule of commissioning activities, integrated with the Construction Schedule. Comply with requirements in Section 01 32 00 "Construction Progress Documentation" for the Construction Schedule general requirements for commissioning process.
 3. Contractor personnel and subcontractors participating in each test.
 4. List of instrumentation required for each test to include identification of parties that will provide instrumentation for each test.
- C. Commissioning schedule.
- D. Two-week look-ahead schedules.
- E. Commissioning Coordinator Letter of Authority:
1. Within 10 days after approval of Commissioning Coordinator qualifications, submit a letter of authority for Commissioning Coordinator, signed by a principal of Contractor's firm. Letter shall authorize Commissioning Coordinator to do the following:
 - a. Make inspections required for commissioning 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.
- F. Commissioning Coordinator Qualification Data: For entity coordinating Contractor's commissioning activities to demonstrate their capabilities and experience.

1. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of **[five]** **<Insert number>** previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- G. 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.
- H. 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.
- I. Construction Checklists:
 1. Material checks.
 2. Installation checks.
 3. Startup procedures, where required.

1.09 CLOSEOUT SUBMITTALS

- A. 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.
- B. Request for Certificate of Construction-Phase Commissioning Process Completion.
- C. Operation and Maintenance Data: For proprietary test equipment, instrumentation, and tools to include in operation and maintenance manuals.

1.10 QUALITY ASSURANCE

- A. Commissioning Coordinator Qualifications:
 - 1. Documented experience commissioning systems of similar complexity to those contained in these documents on at least **[three]** <Insert number> projects of similar scope and complexity.
 - 2. Certification of commissioning-process expertise. The following certifications are acceptable. Owner reserves the right to accept or reject certifications as evidence of qualification.
 - a. Certified Commissioning Authority, by AABC Commissioning Group (ACG).
 - b. Commissioning-Process Management Professional, by American Society of Heating, Refrigerating and Air-Conditioning Engineers.
 - c. Certified Commissioning Professional, by Building Commissioning Association.
 - d. Accredited Commissioning-Process Authority Professional, by University of Wisconsin.
 - e. Accredited Commissioning-Process Manager, by University of Wisconsin.
 - f. Accredited Green Commissioning-Process Provider, by University of Wisconsin.
- 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

2.01 TEST EQUIPMENT, INSTRUMENTATION, AND TOOLS

- A. Test equipment and instrumentation required to perform the commissioning process shall remain the property of Contractor 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.

- 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.

2.02 PROPRIETARY TEST EQUIPMENT, INSTRUMENTATION, AND TOOLS

- A. Proprietary test equipment, instrumentation, and tools are those manufactured or prescribed by tested equipment manufacturer and required for work on its equipment as a condition of equipment warranty, or as otherwise required to service, repair, adjust, calibrate, or perform work on its equipment.
 1. Identify proprietary test equipment, instrumentation, and tools required in the test equipment identification list submittal.
 2. Proprietary test equipment, instrumentation, and tools shall become the property of Owner at Substantial Completion.

2.03 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

3.01 PREPARATION

- A. Review preliminary construction checklists and preliminary test procedures and data forms.

3.02 CONSTRUCTION CHECKLISTS

- A. Construction checklists cannot modify or conflict with the Contract Documents.
- B. Create construction checklists based on actual systems and equipment to be included in Project.
- C. Material Checks: Compare specified characteristics and approved submittals with materials as received. Include factory tests and other evaluations, adjustments, and tests performed prior to shipment if applicable.
 - 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: Perform 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 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, 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 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.

3.03 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.
 - a. General Inspection: [Level I] [Level II] [Level III] <Insert level>.
 - b. Special Inspection: [Level S-1] [Level S-2] [Level S-3] [Level S-4] <Insert level>.
 - c. Acceptance Quality Limit (AQL) of [1.5] <Insert AQL>.
 - 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.

3.04 COMMISSIONING COORDINATOR RESPONSIBILITIES

- A. Management and Coordination: Manage, schedule, and coordinate commissioning process, including, but not limited to, the following:
 1. Coordinate with subcontractors on their commissioning responsibilities and activities.
 2. Obtain, assemble, and submit commissioning documentation.
 3. **[Attend] [Conduct]** periodic on-site commissioning meetings. Comply with requirements in Section 01 31 00 "Project Management and Coordination."
 4. Develop and maintain the commissioning schedule. Integrate commissioning schedule into the Construction Schedule. Update Construction Schedule at specified intervals.
 5. Review and comment on preliminary test procedures and data forms.
 6. Report inconsistencies and issues in system operations.
 7. Verify that tests have been completed and results comply with acceptance criteria, and that equipment and systems are ready before scheduling test demonstrations.
 8. Direct and coordinate test demonstrations.
 9. Coordinate witnessing of test demonstrations by Owner's witness.
 10. Coordinate and manage training. Be present during training sessions to direct video recording, present training, and direct the training presentations of others. Comply with requirements in Section 01 79 00 "Demonstration and Training."
 11. Prepare and submit specified commissioning reports.
 12. Track commissioning issues until resolution and retesting is successfully completed.
 13. Retain original records of Commissioning-Process Work, organized as required for the commissioning report. Provide Owner's representative access to these records on request.
 14. Assemble and submit commissioning report.

3.05 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 **[daily] [weekly] <Insert frequency>** for work performed during the preceding **[day] [week] <Insert time period>**.

4. Provide Commissioning Authority access to construction checklists.
- D. Installation Compliance Issues: Record as an installation compliance issue Work found to be incomplete, inaccessible, at variance with the Contract Documents, nonfunctional, or that does not comply with construction checklists. Record installation compliance issues on the construction checklist at the time they are identified. Record corrective action and how future Work should be modified before signing off the construction checklist.
- E. 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. The sampling rate for tests is 100 percent. The sampling rate for test demonstrations is 100 percent unless otherwise indicated.
 2. Perform and complete each step of the approved test procedures in the order listed.
 3. Record data observed during performance of tests on approved data forms at the time of test performance and when the results are observed.
 4. 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.
 5. 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] <Insert number> percent unless otherwise indicated in the individual test specification.
 2. Notify Owner's witness at least [three days] <Insert alternative time> 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 Architect'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 Architect and Commissioning Authority at least [three working days] <Insert alternative time> (minimum) in advance of tests.
 3. Where deferred tests are specified, coordinate participation of necessary personnel and of Architect, Commissioning Authority, and Owner's witness. Schedule deferred tests to minimize occupant and facility impact. Obtain Architect'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 Architect and Commissioning Authority at least **[three working days]** **<Insert alternative time>** (minimum) in advance of tests.
 3. Where delayed tests are approved, coordinate participation of necessary personnel and of Architect, Commissioning Authority, and Owner's witness. Schedule delayed tests to minimize occupant and facility impact. Obtain Architect'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]** **<Insert alternative time>** 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 **[five]** **<Insert number>** 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.

3.06 COMMISSIONING MEETINGS

- A. **[Schedule and conduct] [Commissioning Authority will schedule and conduct]** commissioning meetings. Comply with requirements in Section 01 31 00 "Project Management and Coordination."

3.07 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 Architect 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.

3.08 SCHEDULING

- A. Commence commissioning process as early in the construction period as possible.
- B. Commissioning Schedule: Integrate commissioning activities into Construction Schedule. See Section 01 32 00 "Construction Progress Documentation."
 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:
 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 via Architect.
2. Notify Architect of commissioning schedule changes at least **[two]** **<Insert number>** work days in advance for activities requiring the participation of Owner's witness.

3.09 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.

3.10 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 through Architect a comprehensive list of items to be completed or corrected. Failure to include an item on such list does not alter Contractor's responsibility to compete commissioning 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 Architect's 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

SECTION 01 91 19.43 - EXTERIOR ENCLOSURE COMMISSIONING

PART 1 GENERAL

1.01 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.

1.02 SUMMARY

- A. Section includes building enclosure Cx process requirements for the above- and below-grade systems and assemblies:
 - 1. Horizontal and vertical waterproofing.
 - 2. Opaque walls.
 - 3. Roofs.
 - 4. Openings.
 - 5. Interfaces.
- B. Related Requirements:
 - 1. Section 01 91 13 "General Commissioning Requirements" for general requirements for Cx processes including definitions, Cx team membership, Owner's responsibilities, Contractor's responsibilities, and CxA's responsibilities.

1.03 DEFINITIONS

- A. Building Enclosure: Materials, components, systems, and assemblies intended to provide shelter and environmental separation between interior and exterior, or between two or more environmentally distinct interior spaces in a building or structure. The building enclosure includes, but is not limited to, exterior walls, above and below grade, and roof assemblies.
- B. Cx: Commissioning, as defined in Section 10 91 13 "General Commissioning Requirements."
- C. CxA: Commissioning Authority, as defined in Section 01 91 13 "General Commissioning Requirements."
- D. First-Installation Mockups: Initial installation of specific enclosure materials, components, systems, and assemblies that are part of Work.
- E. Integrated Exterior Mockups: Integrated mockups of the exterior enclosure erected separately from the building but on Project site, consisting of multiple products, assemblies, and subassemblies.
- F. Laboratory Mockups: Full-size physical assemblies constructed at testing facility.
- G. "Systems," "Assemblies," "Subsystems," "Equipment," and "Components": Where these terms are used together or separately, they shall mean "as-built" systems, assemblies, subsystems, equipment, and components.
- H. Water Penetration: Visible evidence of uncontrolled water penetration on or adjacent to the test specimen in a location not intended to collect and drain water to the building exterior.

1.04 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Construction Checklists: Draft Construction Checklists will be created by CxA for Contractor review.
- C. Construction Checklists: Include the following and comply with requirements in Section 01 91 13 "General Commissioning Requirements" for Construction Checklists:
 - 1. **<Insert checklist>**.
- D. Cx Process Submittals:
 - 1. Shop Drawings: For mockups, including elevations, plans, sections, and full-size details. Show interface conditions, interconnections, and terminations.
 - 2. Testing Program: Developed specifically for Project.
 - 3. Test Reports: Prepared by a qualified testing agency for each test.
 - 4. Record Drawings: As-built drawings of mockups showing changes made during testing.
- E. Field quality-control reports.

1.05 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For building envelope systems and components to include in operation and maintenance manuals.

1.06 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated [**and accredited by IAS or ILAC Mutual Recognition Arrangement as complying with ISO/IEC 17025**].
- B. Build mockups to evaluate constructability and performance, and demonstrate the coordination of trades and sequencing of work necessary to ensure functional and integrated performance of materials, components, systems, assemblies, and interfaces.
 - 1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 2. Notify Architect and CxA [**seven**] **<Insert number>** days in advance of the dates and times when mockups will be constructed and tested.
- C. Laboratory Mockups: Build at testing agency facility; use personnel, products, and methods of construction that will be used at Project site.
- D. Integrated Exterior Mockups: Build at Project site on site at locations [**indicated on Drawings**] [**as directed by Architect**].
- E. First Installation Mockups: Prepare each major exterior enclosure system for testing when first installed and before proceeding with construction of additional similar assemblies. If in compliance, Work may remain as part of the completed construction.
 - 1. Wall Mockups: Extend one full structural bay wide by one full story high plus additional height to connect to assemblies below and above. Include a typical wall to interior floor slab connections.

- a. Minimum Size: [100 sq. ft.] **<Insert size>**.
 2. Roof Mockups: Include parapet or roof edge conditions, flashings, and typical pipe, dunnage, and similar penetrations.
 - a. Minimum Size: [100 sq. ft.] **<Insert size>**.
 3. Horizontal Below-Grade Waterproofing and Slab-on-Grade Mockups: Include edge conditions and typical penetrations.
 - a. Minimum Size: [100 sq. ft.] **<Insert size>**.
 4. Vertical Below-Grade Waterproofing Mockups: Include edge, termination, and penetrations.
 5. Building Expansion Joint Mockups: Include starting point at foundation and extend up vertical surfaces, across horizontal waterproofed surfaces and roofs and return to foundation. Include each type of corner, intersection, transition, and termination.
- F. Mockups specified for quality assurance and control in the following sections may be combined with Cx mockups for testing purposes.
1. Section 03 33 00 "Architectural Concrete."
 2. Section 03 45 00 "Precast Architectural Concrete."
 3. Section 04 20 00 "Unit Masonry."
 4. Section 04 42 00 "Exterior Stone Cladding."
 5. Section 07 27 26 "Fluid-Applied Membrane Air Barriers."
 6. Section 07 61 00 "Sheet Metal Roofing."
 7. Section 08 44 13 "Glazed Aluminum Curtain Walls."
 8. **<Insert section number and title>**

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.01 CONSTRUCTION CHECKLISTS

- A. Prepare detailed Construction Checklists for exterior enclosure Cx systems, subsystems, equipment, and components. Complete and submit Construction Checklists.

3.02 CONSTRUCTION CHECKLIST REVIEW

- A. Review and provide written comments on draft Construction Checklists. CxA will create required draft Construction Checklists and provide them to Contractor.
- B. Return draft Construction Checklist review comments within [10] **<Insert number>** days of receipt.
- C. When review comments have been resolved, CxA will provide final Construction Checklists, marked "Approved for Use, (date)."
- D. Use only Construction Checklists, marked "Approved for Use, (date)."

3.03 GENERAL TESTING REQUIREMENTS

- A. If tests cannot be completed because of a deficiency outside the scope of the building enclosure systems, document the deficiency and report it to Owner. After deficiencies are resolved, reschedule tests.
- B. If seasonal testing is specified, complete appropriate initial performance tests and documentation and schedule seasonal tests.
- C. Coordinate schedule with, and perform Cx activities at the direction of the CxA.

3.04 LABORATORY MOCKUP TESTING

- A. Laboratory Mockup Testing Service: **[Owner will engage] [Engage]** a qualified testing agency to perform testing on laboratory mockups.
- B. Laboratory Mockup Testing Program: Perform the tests listed below in the following order.
 - 1. Structural: ASTM E 330 at 50 percent of positive test load for not less than **[10] <Insert number>** seconds.
 - a. No evidence of deflection exceeding specified limits.
 - 2. Air Infiltration: ASTM E 283 at a static-air-pressure differential of [1.57 lbf/sq. ft.] [6.24 lbf/sq. ft.] **<Insert value>**.
 - a. Maximum air leakage of **<Insert value>**.
 - 3. Water Penetration under Static Pressure: ASTM E 331 at minimum static-air-pressure differential of **[20 percent] <Insert differential>** of positive wind-load design pressure, but not less than [6.24 lbf/sq. ft.] [10 lbf/sq. ft.] [15 lbf/sq. ft.] **<Insert value>**.
 - a. No evidence of water penetration.
 - 4. Water Penetration under Dynamic Pressure: AAMA 501.1 at minimum air-pressure differential of **[20 percent] <Insert differential>** of positive wind-load design pressure, but not less than [6.24 lbf/sq. ft.] [10 lbf/sq. ft.] [15 lbf/sq. ft.] **<Insert value>**.
 - a. No evidence of water penetration.
 - 5. Structural: ASTM E 330 at 100 percent of positive and negative test loads for not less than **[10] <Insert number>** seconds.
 - a. No evidence of deflection exceeding specified limits.
 - 6. Air Infiltration: ASTM E 283 at a static-air-pressure differential of [1.57 lbf/sq. ft.] [6.24 lbf/sq. ft.] **<Insert value>**.
 - a. Maximum air leakage of **<Insert value>**.
 - 7. Water Penetration under Static Pressure: ASTM E 331 at minimum static-air-pressure differential of **[20 percent] <Insert differential>** of positive wind-load design pressure, but not less than [6.24 lbf/sq. ft.] [10 lbf/sq. ft.] [15 lbf/sq. ft.] **<Insert value>**.
 - a. No evidence of water penetration.
 - 8. Water Penetration under Dynamic Pressure: AAMA 501.1 at minimum air-pressure differential of **[20 percent] <Insert differential>** of positive wind-load design pressure, but not less than [6.24 lbf/sq. ft.] [10 lbf/sq. ft.] [15 lbf/sq. ft.] **<Insert value>**.
 - a. No evidence of water penetration.
 - 9. Thermal Cycling: AAMA 501.5.

10. Air Infiltration: ASTM E 283 at a static-air-pressure differential of [1.57 lbf/sq. ft.] [6.24 lbf/sq. ft.] **<Insert value>**.
 - a. Maximum air leakage of **<Insert value>**.
11. Water Penetration under Static Pressure: ASTM E 331 at minimum static-air-pressure differential of **[20 percent]** **<Insert differential>** of positive wind-load design pressure, but not less than [6.24 lbf/sq. ft.] [10 lbf/sq. ft.] [15 lbf/sq. ft.] **<Insert value>**.
 - a. No evidence of water penetration.
12. Structural: ASTM E 330 at 150 percent of positive and negative test loads.
 - a. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding **[0.2]** **<Insert number>** percent of span.
 - b. Test Durations: As required by design wind velocity, but not less than **[10]** **<Insert number>** seconds.

3.05 INTEGRATED EXTERIOR MOCKUP TESTING

- A. Testing Agency: **[Owner will engage]** **[Engage]** a qualified testing agency to perform tests and inspections.
- B. Integrated Exterior Mockup Testing Program: Perform the following tests in the following order:
 1. Smoke Testing: ASTM E 1186 at a static-air-pressure differential of [1.57 lbf/sq. ft.] **<Insert value>**.
 2. Opaque Wall Air Infiltration: ASTM E 783 at a static-air-pressure differential of [1.57 lbf/sq. ft.] [6.24 lbf/sq. ft.] **<Insert value>**.
 - a. Maximum air leakage of **<Insert value>**.
 3. Window Air Infiltration: ASTM E 783 at a static-air-pressure differential of [1.57 lbf/sq. ft.] [6.24 lbf/sq. ft.] **<Insert value>**.
 - a. Maximum air leakage of **<Insert value>**.
 4. Water Penetration under Static Pressure: ASTM E 1105 with minimum **[uniform]** **[and]** **[cyclic]** static-air-pressure differential of [6.24 lbf/sq. ft.] [8.0 lbf/sq.ft.] [10 lbf/sq. ft.] [12 lbf/sq. ft.] **<Insert value>**
 - a. No evidence of water penetration.
 5. Water Penetration under Dynamic Pressure: AAMA 501.1 at a test pressure of [6.24 lbf/sq. ft.] [8.0 lbf/sq.ft.] [10 lbf/sq. ft.] [12 lbf/sq. ft.] **<Insert value>**.
 - a. No evidence of water penetration.
 6. Pull-off Strength of Adhered Air Barriers: ASTM D 4541 as modified by ABAA.
 - a. Minimum [16 lbf/sq. in.] **<Insert value>** adhesion to substrate.
 7. Pull Test for EIFS: ASTM E 2359.
 - a. **<Insert value>**.
 8. Sealant Durability: ASTM C 794.
 - a. **<Insert peel strength>**.
 9. Outdoor-Indoor, Sound-Transmission Loss: ASTM E 966.
 - a. **<Insert value>**.

10. Outdoor A-Weighted Sound Levels: ASTM E 1014.
 - a. **<Insert value>**.
11. Outdoor Sound Measurements Using Digital Statistical Sound Analysis: ASTM E 1503.
 - a. **<Insert value>**.

3.06 FIRST-INSTALLATION MOCKUP TESTING

- A. Testing Agency: **[Owner will engage] [Engage]** a qualified testing agency to perform tests and inspections.
- B. Wall Mockups: Perform the following tests in the following order:
 1. Smoke Testing: ASTM E 1186 at a static-air-pressure differential of [1.57 lbf/sq. ft.] **<Insert value>**.
 2. Opaque Wall Air Infiltration: ASTM E 783 at a static-air-pressure differential of [1.57 lbf/sq. ft.] [6.24 lbf/sq. ft.] **<Insert value>**.
 - a. Maximum air leakage of **<Insert value>**.
 3. Window Air Infiltration: ASTM E 783 at a static-air-pressure differential of [1.57 lbf/sq. ft.] [6.24 lbf/sq. ft.] **<Insert value>**.
 - a. Maximum air leakage of **<Insert value>**.
 4. Water Penetration under Static Pressure: ASTM E 1105 with minimum **[uniform] [and] [cyclic]** static-air-pressure differential of [6.24 lbf/sq. ft.] [8.0 lbf/sq.ft.] [10 lbf/sq. ft.] [12 lbf/sq. ft.] **<Insert value>**
 - a. No evidence of water penetration.
 5. Water Penetration under Dynamic Pressure: AAMA 501.1 at a test pressure of [6.24 lbf/sq. ft.] [8.0 lbf/sq.ft.] [10 lbf/sq. ft.] [12 lbf/sq. ft.] **<Insert value>**.
 - a. No evidence of water penetration.
 6. Pull-off Strength of Adhered Air Barriers: ASTM D 4541.
 - a. **<Insert value>**.
 7. Pull Test for EIFS: ASTM E 2359.
 - a. **<Insert value>**.
 8. Sealant Durability: ASTM C 794.
 - a. **<Insert peel strength>**
 9. Outdoor-Indoor, Sound-Transmission Loss: Per ASTM E 1332, determined by testing according to ASTM E 966.
 - a. **<Insert OITC value>**.
 10. Outdoor A-Weighted Sound Levels: ASTM E 1014.
 - a. **<Insert value>**.
 11. Outdoor Sound Measurements Using Digital Statistical Sound Analysis: ASTM E 1503.
 - a. **<Insert value>**.
- C. Roof Mockup: Perform the following tests in the following order:
 1. Air Leakage Site Detection: ASTM E 1186.
 - a. No evidence of air penetration.

2. Flood Testing of Horizontal Waterproofing: ASTM D 5957.
 - a. No evidence of water penetration for a minimum 48 hours.
 3. Water-Spray Test: AAMA 501.2.
 - a. No evidence of water penetration.
 4. Electronic Leak Detection:
 - a. No evidence of water penetration.
- D. Horizontal Below-Grade Waterproofing and Slab-on-Grade Mockups: Perform the following tests in the following order:
1. Water Penetration: ASTM D 5957.
 - a. No evidence of water penetration.
 2. Water-Spray Test: AAMA 501.2 for terminations and interface conditions.
 - a. No evidence of water penetration.
 3. Electronic Leak Detection.
 - a. No evidence of water penetration.
- E. Vertical Below-Grade Waterproofing Mockups: Perform the following tests in the following order:
1. Water Penetration: ASTM E 1105 without air-pressure differential
 - a. No evidence of water penetration.
 2. Water-Spray Test: AAMA 501.2.
 - a. No evidence of water penetration.
- F. Building Expansion Joint Mockups: Perform the following tests in the following order:
1. Water Penetration under Static Pressure: ASTM E 1105 with minimum **[uniform] [and] [cyclic]** static-air-pressure differential specified for laboratory testing, but not less than 6.24 lbf/sq. ft. .
 - a. No evidence of water penetration.
 2. Water-Spray Test: AAMA 501.2.
 - a. No evidence of water penetration.

3.07 BUILDING ENCLOSURE TESTING

- A. Building Enclosure Testing: Perform testing before installation of interior finishes unless otherwise indicated.
- B. Testing Agency: **[Owner will engage] [Engage]** a qualified testing agency to perform tests and inspections.
- C. **<Insert Type>** Building Enclosure Testing: Perform the following tests in the following order:
1. Smoke Testing: ASTM E 1186 at a static-air-pressure differential of [1.57 lbf/sq. ft.] **<Insert value>**.
 2. Opaque Wall Air Infiltration: ASTM E 783 at a static-air-pressure differential of [1.57 lbf/sq. ft.] [6.24 lbf/sq. ft.] **<Insert value>**.
 - a. Maximum air leakage of **<Insert value>**.

3. Window Air Infiltration: ASTM E 783 at a static-air-pressure differential of [1.57 lbf/sq. ft.] [6.24 lbf/sq. ft.] **<Insert value>**.
 - a. Maximum air leakage of **<Insert value>**.
 - b. Perform a minimum of two tests.
4. Air Leakage Site Detection: ASTM E 1186.
 - a. Maximum air leakage of **<Insert value>**.
5. Water Penetration under Static Pressure: ASTM E 1105 with minimum [uniform] [and] [cyclic] static-air-pressure differential of [6.24 lbf/sq. ft.] [8.0 lbf/sq.ft.] [10 lbf/sq. ft.] [12 lbf/sq. ft.] **<Insert value>**.
 - a. No evidence of water penetration.
6. Water Penetration under Dynamic Pressure: AAMA 501.1 at a minimum air-pressure differential of [6.24 lbf/sq. ft.] [8.0 lbf/sq.ft.] [10 lbf/sq. ft.] [12 lbf/sq. ft.] **<Insert value>**.
 - a. No evidence of water penetration.
7. Water-Spray Test: AAMA 501.2.
 - a. No evidence of water penetration.
8. Flood Testing of Horizontal Waterproofing: ASTM D 5957 on all exterior horizontal surfaces.
 - a. No evidence of water penetration.
9. Location of Wet Insulation in Roofing Systems: ASTM C 1153.
 - a. No wet insulation.
10. Pull-off Strength of Adhered Air Barriers: ASTM D 4541 as modified by ABAA.
 - a. Minimum [16 lbf/sq. in.] **<Insert value>** adhesion to substrate.
11. Anchor Pull-Out: ASTM E 488/488M.
 - a. **<Insert value>**.
12. Pull Test for EIFS: ASTM E 2359.
 - a. **<Insert value>**.
13. Sealant Durability: ASTM C 794.
 - a. **<Insert peel strength>**.
 - b. Perform a minimum of three tests.
14. Whole Building Air Leakage Rate by Fan Pressurization: ASTM E 779.
 - a. Maximum Air Leakage Rate: **<Insert value>**.
15. Whole Building Air Tightness Using an Orifice Blower Door: ASTM E 1827.
 - a. Maximum Air Leakage Rate: **<Insert value>**.

3.08 BUILDING ENCLOSURE TESTING SCHEDULE

END OF SECTION

SECTION 02 41 19
SELECTIVE DEMOLITION

PART 1 GENERAL

1.01 SUMMARY

- A. The Work of this Section Includes:
 - 1. Demolition and removal of selected portions of site elements.

1.02 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of off-site unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner as indicated.
- C. Existing to Remain: Existing items of construction that are not to be removed.

1.03 MATERIALS OWNERSHIP

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

1.04 PREINSTALLATION MEETINGS

- A. Predemolition Conference: Conduct conference at Project site.
 - 1. Inspect and discuss condition of construction to be selectively demolished.
 - 2. Review and finalize selective demolition schedule and verify availability of demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 - 3. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
 - 4. Review areas where existing construction is to remain and requires protection.
 - 5. Review and finalize protection requirements.
 - 6. Review procedures for noise control and dust control.
 - 7. Review storage, protection, and accounting for items to be removed for salvage.

1.05 INFORMATIONAL SUBMITTALS

- A. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection , for dust control and , for noise control. Indicate proposed locations and construction of barriers.
- B. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Temporary interruption of utility services. Indicate how long utility services will be interrupted.
2. Coordination for shutoff, capping, and continuation of utility services.

1.06 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.

1.07 FIELD CONDITIONS

- A. Owner will occupy building adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials:
 1. It is not expected that hazardous materials will be encountered in the Work.
 - a. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
 - b.
- E. Historic Areas: Demolition and hauling equipment and other materials to be of sizes that clear surfaces within historic spaces, areas, rooms, and openings, including temporary protection, by 12 inches or more.
- F. On-site sale of removed items or materials is not permitted.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSP A10.6 and NFPA 241.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.

- C. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video, measured drawings. Comply with Section 01 32 33 "Photographic Documentation."
 - 1. Inventory and record the condition of items to be removed for salvage. Photograph or video conditions that might be misconstrued as damage caused by removal.
 - 2. Photograph or video existing conditions of adjoining construction including finish surfaces, that might be misconstrued as damage caused by selective demolition operations or removal of items for salvage.

3.02 PREPARATION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 - 2. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
- B. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition.

3.03 UTILITY SERVICES AND BUILDING SYSTEMS

- A. Existing Services/Systems to Be Removed: Locate, identify, disconnect, and seal or cap off utilities to be selectively demolished.
 - 1. Owner will arrange to shut off indicated utilities when requested by Contractor.
 - 2. If disconnection of utilities will affect adjacent occupied parts of the buildings, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to those parts of the building.
 - 3. Demolish and remove existing items indicated on Drawings to be removed.

3.04 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
 - 2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 3. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed trafficways if required by authorities having jurisdiction.
2. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.

3.05 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and recycle or dispose of them in accordance with Section 01 74 19 "Construction Waste Management and Disposal."
 1. Do not allow demolished materials to accumulate on-site.
 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 3. Comply with requirements specified in Section 01 74 19 "Construction Waste Management and Disposal."
- B. Burning: Do not burn demolished materials.

3.06 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION

SECTION 31 1000 - SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes soil erosion and sediment controls including but not limited to:
 - 1. Demolition and removal of utilities, utility poles and fixtures.
 - 2. Demolition of curbs, sidewalks, pavement and aggregate bases, trees, signs, and other items shown or otherwise required to be removed.
 - 3. Abandoning in place or removing below-grade construction.
 - 4. Disconnecting, capping or sealing, and abandoning in place or removing site utilities.
 - 5. Saw-cutting pavement
 - 6. Disposal and/or recycling of demolished materials.
 - 7. Installation, maintenance, inspection, and removal of all sediment and erosion control devices
- B. This section does not include demolition of buildings.

1.2 REFERENCES

- A. The most current version of the publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.
- B. AMERICAN NATIONAL STANDARDS INSTITUTE
 - 1. ANSI A10.6: Safety Requirements for Demolition Operations
- C. NATIONAL FIRE PROTECTION ASSOCIATION
 - 1. NFPA 241: Standard for Safeguarding Construction, Alteration, and Demolition Operations
- D. Colorado Water Quality Control Act, in particular Section 25-8-501 through 505, C.R.S.
- E. Colorado Department of Health, Regulation No. 61
- F. The City of Grand Junction Standard Contract Documents for Capital Improvements Construction
- G. Colorado Department of Transportation Standard Specifications for Road and Bridge Construction (CDOT)

1.3 SUBMITTALS

- A. Pre-demolition Photographs, 35 mm or digital (in JPG format, taken with a minimum 4 mega-pixel digital camera with optical zoom) or Videotape/DVD: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Submit before Work begins.
- B. Schedule of Demolition Activities: Indicate the following:
 - 1. Detailed sequence of demolition and removal work, with starting and ending dates for each activity.
 - 2. Coordination for shutoff, and capping of utility services.
- C. Evidence of disposal and recycling contracts (for information only)
- D. Record drawings of removed and abandoned utilities, indicating locations, sizes, materials, and elevations. Drawings shall be legible, drawn to scale, and contain sufficient information to locate abandoned utilities after excavations are backfilled.
- E. Product Data: none required.
- F. Submit samples, manufacturers' product data, test reports, in accordance with the requirements of contract documents and Division 1 requirements.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with governing local, State, and Federal notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI A10.6.
- C. Environmental Agency Compliance: Comply with applicable portions of federal, state and local environmental regulations pertaining to soil erosion and sediment controls.

1.5 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or recycled.
- B. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or recycled.

1.6 MATERIALS OWNERSHIP

- A. Unless otherwise noted on the drawings, all cleared or demolished materials shall become Contractor's property and shall be promptly removed from the site.

1.7 PROJECT CONDITIONS

- A. Work on the site under other contracts may be concurrent with this contract. The Contractor shall coordinate the demolition sequence with all other contractors. The Contractor shall provide all temporary bracing, shoring, and supports that may be required to ensure the safety of personnel in areas of the site adjacent to the demolition area.
- B. Owner assumes no responsibility for site features to be demolished.
- C. Conditions existing at time of inspection for bidding purposes will be maintained by Owner as far as practicable.
- D. Storage or sale of removed items or materials on-site is not permitted.

1.8 COORDINATION

- A. Arrange demolition schedule so as not to interfere with other contractor's on-site operations.
- B. Contact utility owners to arrange for shutoff of utilities prior to removal.

PART 2 - PRODUCTS

- A. NOT INCLUDED

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Survey existing conditions and correlate with requirements indicated to determine extent of site demolition required.
- B. Review Project Record Documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are the same as those indicated in Project Record Documents.
- C. When unanticipated elements are encountered, investigate and measure the nature and extent of the element. Promptly submit a written report to the Owner.

3.2 PREPARATION

- A. Notify the Colorado One-Call System at 1-800-922-1987 in accordance with Colorado Revised Statutes §9-1.5-101 and all amendments. Retain the services of a utility locator for identification of underground utilities on private property.
- B. Pre-demolition Conference: Conduct conference at Project site with Owner to discuss the following:
 - 1. Inspect and discuss condition of construction to be demolished.
 - 2. Review and finalize demolition schedule and verify availability of demolition personnel, equipment, and facilities needed to make progress and avoid delays.
- C. Review and finalize protection requirements.

- D. Arrange to discontinue utility service with utility companies and other agencies:
- E. Obtain all required permits and post all required notifications prior to beginning the work.
- F. Have all erosion control materials on site before any work commences.
- G. Existing Utilities: Do not start demolition work until utility disconnection/de-energization have been completed and verified in writing.
- H. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent unexpected movement or collapse of construction being demolished.
- I. Strengthen or add new supports when required during progress of demolition.

3.3 SAW CUTTING

- A. Saw-cut pavement at limits of removal where remaining pavement is to be incorporated into new work.
- B. Saw-cut pavement at limits of removal where remaining pavement is to be incorporated into new work. Saw cuts shall be neat, straight, and a minimum of 1" in depth. Full depth saw cuts will be required where cutting utility trenches in the street.

3.4 PROTECTION

- A. Existing Facilities: Protect adjacent walkways, building entries, and other building facilities during demolition operations.
- B. Temporary Protection: Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction or as indicated.
- C. Protect existing site appurtenances and landscaping which are to remain.
- D. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities which are to remain.
- E. Provide protection to ensure safe passage of people and vehicles around demolition areas, and to and from occupied portions of adjacent buildings and structures.

3.5 GENERAL DEMOLITION

- A. General: Demolish indicated site improvements completely. Use methods required to complete the Work within limitations of governing regulations
- B. Engineering Surveys: Perform regular engineering surveys of the entire work area as the Work progresses to detect hazards that may result from demolition activities. Maintain a written log of survey times, dates, and findings.

- C. Site Access and Temporary Controls: Conduct demolition and debris-removal operations to ensure minimum interference with roads, streets, sidewalks, walkways, and other adjacent occupied and used facilities.
 - 1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
 - 2. Use water mist, dust control palliatives, and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, contaminated runoff, and pollution.

3.6 EXPLOSIVE DEMOLITION

- A. Explosives: Use of explosives is not permitted.

3.7 TREE REMOVAL

- A. No trees shall be removed except as specifically directed by the Owner. Stumps are to be removed to a depth of 48 inches below subgrade and backfilled with compacted clean earth fill. All debris is to be left in a clean and safe condition at the end of each working day.

3.8 RESTORATION

- A. Below-Grade Areas: Fill below-grade areas and voids resulting from demolition operations with satisfactory soil materials. Refer to Section 02300 for soil materials and compaction.

3.9 REPAIRS

- A. General: Promptly repair damage to adjacent construction.
- B. Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
- C. Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.

3.10 RECYCLING DEMOLISHED MATERIALS

- A. General: Separate recyclable demolished materials from other demolished materials to the maximum extent possible. Separate recyclable materials by type.
 - 1. Provide containers or other storage method approved by the Owner for controlling recyclable materials until such materials are removed from Project site.
 - 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 demolition area.

4. Store components off the ground and protect from the weather.
5. Transport recyclable materials off Owner's property to the recycling process facility.

- B. Recycling Incentives: Revenues for recycling demolition materials shall accrue to the contractor unless otherwise noted in the Project Documents.

3.11 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Except for items or materials planned to be recycled, reused, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in a permitted, regulated disposal facility.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

- B. Burning or burial: Do not burn or bury demolished materials unless otherwise specified.

- C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.12 CLEANING

- A. Clean adjacent structures, streets, sidewalks, and other pavement surfaces to remain free of dust, dirt, and debris caused by demolition operations. Return adjacent areas to condition existing before demolition operations began. general
- B. Temporary and permanent measures shall be undertaken before, during and after construction to control sediment from being carried onto or into adjoining areas, properties, streets, walkways, drainageways, or receiving waters.
- C. Required maintenance shall be provided to all sediment and erosion control measures.

END OF SECTION 31 1000

SECTION 31 2000 - EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Geotechnical and Geologic Hazards Investigation, Student Housing, Colorado Mesa University, Grand Junction, Colorado, May 9, 2026, Job Number: 00569-0070.

1.2 SUMMARY

- A. The Work in this Section includes furnishing all materials, labor, supervision, tools, equipment, tools, and performing all operations and incidentals necessary for excavation, hauling, disposal, placement, and compaction of all material encountered within the limits of the work. All excavation will be classified, "unclassified excavation". All embankment will be classified "embankment material". Earthwork activities include but are not limited to subgrade preparation, excavating, backfilling, and compaction for structures and foundations, pavements, sidewalks, landscape areas, and utilities.

1.3 REFERENCES

- A. Geotechnical and Geologic Hazards Investigation, Student Housing, Colorado Mesa University, Grand Junction, Colorado, May 9, 2026, Job Number: 00569-0070. Should the data contained in this report not be adequate for the Contractor's purposes, the Contractor may make, prior to bidding, its own investigation, test and analysis. The report is available from the Owner and a copy can be provided for the bidders' convenience upon request from the Owner.
- B. The most current version of the publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

- 1. AMERICAN ASSOCIATION OF STATE HIGHWAY TRANSPORTATION OFFICIALS (AASHTO)

- a. AASHTO T 180 Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

- 2. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- a. D 698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³))
 - b. D 1556 Density and Unit Weight of Soil in Place by the Sand-Cone Method

- c. D 1557 Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³.)
 - d. D 2487 Classification of Soils for Engineering Purposes (Unified Soil Classification System)
 - e. D 2922 Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
 - f. D 4318 Liquid Limit, Plastic Limit, and Plasticity Index of Soils
 - g. D 4254 Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
- 3. Colorado Department of Transportation Standard Specifications for Road and Bridge Construction (CDOT).
- 4. City of Grand Junction, Department of Public Works
 - a. Standard Specifications for Construction of Underground Utilities, Waterlines, Sanitary Sewer, Storm Drains, Underdrains, and Irrigation Systems
 - b. Standard Specifications for Road and Bridge Construction. Provisions of the Grand Junction specifications take precedence over CDOT specifications.

1.4 SUBMITTALS

- A. Material Test Reports: Shall be provided from the testing agency indicating and interpreting test results for compliance on the following:
 - 1. Classification according to ASTM D 2487 of each on-site or embankment soil material proposed for fill and backfill.
 - 2. Laboratory compaction curve according to ASTM D 698 for each on-site or embankment soil material proposed for fill and backfill; provide for each material type and for every 5,000 cubic yards of each material.
 - 3. Laboratory compaction curve according to ASTM D 1557 for each on-site or off-site material to be used for structural fill and backfill; provide for each material type and for every 5,000 cubic yards of each material.
 - 4. Material Gradation Tests

1.5 QUALITY ASSURANCE

- A. The Owner will engage the services of a geotechnical engineer and testing agency to perform quality control of the earthworks. The Contractor shall provide testing of any materials imported to the site.

1.6 DEFINITIONS

- A. Backfill: Soil materials used to fill an excavation.
- B. Base Course: Layer placed between the subgrade or subbase and paving.
- C. Bedding Course: Layer placed over the excavated subgrade in a trench before laying pipe.
- D. Embankment Material: Approved soil materials imported from off-site for use as fill or backfill.
- E. Classification: No consideration will be given to the nature of earthen materials, and all excavation required for this Project will be designated as unclassified.
- F. Degree of Compaction: Degree of compaction required is expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 698 or D 1557 abbreviated hereinafter as percent laboratory maximum density
- G. Unclassified Excavation: Removal of material encountered down to subgrade elevations:
 - 1. Bulk Excavation: Excavation more than 10 feet in width.
 - 2. Over excavation: Excavation of existing unsuitable material beyond limits shown on the Drawings for replacement with structural fill as directed by the Owner.
 - 3. Unauthorized Excavation: Excavation below subgrade elevations or beyond limits shown on the Drawings without direction by the Owner.
- H. Hard Material: Weathered rock, dense consolidated deposits, or buried construction debris (i.e., demolished brick walls, concrete, etc.) which are not included in the definition of "rock" but which usually require the use of heavy excavation equipment, ripper teeth, or jack hammers for removal.
- I. Rock: Rock material in beds, ledges, unstratified masses, and conglomerate deposits and boulders of rock material exceeding 1 cubic yard for bulk excavation or 3/4 cubic yard for footing, trench, and pit excavation that cannot be removed by rock excavating equipment without systematic drilling, ram hammering, ripping, or blasting, when permitted
- J. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below base or topsoil materials.
- K. Subbase: Material shown on the Drawings between the pavement base and subgrade.
- L. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.7 REGULATORY COMPLIANCE

- A. Codes and Standards: Perform earthwork complying with federal, state, and local regulations including the Occupational Safety and Health Act of 1970 as amended.
- B. Any runoff or pumped water shall be discharged from the Site in accordance with federal, state and local codes and regulations.

1.8 PROJECT CONDITIONS

- A. Notify the Colorado One-Call System at 1-800-922-1987 in accordance with Colorado Revised Statutes §9-1.5-101 and all amendments. Retain the services of a utility locator for identification of underground utilities on private property.
- B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Owner and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify the Owner not less than 72 hours in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without the Owner's written permission.
- C. Coordinate with utility companies to shut off services if lines in advance of construction.
- D. Existing improvements, adjacent property, and other facilities and trees and plants that are not to be removed shall be protected from injury or damage, which may result from Contractor's operation.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide embankment soil materials when sufficient satisfactory soil or suitable backfill materials are not available from excavations.
- B. Satisfactory Soil Materials: ASTM D 2487 soil classification groups GW, GP, GM, SP, SM, SW, SC, GC, SC, ML, MH, CH and CL or a combination of these group symbols.
 - 1. Low plasticity (plasticity index less than 15).
 - 2. Less than 15 percent, by weight, of particles larger than 2 inches in greater dimension.
 - 3. Less than 2 percent deviation from optimum moisture content.
 - 4. Less than 50 percent, by weight, of particles passing the #200 sieve
- C. Unsatisfactory Soil Materials: ASTM D 2487 soil classification groups OL, OH, and PT, or a combination of these group symbols, or materials not conforming to the requirements for satisfactory soils, including:

1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
2. Debris, waste, frozen materials, vegetation and other deleterious matter.
3. Otherwise not meeting the requirements for satisfactory soil materials.
4. Materials containing excessive amounts of deleterious materials including construction debris, wood, glass, ash, or organic material as determined by Owner.

D. Backfill and Fill Materials: Satisfactory soil materials.

E. Structural Fill: Granular, non-free draining, non-expansive material meeting the requirements of CDOT Class 1 Structural Backfill.

F. Base Course: Class 6, as specified in CDOT specifications, Section 703.

G. Bedding for Utilities

1. In accordance with City of Grand Junction standards
2. Liquid Limit (LL): 35 or less
3. Plasticity Index (PI): 6 or less
4. Gradation:

Sieve Size (#)	1"	3/8"	#4	#8	#200
% Passing	100	-	-	-	20 max

2.2 ACCESSORIES

A. Detectable Warning Identification Tape: Acid-and-alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities. Warning tape shall be a minimum 6 inches wide, 6 mils thick, have a minimum tensile strength 7,500 lbs/in², continuously inscribed with a description of the utility in permanent printing with caution striping, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; APWA color-coded as follows:

1. Red: Electric
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect existing utilities, sidewalks, structures, pavements, and other facilities to remain free from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways in accordance with Paragraph 1.7.

3.2 DRAINAGE AND DEWATERING

- A. Prevent surface water and subsurface or groundwater from entering or flowing into excavations, from ponding on prepared subgrades, and from flooding the project site and surrounding area.
- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
- C. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
- D. Provide pumping to remove any water encountered in accordance with Paragraph 1.7B.

3.3 EXPLOSIVES

- A. Explosives: The use explosives are prohibited on this Project.

3.4 UNCLASSIFIED EXCAVATION

- A. Unclassified excavation shall consist of the excavation of all materials of whatever character required for the work, obtained within the limits of construction. Compact subgrade surface in accordance with sections 3.7 & 3.8.
- B. Any soft or unstable material shall be overexcavated and replaced with compacted structural fill as directed by the geotechnical engineer. Any areas of instability shall be overexcavated to a depth of at least 2 feet and replaced with structural fill in accordance with sections 3.7 & 3.8.
- C. Where a conventional floor slab is used, it is recommended that the floor slab be constructed above a minimum of 24-inches of structural fill, extending horizontally 4-feet.
- D. Provide a minimum of 12 inches of compacted and moisture conditioned fill under exterior slabs and concrete flatwork.
- E. Provide shoring and bracing necessary to comply with Paragraph 1.7A.

3.5 STORAGE OF SOIL MATERIALS

- A. Stockpile embankment materials sufficiently far away from the edge of excavations to preclude excavation instability. Stockpile soil materials without intermixing. Cover to prevent windblown dust.
- B. Install erosion control measures around stockpiles as required to comply with Paragraph 1.7.

3.6 GENERAL BACKFILL

- A. Embankment construction shall include preparation of the areas upon which embankments are to be placed. Only approved materials shall be used in the construction of embankments and fills. Embankments shall be finished to smooth and uniform surfaces conforming to the adjacent ground. Embankment material shall not be placed on a subgrade which contains frozen material, or which has been subjected to freeze-thaw action. This prohibition encompasses all subgrade types, including the natural ground, all prepared subgrades (whether in an excavation or in a trench) and all layers of previously placed and compacted earth fill which become the subgrade for successive layers of earth fill. All material that freezes or has been subjected to freeze-thaw action during the construction work, or during periods of temporary shutdowns, such as, but not limited to, nights, holidays, weekends, winter shutdowns, or earthwork operations, shall be removed to a depth that is acceptable to the Owner and replaced with new material. Alternatively, the material shall be thawed, dried, reworked, and recompacted to the specified criteria before additional material is placed. The Owner will determine when placement of fill shall cease due to cold weather. The Owner may elect to use average daily air temperatures, and/or physical observation of the soils for his determination.
- B. Place and compact backfill in excavations promptly, but not before completing the following:
 - 1. Construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.
 - 2. Surveying locations of underground utilities for record documents.
 - 3. Inspecting and testing underground utilities.
 - 4. Removing concrete formwork.
 - 5. Removing of temporary shoring, bracing, and sheeting unless directed to remain.
 - 6. Removing trash and debris including broken concrete, asphalt or other solid materials more than 6 inches in greatest dimension.

3.7 MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.
 - 1. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
 - 2. Remove and replace, or scarify and air-dry satisfactory soil material that exceed optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.
 - 3. Construction during wet weather may also create unnecessary delays and undercutting of subgrades due to disturbance by construction traffic.

3.8 COMPACTION OF BACKFILLS AND FILLS

- A. Prior to placing fill or backfill, the top 12 inches of in-place materials on which soils will be placed shall be scarified, moisture conditioned, and properly compacted to provide a uniform base for fill placement per the project geotechnical report requirements.
- B. Place backfill and fill materials in layers not more than 12 inches in loose depth for material compacted by heavy compaction equipment, and not more than 6 inches in loose depth for material compacted by hand-operated tampers.
- C. Place backfill and fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- D. Fills shall be thoroughly mixed to achieve a uniform moisture content.
- E. Compact soil to not less than the following percentages of maximum dry unit weight:
 - 1. Soils that classify as GP, GW, GM, GC, SP, SW, SM, or SC in accordance with the USCS classification system (granular materials) shall be compacted to 95 or more percent of the maximum modified Proctor dry density at moisture contents within 2 percent of optimum moisture content as determined by ASTM D1557.
 - 2. Soils that classify as CL, CH, ML, or MH (cohesive materials) shall be compacted to 95 or more percent of the maximum standard Proctor dry density at moisture contents from 1 percent below to 2 percent above the optimum as determined by ASTM D698.
- F. The Contractor is responsible for maintenance and protection of approved subgrades or previously placed materials.

3.9 GRADING

- A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.
 2. Cut out soft spots, fill low spots, and trim high spots to comply with the required grading surface tolerances.
- B. Site Grading: Slope grades to direct water away from buildings and prevent ponding. Where paved, finish grades shall slope away from the building by a minimum 3/8" per foot for a distance of 10 feet unless otherwise indicated at accessible entrances. In unpaved areas, finish grades shall slope away from the building by a minimum 1" per foot for a distance of 10 feet, unless otherwise indicated.
- C. Finish subgrades to required elevations within the following tolerances:
1. Lawn or unpaved areas: Plus or minus 1 inch.
 2. Pavements: Plus or minus 1/2 inch.
- D. Grading inside building lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.10 BASE COURSES

- A. Under pavements and walks place base course (where indicated) on prepared subgrade and as follows:
1. Strip topsoil, fill, and other unsuitable materials.
 2. Scarify subgrade to a depth of 12 inches. Moisture-condition soil and recompact in 9" maximum lifts, to 95 percent of maximum dry unit density according to AASHTO T-99, within 2% of optimum moisture content.
 3. Compact base course in maximum 9-inch lifts, at -2% to +2% of optimum moisture content to not less than 95 percent of maximum dry unit density according to AASTHO T-180.

3.11 FIELD QUALITY CONTROL

- A. The contractor shall coordinate all earthwork with the testing agency and geotechnical engineer to allow for inspection and testing.
- B. Allow geotechnical engineer to inspect and test each subgrade and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.
- C. When the geotechnical engineer reports that subgrades, fills or backfills have not achieved degree of compaction specified, recompact and retest until specified compaction is obtained.

- D. The contractor shall proof roll all subgrade areas under pavement/concrete prior to placement of base course materials with the engineer or geotechnical testing engineer.
- E. The contractor shall proof roll all compacted base materials with the engineer or geotechnical engineer prior to concrete formwork placement or asphalt pavement placement.

3.12 PROTECTION

- A. Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and re-establish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled or where they lose compaction due to subsequent construction operations or weather conditions.
 - 1. Scarify or remove and replace soil material to depth as directed by the Owner or the geotechnical engineer; reshape and recompact to the required density, at no additional cost to the Owner.
- C. Where settling occurs before the project correction period elapses, remove finished surfacing, backfill with additional approved material, compact, and reconstruct.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible at no additional cost to the Owner.
- D. Provide temporary underpinning, bracing, sheeting, and/or shoring as required to maintain the conditions of existing utilities or structures adjacent to excavation work. Prepare shop drawings of design details sealed by a professional engineer.
- E. Provide fencing, barricades, and/or protective barriers for all excavation.

3.13 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off site to a regulated and permitted facility. Provide two copies of load manifest and permit from owner of the property where material is deposited.

END OF SECTION 31 2000

SECTION 31 2500 - EROSION CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Construction Stormwater Management Plan

1.2 SUMMARY

- A. This Section includes soil erosion and sediment controls including but not limited to:
 - 1. Silt fences
 - 2. Inlet Protection
 - 3. Stabilized rock construction entrances
 - 4. Temporary Seeding and Mulching
 - 5. Maintenance, inspection, and removal of all sediment and erosion control devices

1.3 REFERENCES

- A. The most current version of the publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.
- B. Colorado Department of Public Health and Environment
- C. Mesa County Stormwater Division
- D. Colorado Water Quality Control Act, in particular Section 25-8-501 through 505, C.R.S.
- E. Colorado Department of Transportation Standard Specifications for Road and Bridge Construction (CDOT)

1.4 SUBMITTALS

- A. Product Data: silt fence, inlet protection, temporary seed mixture.
- B. Submit samples, manufacturers' product data, test reports, in accordance with the requirements of contract documents and Division 1 requirements.

1.5 QUALITY ASSURANCE

- A. Environmental Agency Compliance: Comply with applicable portions of federal, state and local environmental regulations pertaining to soil erosion and sediment controls.

PART 2 - PRODUCTS

2.1 GEOTEXTILES

- A. In accordance with CDOT Section 420.

2.2 TEMPORARY SEED AND MULCH

- A. Seed: In accordance with CDOT Section 212
- B. Mulch: In accordance with CDOT Section 213

2.3 VEHICLE TRACKING CONTROL

- A. In accordance with CDOT Section 208

PART 3 - EXECUTION

3.1 GENERAL

- A. Temporary and permanent measures shall be undertaken before, during and after construction to control sediment from being carried onto or into adjoining areas, properties, streets, walkways, drainageways, or receiving waters.
- B. Required maintenance shall be provided to all sediment and erosion control measures.

3.2 PREPARATION FOR CONSTRUCTION

- A. Coordinate schedule, and attend pre-construction meeting at the site with regulatory agencies before the start of construction.
- B. Have all erosion control materials on site before any work commences.

3.3 CONSTRUCTION REQUIREMENTS

- A. Furnish all materials, labor, and equipment required to construct erosion control devices in accordance with the Drawings and applicable reference standards.
- B. Construction or installation of erosion control measures shall be in accordance with all applicable regulatory requirements.
- C. The Contractor shall minimize the project site areas which are disturbed by the execution of work and left unstabilized.

- D. All sediment spilled, dropped, washed or tracked onto the existing roads, sidewalks, or streets must be removed immediately. The Contractor shall provide a mechanical street sweeping machine on a regular basis, manual sweeping, or maintenance as directed by the Owner to remove sediment from surfaces outside the work area.
- E. Construction operations for all erosion and sediment control shall be carried out in such a manner that pollution is minimized.
- F. Erosion Control Supervisor inspections are required each 14 calendar days and after each storm/runoff event. Mitigative efforts are required within 7 days of notice of any deficiency.

3.4 TEMPORARY SEEDING AND MULCHING

- A. Where not specified on the Drawings, apply temporary seed and mulch at the rates specified in CITY Sections 212 and CDOT 213.

END OF SECTION 31 2500

SECTION 33 1100 - WATER DISTRIBUTION SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes furnishing, installation, and testing of underground water main piping, valves, hydrants, taps, fittings, and other specialties for potable domestic water service and fire service from a distance of approximately 5' outside the buildings and connection to the utility company water main. Coordinate with the City of Grand Junction for connections to existing mains.

1.3 REFERENCES

- A. The most current version of the publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.
- B. The City of Grand Junction Standard Specifications for Construction of Underground Utilities
- C. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
 - 1. ASTM D3139: Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals
- D. AMERICAN WATER WORKS ASSOCIATION (AWWA)
 - 1. AWWA C104/A21.4: ANSI Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
 - 2. AWWA C111/A21.11: ANSI Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
 - 3. AWWA C153/A21.53: ANSI Standard for Ductile-Iron Compact Fittings for Water Service
 - 4. AWWA C651: Disinfecting Water Mains
 - 5. AWWA C800: Underground Service Line Valves and Fittings
 - 6. AWWA C900: Polyvinyl Chloride (PVC) Pressure Pipe, and Fabricated Fittings, 4 In.-12 In. (100 mm-300 mm), for Water Dist.
 - 7. AWWA C905: Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 In.-48 In. (350 mm-1,200 mm)

8. AWWA C502: Dry Barrel Fire Hydrants

E. NSF

1. NSF 61: Drinking Water System Components - Health Effects

F. NATIONAL FIRE PROTECTION ASSOCIATION

1. NFPA 24: Standard for the Installation of Private Fire Service Mains and Their Appurtenances.

1.4 SUBMITTALS

A. General: Submit each item in accordance with the General Requirements and Conditions of the Contract documents.

B. Product Data: For the following:

1. Pipe and fittings
2. Water main taps, tapping sleeves, and caps
3. Valves and valve access boxes
4. Hydrants

C. Coordination Drawings: For piping and specialties including relation to other services in same area. Show piping and specialty sizes, tapping sleeves, valves, valve boxes, corporation stops, caps, locations, and elevations.

D. Record Drawings: At project closeout of installed water-service piping and valving according to Division 1 specification requirements.

E. Test Reports: As specified in "Field Quality Control" in Part 3 of this section.

F. Cleaning and Disinfecting Reports: As specified in "Cleaning and Disinfection" in Part 3 of this section.

G. Shop Drawings: Water piping, valves, tapping sleeves, and specialties; precast concrete water equipment pits.

1.5 QUALITY ASSURANCE

A. Product Options: Drawings indicate size, profiles, and dimensional requirements of water-service piping specialties and are based on specific types and models indicated on the Drawings or within these specifications. Other manufacturer's products with equal performance characteristics may be considered. Refer to requirements for "Substitutions" described within these contract documents.

- B. Comply with applicable standards and requirements of the local Plumbing Code, and other local jurisdictional requirements.
- C. Comply with NSF 61, "Drinking Water System Components and Health Effects", for materials for potable water.
- D. Provide approval certification stamp, label, or other marking on piping and specialties indicating specified standards are met.

1.6 SYSTEM PERFORMANCE REQUIREMENTS

- A. Minimum Working Pressures: The minimum pressure requirement for piping and specialties, unless otherwise indicated, is 250 psig.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Preparation for transport: Prepare valves, tapping sleeves, and other specialties according to the following:
 - 1. Ensure that sleeves and valves are dry and internally protected against rust and corrosion.
 - 2. Protect sleeves and valves against damage to bodies, accessories, threaded ends, and flange faces.
 - 3. Set valves in best position for handling. Set valves closed to prevent rattling.
- B. During Storage: Use precautions for valves and sleeves according to the following:
 - 1. Do not remove end protectors, unless necessary for inspection; then reinstall for storage. Maintain sealed packaging until installation.
 - 2. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off ground and maintain in watertight enclosures when outdoor storage is necessary. Store valves, tapping sleeves, in accordance with the manufacturer's recommendations.
- C. Handling: Use sling to handle valves whose size requires handling by crane or lift. Do not use valve handwheels or stems as lifting or rigging points.
- D. Deliver piping with factory-applied end caps. Maintain end-caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.
- E. Protect stored piping from moisture and dirt. Elevate above grade. Pipes shall be inspected and verified to be clean immediately upon delivery and then plugged so soil, trash, and other contaminants cannot easily enter them while they await installation. Pipes brought to the site with debris shall be cleaned and swabbed before plugging. Inspect pipes for missing caps regularly and replace immediately. During installation, inspect pipes upon removing the plugs in order to ensure no debris is present.

- F. Protect flanges, fittings, and specialties from moisture and dirt.

1.8 PROJECT CONDITIONS

- A. Perform site review and investigation, research public utility records, and verify existing utility locations. Contact utility-locating service for area where project is located.
- B. Verify that water-service piping may be installed to comply with original design and referenced standard.

1.9 coordination

- A. Coordinate connections of water mains with the utility owner.
- B. Coordinate piping materials, sizes, entry locations, and pressure requirements with building and existing water distribution piping.
- C. Coordinate with other utility work.

PART 2 - PRODUCTS

2.1 PIPING

- A. PVC
 - 1. AWWA C900 for sizes 4" through 12". The minimum thickness class of C900 PVC shall be a Dimension Ratio (DR) of 18.
 - 2. Joints: Bell and spigot type sealed with elastomeric gaskets conforming to ASTM D3139.

2.2 PIPE FITTINGS

- A. PVC fittings shall not be allowed.
- B. Ductile-Iron Fittings:
 - 1. All ductile iron fittings shall be wrapped with polyethylene encasement material conforming to AWWA C105.
 - 2. In accordance with City of Grand Junction Standard Specification for Construction of Underground Utilities.
 - 3. Restraint Lugs: In accordance with City of Grand Junction Standard Specification for Construction of Underground Utilities.

2.3 VALVES

- A. Non-rising Stem resilient seated buried Gate Valves: AWWA C 509, In accordance with City of Grand Junction Standard Specification for Construction of Underground Utilities.

- B. Tapping Sleeve and Tapping Valve: In accordance with City of Grand Junction Standard Specification for Construction of Underground Utilities.
- C. Valve Boxes: In accordance with City of Grand Junction Standard Specification for Construction of Underground Utilities.

2.4 CONCRETE ANCHORS

- A. Furnish ready-mixed concrete in accordance with ASTM C 94. Use only sulfate-resistant modified Type II Portland cement. Use maximum one-inch coarse aggregate (size 5, 56, 57, 6, or 7). Slump shall not exceed 4 inches. No air entrainment. Compressive strength shall be at least 1500 psi after 28 days.
- B. Anchors shall be sized in accordance with City of Grand Junction Standard Specification for Construction of Underground Utilities.

2.5 IDENTIFICATION

- A. Refer to Section 02300 Earthwork

2.6 FREESTANDING FIRE HYDRANTS

- A. In accordance with City of Grand Junction Standard Specification for Construction of Underground Utilities.

PART 3 - EXECUTION

3.1 VALVES

- A. In accordance with City of Grand Junction Standard Specification for Construction of Underground Utilities.

3.2 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. In accordance with City of Grand Junction Standard Specification for Construction of Underground Utilities.
- B. General Locations and Arrangements: Drawings indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated, unless deviations to layout are approved on the Contractor's Coordination Drawings.
- C. Install piping with minimum 48-inch cover unless otherwise shown on the Drawings.
- D. Install components with pressure rating equal to or greater than system operating pressure.
- E. Install piping free of sags and bends.
- F. Where groups of pipes are parallel, locate and space piping to permit valve servicing.

- G. Install fittings for changes in direction and branch connections. Provide all fittings required to completely install pipeline and avoid obstructions.

3.3 FIRE HYDRANT INSTALLTION

- A. In accordance with City of Grand Junction Standard Specification for Construction of Underground Utilities.

3.4 installation of water services

- A. In accordance with City of Grand Junction Standard Specifications for Construction of Underground Utilities.

3.5 FIELD QUALITY CONTROL

- A. Piping Tests: Conduct piping tests before joints are covered and after thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilized system. Use only potable water.
- B. Private fire services mains and connections shall be flushed in accordance with NFPA 24.
- C. Water Services shall be tested In accordance with City of Grand Junction Standard Specifications for Construction of Underground Utilities.

3.6 CLEANING AND DISINFECTION

- A. In accordance with City of Grand Junction Standard Specifications for Construction of Underground Utilities.

END OF SECTION 33 1100

SECTION 33 3100 - SANITARY & DRAINAGE SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This section includes the furnishing of all labor, equipment, supervision, and materials necessary for the installation of sewer piping, fittings, manholes, inlets, and other specialties for the conveyance of stormwater and sanitary waste outside the buildings, new sewer mains, and connections to the public sewer system.

1.3 REFERENCES

- A. The most current version of the publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.
- B. City of Grand Junction Standard Specifications for Construction of Underground Utilities
 - 1. Standard Specifications for Construction of Underground Utilities, Waterlines, Sanitary Sewer, Storm Drains, Underdrains, and Irrigation Systems
- C. Colorado Department of Transportation (CDOT)
 - 1. Standard Specifications for Road and Bridge Construction (CDOT Specifications)
 - 2. Standard Plans (CDOT Plans)
- D. AMERICAN CONCRETE INSTITUTE (ACI)
 - 1. ACI 318: Building Code Requirements for Structural Concrete and Commentary
 - 2. ACI 350R: Code Requirements for Environmental Engineering Concrete Structures
- E. AMERICAN ASSOCIATION OF STATE HIGHWAY & TRANSPORTATION OFFICIALS (AASHTO)
 - 1. AASHTO M 199: Standard Specification for Precast Reinforced Concrete Manhole Sections
- F. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
 - 1. ASTM A 185: Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete

2. ASTM A 615: Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
3. ASTM C 33: Standard Specification for Concrete Aggregates
4. ASTM A 36: Standard Specification for Carbon Structural Steel
5. ASTM C 94: Standard Specification for Ready-Mixed Concrete
6. ASTM C 150: Standard Specification for Portland Cement
7. ASTM C 443: Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
8. ASTM C 478: Standard Specification for Precast Reinforced Concrete Manhole Sections
9. ASTM A 536: Standard Specification for Ductile Iron Castings
10. ASTM C 857: Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures
11. ASTM C 858: Standard Specification for Underground Precast Concrete Utility Structures
12. ASTM C 891: Standard Practice for Installation of Underground Precast Concrete Utility Structures
13. ASTM C 913: Standard Specification for Precast Concrete Water and Wastewater Structures
14. ASTM D 2321: Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity Flow Applications
15. ASTM D3034: Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
16. ASTM D 4101: Standard Specification for Polypropylene Injection and Extrusion Materials
17. ASTM F477: Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe

G. UNI-BELL PVC PIPE ASSOCIATION (UNI):

1. UNI-B-6-98: Recommended Practice for Low-Pressure Air Testing of Installed Sewer Pipe

2. UNI Pub 06: Installation Guide for PVC Solid-Wall Sewer Pipe (4-15 Inch)

1.4 SUBMITTALS

- A. General: Submit each item in accordance with the General Requirements and Conditions of the Contract documents.
- B. Product data for the following:
 1. Piping and fittings
 2. Manhole covers and frames
 3. Mix design for cast-in-place concrete
 4. Other appurtenances
- C. Shop drawings – None required
- D. Prepare record plan view drawings showing manholes, inlets and other structures, pipe sizes, locations, and elevations. Include details of underground structures, pipe, and connections. Show other piping in same trench and clearance from sewerage system piping. Indicate interface and spatial relationship between piping and proximate structures.
- E. Prepare record profile drawings showing system piping in elevation. Draw profiles at horizontal scale of not less than 1-inch equals 50 feet and vertical scale of not less than 1-inch equals 5 feet. Indicate underground structures, pipe and connections. Show types, sizes, materials, and elevations of other crossing utilities system piping.
- F. Test reports specified in the “Field Quality Control” Article. Indicate and interpret test results for compliance with performance requirements.

1.5 QUALITY ASSURANCE

- A. Comply with applicable standards and requirements of local jurisdictional requirements.
- B. Utility Compliance: Comply with regulations of other utilities where applicable. Include standards of other utilities where appropriate.
- C. Provide approval certification stamp, label, or other marking on piping and specialties indicating specified standards are met.

1.6 PERFORMANCE REQUIREMENTS

- A. Gravity-flow, Non-Pressure-Piping Pressure Ratings: At least equal to system test pressure. Comply with the field quality control and testing indicated in this Section.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect pipe, fittings, manholes, inlets, and seals from dirt and damage.
- B. Handle precast concrete manholes, inlets, piping and all components according to manufacturers written rigging, storage and handling instructions and recommendations.

1.8 PROJECT CONDITIONS

- A. Site Information: Perform complete site review and investigation, research public utility records, and verify existing utility locations. Contact utility-locating service for area where project is located.
- B. Locate existing structures and piping to be removed, closed, or abandoned where required.
- C. Existing Utilities: Do not interrupt existing utilities serving facilities occupied by Owner or others except when permitted under the following conditions and then only after arranging to provide acceptable temporary utility services.
 - 1. Notify the Utility owner not less than 72 hours in advance of any proposed utility interruptions.
 - 2. Secure any permits as required by the jurisdictional authority.

PART 2 - PRODUCTS

2.1 PIPES AND FITTINGS

- A. General: Include watertight joints.
- B. PVC pipe and fittings: SDR 35, in accordance with ASTM D3034, with material in accordance with ASTM D2122.
 - 1. Joints: Gasketed, in accordance with ASTM D3212 and ASTM F477
 - 2. Tap connections to existing HDPE storm sewers: Hancor UNI-T Tapping Tee, or equal.

2.2 PIPING APPLICATIONS

- A. Sewer pipe and fitting applications shall be as follows except as indicated otherwise on the Drawings:
 - 1. Sanitary Laterals: PVC
 - 2. Roof drains and Storm Sewer: PVC

2.3 AREA DRAINS

- A. Inline PVC drains / Nyloplast

1. 12" diameter PVC riser with integral boots accepting SDR 35 sewer PVC piping.
2. 12"x12" Ductile Iron Grates with Cast Iron Frames. H-20 rated.

2.4 PRECAST CONCRETE STRUCTURES

- A. Portland cement shall conform to ASTM C 150 with aggregates conforming to ASTM C 33. Minimum compressive strength shall be 4000 PSI. Cement shall be Type V or modified Type II having less than (5) percent tricalcium aluminate.

- B. Reinforcing steel shall conform to ASTM A 615 grade 60 for bars or ASTM A 185 for welded wire fabric.

C. MANHOLES

1. In accordance with City of Grand Junction standards.
2. Pre-cast Concrete manholes shall be in accordance with AASHTO M 199, with provision for stepped, butyl joints, of depth indicated on the Drawings and in accordance with local standards.
3. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent floatation. For design purposes, refer to the geotechnical engineering evaluation for information on the groundwater elevation.
4. Base Section: 6-inch minimum thickness for floor slab and 5-inch minimum thickness for walls and base riser section unless otherwise indicated.
5. Riser Sections: 5-inch minimum thickness, 48-inch inside diameter and lengths to provide depth indicated.
6. Top Section: Eccentric cone type, unless concentric or flat-slab-top type is indicated on the Drawings. Top of cone or slab size shall match grade rings.
7. Gaskets: rubber or preformed butyl sealant.
8. Grade Rings: Include 2 or 3 reinforced-concrete rings, of 6 to 9 inch total thickness, that match frame and cover.
9. Steps: Copolymer polypropylene, steel reinforced individual steps. Include width that allows a worker to place both feet on one step and is designed to prevent lateral slippage off the step. Cast or anchor steps into base, riser, and top section sidewalls at 12-inch intervals. Omit steps for manholes less than 60 inches deep. Polypropylene shall conform to ASTM D4101 with steel core conforming to ASTM A 615 grade 60.
10. Pipe Connectors: Watertight, resilient connections in accordance with ASTM C-923.

11. Manhole Frames and Covers: City of Grand Junction standard. Grey Iron, AASHTO M 105, Class 30, designed for HS-20 loading. As manufactured by Castings Inc. MH-250-24D CI. Any substitutions must be fully interchangeable with specified model.

D. INLETS

1. Small and Large Area Inlet Type D-11, In accordance with City of Grand Junction standards

E. STORMCEPTOR

1. Not Required

PART 3 - EXECUTION

3.1 INSPECTION

- A. All delivered manholes, inlets, pipe and fittings shall be visually inspected by the Contractor. Damaged inlets, manholes, pipe or fittings will not be accepted.

3.2 IDENTIFICATION

- A. Refer to Section 02300 Earthwork

3.3 PIPE INSTALLATION

- A. General: Join and install pipe and fittings according to the following:
- B. City of Grand Junction standards.
- C. PVC Pipe and Fittings: Install pipe in accordance with UNI Pub 06 and ASTM D2321.
- D. System Piping Joints: Make joints using system manufacturer's couplings and recommended lubricants, except where otherwise specified or indicated on the Drawings.
- E. Use proper size increasers, reducers, and couplings, where different sizes or materials of pipes and fittings are connected. Reduction of the size of piping in the direction of flow is prohibited unless indicated on the Drawings.
- F. Install gravity-flow-system piping at constant slope between structures or junctions, unless otherwise indicated on the Drawings.
- G. Join piping made of different materials or dimensions with couplings made for each specific application. Use couplings that are compatible with and fit both system materials and dimensions.

3.4 MANHOLE INSTALLATION

- A. General: Install manholes, complete with appurtenances and accessories, as indicated on the drawings, in accordance City of Grand Junction standard, in accordance with ASTM C 891, and as follows:
- B. Excavate to subgrade elevation in accordance with Section 02300 Earthwork. Install a 6" layer of #57 stone setting bed. Do not use wood, brick, or other materials to shim the base section.
- C. Seal lifting holes with non-shrink, non-metallic mortar.
- D. Form continuous concrete channels and benches between inlets and outlets for sanitary sewers.
- E. Set frames and grates to elevations as indicated on the Drawings. The manhole frame shall be adjusted to the design elevation using paving bricks and mortar.
- F. Backfill in accordance with Section 02300 Earthwork.

3.5 CONCRETE PLACEMENT

- A. Place cast-in-place concrete according to ACI 318 or ACI 350R and as indicated on the Drawings.

3.6 Cleaning

- A. Clear interior of piping and structures of dirt and superfluous material as the work progresses. Maintain swab or drag in piping and pull past each joint as it is completed.
- B. Place plug in end of incomplete piping at end of day and whenever work stops.
- C. Flush piping between manholes and inlets to remove collected debris. Do not flush debris into existing downstream sewers or into streams.

3.7 FIELD QUALITY CONTROL

- A. Inspection and Testing
 - 1. Contractor shall test new piping systems and parts of existing systems which have been altered, extended, or repaired for leaks and defects.
 - 2. Do not enclose, cover, or put sewer systems into service before inspection and approval.
 - 3. Testing methods:
 - a. Air test per City of Grand Junction standards, Section 105.2a.

Alignment test per City of Grand Junction standards, Section 105.2b.

FORMATION DISTRICT RESIDENCE HALL
COLORADO MESA UNIVERSITY
GRAND JUNCTION, COLORADO

BID PACKAGE #1
JUNE 1, 2026

END OF SECTION 33 3100