PROJECT MANUAL FOR

SHERMAN HALL RENEWAL

AT UNIVERSITY OF MARYLAND, BALTIMORE COUNTY
UMBC PROJECT No. PRF 21-116
UMB PROJECT No. 22-323

BUILDING No. 877

50% Construction Documents
Volume 1 of 2

February 24, 2023

Owner
University of Maryland, Baltimore County
Facilities Management
1000 Hilltop Circle
Baltimore, Maryland 21250

Architect/Engineer
EYP Architecture & Engineering, PC
1000 Potomac Street, NW
Washington, DC 20007

EYP A Page/ Company

Construction Manager
Whiting-Turner
300 East Joppa Road
Baltimore, MD 21286

TABLE OF CONTENTS

DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS

DIVISION 01 - GENERAL REQUIREMENTS

DIVISION 02 - EXISTING CONDITIONS

DIVISION 08 – OPENINGS

DIVISION 09 - FINISHES

DIVISION 10 - SPECIALTIES

DIVISION 11 - EQUIPMENT

DIVISION 12 - FURNISHINGS

DIVISION 32 - EXTERIOR IMPROVEMENTS

DIVISION 33 – UTILITIES

END OF TABLE OF CONTENTS

SECTION 01 0100 - SUMMARY OF THE WORK

PART 1 GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Identification: UMBC Project No. PRF 21-116; UMB Project No. 22-323.

B. Project Location: Sherman Hall 1000 Hilltop Circle, Baltimore, MD 21250.

C. Owner: University of Maryland, Baltimore County.

D. Architect Identification: EYP, A Page Company.

E. Construction Manager: Whiting-Turner.

F. The Work consists of the complete removal and replacement of interior mechanical, electrical, plumbing, fire protection, and telecommunications systems, complete removal and replacement of interior demountable partitions, flooring, and ceiling systems, select removal and replacement of exterior wall systems, courtyard renovation, and new link addition. Hazardous material abatement shall be addressed under separate contract, prior to demolition. The project will be constructed in two phases; Phase One consists of the West Wing and Link, Phase Two consists of the East Wing, Courtyard, Site Improvements, and the Bridge Alternate.

1.2 OWNER-SUPPLIED PRODUCTS

A. Owner’s Responsibilities:
1. Use online construction management portal (e-Builder) to deliver Owner reviewed Shop Drawings, Product Data and Samples, to the Construction Manager.
2. Arrange and pay for delivery to the site of Owner-furnished items according to Construction Manager’s Construction Schedule.
3. On delivery, inspect delivered items for damage. Construction Manager shall be present for and assist in Owner's inspection.
4. If Owner-furnished items are damaged, defective, or missing, Owner will arrange for replacement.
5. Owner will arrange for manufacturer's field services and for delivery of manufacturer's warranties to Construction Manager.
6. Owner will furnish Construction Manager the earliest possible delivery date for Owner-furnished products. Using Owner-furnished earliest possible delivery dates, Construction Manager shall designate delivery dates of Owner-furnished items in Construction Manager’s Construction Schedule.

B. Construction Manager’s Responsibilities:

1. Review Owner reviewed Shop Drawings, Product Data, and Samples and return them to Architect noting discrepancies or anticipated problems in use of product.
2. Receive and unload Owner-furnished items at Project site.
3. Construction Manager is responsible for protecting Owner-furnished items from damage during storage and handling, including damage from exposure to the elements.
4. If Owner-furnished items are damaged as a result of Construction Manager's operations, Construction Manager shall repair or replace them.

1.3 CORRESPONDENCE:

A. Correspondence concerning this work that is directed to the University of Maryland Baltimore County, and shall be addressed as follows:
Stacy Brian, RA, LEED AP, Project Manager
University of Maryland, Baltimore County
102 Facilities Management
1000 Hilltop Circle
Baltimore, MD 21250
Reference: UMBC Project No. PRF 21-116; UMB Project No. 22-323.

1.4 SEXUAL HARASSMENT:

A. The University of Maryland is committed to maintaining a working and learning environment in which students, faculty and staff can develop intellectually, professionally, personally and socially. Such an environment must be free of intimidation, fear, coercion and reprisal. The University prohibits sexual harassment.

B. The Construction Manager will be responsible to inform his and his Trade Contractors and subcontractors work force that any act of sexual harassment will not be tolerated and such acts will be severely dealt with.

C. Sexual harassment includes but not limited to the following:
1. Lewd remarks, suggestive sounds as whistling, wolf calls
2. Unwanted physical contact
3. Persistent and offensive sexual jokes and comments

1.5 OCCUPANCY REQUIREMENTS

A. Full Owner Occupancy: Owner will occupy surrounding existing building 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 operations.

B. Partial Owner Occupancy: Owner reserves the right to occupy and to place and install equipment in completed areas of the Project before Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and partial occupancy shall not constitute acceptance of the total Work.
1. Owner will prepare a Certificate of Partial Substantial Completion for each specific portion of the Work to be occupied before Owner occupancy.

2. Before partial Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will provide, operate, and maintain mechanical and electrical systems serving occupied portions of building.
3. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of building.

1.6 MATERIAL NOT ACCEPTABLE

A. Construction Manager is responsible to not submit any product which contains an asbestos material.

PART 2 – PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION 01 0100

SECTION 01 0300 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1.3 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 the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. The cost for each alternate is the net addition to the Guaranteed Maximum Price to incorporate alternate into the Work. No other adjustments are made to the Guaranteed Maximum Price.

1.4 PROCEDURES

A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into the 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.
2. The cost for each alternate shall include costs of related coordination, modification or adjustment.

B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. Schedule: A Schedule of Alternates is included at the end of this Section. Specification Sections referenced in the schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. The requirements of each of the alternates listed below is described and identified on the drawings or in the specifications or both.

B. Alternate No. 5: Bridge Upgrades.
1.
a. Base Bid: Exterior Bridge to remain.
b. Add Alternate: Remove existing systems and install new curtainwall enclosure, new metal soffit cladding, new roofing, new mechanical conditioning, new fire protection, new electrical power and lighting, and new floor and ceiling finishes.

C. Alternate No. 6: Bridge Upgrades.
1.
a. Base Bid: Exterior masonry to remain.
b. Add Alternate: Cut new masonry openings and install new curtainwall windows at stair landing locations indicated.

D. Alternate No. 7: Bridge Upgrades.
1.
a. Base Bid: Existing Roofing System to remain.
b. Add Alternate: Remove existing roofing system to existing concrete deck and install new overflow drains and new single-ply fully adhered membrane roofing system on 1/2" cover board, on tapered polyisocyanurate insulation, on vapor barrier, as indicated on drawings.

E. Alternate No. 8: Bridge Upgrades.
1.
a. Base Bid: Existing Brick Masonry Walls to remain in Interior Lobby Spaces.
b. Add Alternate: Add interior partition cladding and finishes over existing brick masonry walls, as indicated on drawings.

F. Alternate No. 9: Bridge Upgrades.
1.
a. Base Bid: Existing Areaway to remain at Electric Vault.
b. Add Alternate: Provide new areaway enclosure, new mechanical ventilation, and new fire rated doors and frames, as indicated on drawings.

G. Alternate No. 10: Bridge Upgrades.
1.

a. Base Bid: Existing South site stair to remain.
b. Add Alternate: Remove existing south site stair and install new south site stair, associated retaining walls, regrading, and new planting, as indicated on drawings.

H. Alternate No. 11: Penthouse Cladding.
1.
a. Base Bid: Existing exterior brick veneer and CMU backup to remain.
b. Add Alternate: Install new terra cotta panels and associated support framing, as indicated on drawings.

END OF SECTION 01 0300

SECTION 01 0350 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies administrative and procedural requirements for handling and processing contract modifications.

B. Related Sections:

1. Division 1 Section "Schedule and Reports" for requirements for the Construction Manager's Construction Schedule.
2. Division 1 Section "Payment Procedures" for administrative procedures governing Applications for Payment.
3. Division 1 Sections "Product Requirements" for administrative procedures for handling requests for substitutions made after award of the Contract.

1.2 MINOR CHANGES IN THE WORK

A. The Architect may issue supplemental instructions making minor changes in the Work, not involving adjustment to the Guaranteed Maximum Price or Contract Time, on AIA Form G710, Architect's Supplemental Instructions.

1.3 CHANGE ORDER PROPOSAL REQUESTS

A. Owner/Architect-Initiated Proposal Requests: A request to the Construction Manager, signed by the Architect, for submission of an itemized quotation for changes in the Guaranteed Maximum Price or Contract Time. These proposals will provide a detailed description of proposed changes including supplemental or revised Drawings and Specifications if necessary.

1. This is not a Change Order or a direction to proceed with the Work. Form: Unless otherwise indicated, AIA Document G709, Proposal Request.
2. Within 10 days of receipt of a proposal request, submit a detailed proposal indicating all costs necessary to execute the change to the Owner and Architect for review. Include supporting information including, but not limited to:

a. Labor required.
b. Equipment required (specify whether rental or company owned).
c. Products required.
d. Quantities required and unit prices (furnish survey data to substantiate quantities if requested by Owner or A/E.)
e. Taxes, insurance, and bonds.
f. Delivery charges
g. Credit for work deleted from Contract, similarly documented.
h. Overhead and profit for Trade Contractors.

i. Justification for any change in Contract Time. Include an updated Construction Schedule Fragnet that indicates the effect of the change, including, but not limited to, changes in activity durations, start and finish times , and activity relationships. Use available total float before requesting an extension of Contract Time

3. Include all costs necessary to allow a full and final settlement of the change order without reservation of rights by either the Construction Manager or its Trade Contractors or suppliers.

B. Construction Manager-Initiated Proposals: The Construction Manager may propose changes by submitting a request for a change to the Architect.

1. Include a statement outlining the reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Guaranteed Maximum Price and Contract Time.
2. Include a list of quantities of products required and unit costs, with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Justification for any change in Contract Time. Include an updated Construction Schedule Fragnet that indicates the effect of the change, including, but not limited to, changes in activity durations, start and finish times, and activity relationships. Use available total float before requesting an extension of Contract Time
5. Comply with requirements in Section "Product Requirements" if the proposed change requires substitution of one product or system for a product or system specified.

1.4 APPROVALS

A. The University will be the only authority to authorize and approve the change in work and shall be the sole judge of the validity of the rational for any requested extension of the contract time due to any change in work. No order for change, at any time or place, shall be in any manner, or to any extent relieve the Construction Manager of his obligations under the contract.

PART 2 – PRODUCTS (Not used)

PART 3 – EXECUTION (Not Used)

END OF SECTION 01 2500

SECTION 01 1400 – WORK RESTRICTIONS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other miscellaneous submittals.

B. Related Sections include the following:
1. Restrictions that affect construction operations.
2. Access to site.
3. Coordination with occupants.
4. Use of building premises and site.
5. Outages and service interruptions.

1.2 DEFINITIONS

A. Outage: A temporary disruption of normal operation or use of utilities, sidewalks, parking areas, driveways or facility access.

B. Outage Request: A form that is used to collect pertinent information and to initiate the process for a planned interruption of the normal operation of a facility.

C. Planned Utility Outage: An event that can be foreseen and has a plan of action in place to accomplish specific tasks during a utility outage.

D. Utility: Any service provided by an outside source or manufactured in house (gas, water, electricity, fire suppression water, heating or cooling water, telecommunications, data systems, building automation systems, fire alarm systems, and similar service) which facilitates building operations.

E. Scheduled Outage: An outage is considered “scheduled” whenever the University outage coordinator sends the final e-mail notification of approval (e-mail includes the outage date/time and pertinent details).

F. Shutdown: Same as outage. The terms “outage” and “shutdown” are used interchangeably throughout the Contract Documents.

G. Stakeholders: Personnel and concerned parties who have participated in the planning, implementation, and execution of a Utility outage or will be affected by the event.

1.3 SUBMITTAL PROCEDURES

A. Submit Utility Outage Planning Form not more than 10-days after Notice-to-Proceed.

1. Include details and proposed schedule for all planned outages.
2. Re-submit Form in response to Owner comments, if additional information becomes available, or if work conditions change.
3. Cooperate with Owner review and planning of utility outages.

B. Submit utility outage request not less than 14-days in advance of planned utility interruption
1. Submit separate request for each independent utility outage.

2. Comply with coordination requirements identified during planning for utility outage.

1.4 WORK HOURS

A. On-Site Work Hours: Work shall be generally performed during regular work hours, except as otherwise indicated or as allowed on a project-by-project basis.
   1. Regular work hours: Between 7 a.m. and 7 p.m.
   2. Regular workdays: Monday through Friday, except on University holidays and University non-work days.
      a. Non-workdays will be established by Owner on a project-by-project basis.
      b. Non-workdays may include resident student move-in days, commencement day, or other high activity days that involve an exceptional amount of campus traffic.
   3. Work outside regular work hours or days (off-hours): Provide written request to Owner not less than 7-days prior to proposed work outside regular work hours or days. Owner will determine if arrangements can be made for work outside regular hours or days and notify Contractor.
      a. Approval to work outside regular hours and days will not be unreasonably withheld, provided that campus operations and occupancy are not adversely impacted.

B. Work that disrupts the routine business of the campus, such as major deliveries and high noise level activities, shall be coordinated and scheduled with Owner to minimize interference with ongoing campus operations.
   1. Disruptive activities may require off-hours work to avoid interference with on-going campus activities.
   2. Notify Owner not less than two days in advance of proposed disruptive operations.
      a. Obtain Owner's written permission before proceeding with disruptive operations.

C. Quiet Times or Days: Quiet times or days will be established by Owner on a project-by-project basis.
   1. Quiet times may include exam periods or other sensitive times when even routine construction noise is to be avoided.

1.6 COORDINATION WITH OWNER'S OCCUPANCY

A. Full Owner Occupancy of Campus: The UMBC campus is in continuous operation with varying levels of activities. Owner will occupy and utilize the project site and adjacent buildings 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, by written notice, not less than 7-days in advance of activities that will affect Owner's operations.

B. Partial Owner Occupancy: Owner will occupy the premises during entire construction period, except for 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. Notify Owner, by written notice, not less than 7-days in advance of activities that will affect Owner's operations.

C. Owner Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed portions of the Work, prior to Substantial Completion of the Work, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and limited occupancy shall not constitute acceptance of the total Work.

1. Owner will 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 partial 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.

D. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of Work.

1.7 PROTECTION OF UNIVERSITY PERSONNEL

A. Students, faculty, staff, and visitors will be on present on campus during the construction period. Contractor shall take proper precautions to ensure the safety of all persons during the construction period.

B. Operate vehicles safely to protect the driver, passengers, and pedestrians.

1. Exercise caution and be alert for pedestrians and bicyclists.
2. Take precautions necessary to maintain a safe environment for the campus community.
3. Drive responsibly; practice defensive driving by anticipating situations and conditions that could be hazardous. Be alert for vehicles backing out of parking spaces into traffic.

1.8 ACCESS TO SITE

A. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.

B. Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Driveways, Walkways and Entrances: Keep driveways, 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 storage of materials.

a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

1.9 NOISE AND VIBRATION CONTROL

A. Noise-Vibration Restrictions: Noise- and vibration-sensitive research or operations will be conducted concurrent with the Project.

1. Provide a notification system with Owner's Representative that will provide building occupants not less than 24-hours warning of performance of construction operations that will cause noise and vibration.
2. Plan, schedule and perform work during evenings and weekends, at no additional cost to Owner, as required to achieve completion of disruptive activity within indicated time.

1.10 OUTAGES

A. Plan and schedule outages to minimize disruption to the University community.

1. Minimize the number and length of planned outages through careful coordination of work.
2. Minimize the impact of planned outages by scheduling them to occur when they least affect critical operations, inconvenience the fewest individuals, and least affect the mission of the University.

B. Non-utility Interruptions: Do not interrupt or block egress paths, sidewalks, parking areas, driveways or facility accessways unless permitted by Owner.

1. Notify Owner in writing not less than 7-days in advance of proposed non-utility interruptions.
2. Include information regarding the area affected and proposed duration of interruption.
3. Include information about proposed arrangements to minimize disruption and interference with on-going campus operations.
4. Do not proceed with non-utility interruptions without Owner's written permission

C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted by Owner.

D. Utility shutdowns necessary for completion of the project shall be identified and listed as Milestones on the project schedule, beginning with the Startup Construction Schedule, specified in Section 01 3200 *Construction Progress Documentation*.

E. Planned Utility Outages:

1. Identify and develop initial schedule for utility outages.
2. Review scope of outage and apparent impact on existing facilities.
3. Complete and submit the Utility Outage Planning Form included at the end of this section. For each planned outage, provide the following information.

    a. Building system or service utility effected.
    b. Scope of work that requires outage.
    c. Proposed dates of outage.
    d. Anticipated outage duration.
    e. Location of component to be turned off or disconnected.
    f. Size or characteristics of system to be turned off or disconnected.
    g. Building(s)/Affected Areas.
    h. Life-Safety System Outage (Yes/No).

4. Submit formal, written utility outage request to Owner, on form provided by Owner, not less than 14-days in advance of proposed utility interruption.

    a. Include information regarding type of service, area affected, and proposed duration of outage.
    b. Coordinate in advance the proposed activities of utility operator, Owner, and Contractor in conducting the outage.

5. Contractor shall program Work so that service will be restored in the minimum possible time and shall cooperate with the University in reducing shutdowns of utility systems.

F. Fire and Life Safety Outages: In addition to other requirements, University Environmental Safety and Health (ESH) Office approval is required for Utility Outages that impact life safety systems such as fire suppression sprinkler systems, fire alarm systems, and egress paths.

1. For outages that affect egress paths or fire lanes, include floor plans or representative drawings as part of the utility outage request.
2. University ESH office will determine if Interim Life Safety Measures (ILSM) will be required in connection with the outage.

G. Fire Watch: If a fire suppression sprinkler system or fire alarm system is out of service due to an outage of four-hours or longer, provide a fire watch in accordance with the following procedures:

1. Person(s) on fire watch duty should not have any other responsibility during the time the fire watch is in effect and shall have a cell phone in their possession at all times during the fire watch.
2. Patrol the entire area affected by the service outage every 30-minutes and look for any signs of fire, smoke and any activities that could create a fire.
3. Keep a log of all fire watch patrols.

4. Maintain fire watch until life-safety system is restored and operation is confirmed.
5. If a fire is discovered:

    a. Activate the building alarm system if in service.
    b. Notify UMBC Police at 410-455-5555.

6. Notify University at the beginning and end of each fire watch.

H. Do not proceed with utility interruptions without Owner's written permission and confirmation of a Scheduled Outage.

I. For a complex outage conduct pre-outage walk-through with key personnel to confirm roles and procedures and help ensure that the outage can occur as scheduled.

J. Hours for Utility Shutdowns:

1. For limited outages that that do not adversely affect campus operations, utility outages will be conducted between 7:30 a.m. and 4 p.m., Monday through Friday, except University holidays.
2. Provide off-hours work for utility shutdowns where required to prevent conflict with campus operations.

K. If situations require the outage to be cancelled or rescheduled, the Owner may cancel an outage after it has been approved and before it is executed.

1. Owner will notify Stakeholders of the cancellation as soon as practical.

1.11 EMPLOYEE IDENTIFICATION

A. Employee Identification: Provide owner-approved identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.

1.12 PARKING REQUIREMENTS

A. Valid UMBC parking permit must be displayed on vehicles parked in non-metered parking spaces on campus. Parking permits are enforced year-round.

B. Failure to display parking permit or parking in unauthorized locations may result in issuance of a citation. A parking violation issued against a vehicle without a permit will be charged to the registered owner of the vehicle.

C. Confine parked vehicles to designated parking spaces unless otherwise approved in writing.

D. When practical for the University, each Contractor and each primary subcontractor will be issued one Service Area parking permit. Issuance of a parking permit does not guarantee that a Service Area parking space is available in the vicinity of the project site.

E. UMBC Project Manager will notify UMBC Parking Services of contractor parking needs. Parking permits for contractors are available only when UMBC Parking Services has been notified about the project in advance by UMBC Project Manager.

1. For each vehicle requiring a parking permit, complete Contractor Parking Permit application and submit to UMBC Parking Services in Facilities Management Building. UMBC Project Manager will provide appropriate application form for use.

F. No campus parking spaces are available for this project.

G. Contractor parking is allowed in Parking Lot 23; no University permits are required.
H. Contractor and subcontractor employees are not to park in residential communities adjacent to UMBC.

1.13 CONDUCT AND DISCIPLINE

A. Contractors are expected to perform their work efficiently and effectively and to be mindful of the proper conduct expected by the University. Contractors shall enforce the following among their direct and indirect employees on University property or at University workplaces:

1. Be courteous and refrain from conduct or actions that are offensive.
2. Do not, under any circumstances, fraternize with University students or employees.

a. Normal business dealings with University employees are not considered to be fraternization.

3. Harassment will not be tolerated.

1.14 DRIVING RULES AND REGULATIONS

A. Maryland State Motor Vehicle Laws apply to and are enforceable on UMBC campus.
B. Vehicles shall be driven only on paved roads and parking areas intended for that purpose. Driving is not permitted on sidewalks, walkways, lawns, vegetated areas, or similar spaces, unless specifically authorized in writing by the Owner.
C. For access to fire lanes or other drive aisles controlled by removable bollards, Contractor shall request permission in writing and shall provide details including purpose, proposed route, and duration.
D. For access across landscape or similar areas, Contractor shall request permission in writing and shall provide details including purpose, proposed route, duration, and restoration measures.
E. Owner will consider Contractor requests for vehicle access on a case-by-case basis.

1.15 SMOKING POLICY

A. UMBC is a smoke free campus. Refer to the following web link for additional information about Smoke-Free UMBC:

1. http://smokefree.umbc.edu/

B. The UMBC campus has designated two approved smoking areas that are removed from major pedestrian areas. The two locations are as follows:

1. Park Road Smoking Area (adjacent to Parking Lots 1 and 3).
2. Parking Lot 8 Smoking Area (adjacent to Parking Lot 8).

C. Smoking outside of these two designated areas is subject to a fine of $50 per incident.
D. Smoking refuse deposited on University grounds or pavement areas will be considered littering. The Contractor is responsible for collection and removal of litter deposited by their direct and indirect employees.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION 01 1400

SECTION 01 2500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

1.2 DEFINITIONS

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

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required to meet other Project requirements but may offer advantage to Contractor or Owner.

1.3 ACTION SUBMITTALS

A. 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 that is part of web-based Project management software.
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.
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 days of receipt of a request for substitution. Architect will notify Contractor through Construction Manager of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven 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.

1.4 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.

1.5 PROCEDURES

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

1.6 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied,

Architect will return requests without action, except to record noncompliance with these requirements:

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

b. Substitution request is fully documented and properly submitted.
c. Requested substitution will not adversely affect Contractor's construction schedule.
d. Requested substitution has received necessary approvals of authorities having jurisdiction.
e. Requested substitution is compatible with other portions of the Work.
f. Requested substitution has been coordinated with other portions of the Work.
g. Requested substitution provides specified warranty.
h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Not allowed unless otherwise indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 2500

SECTION 01 2900 - PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

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

1. Coordinate the Schedule of Values and Applications for Payment with the Construction Manager's Construction Schedule.

1.2 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the Schedule of Values with preparation of the Construction Manager's Construction Schedule.

1. Submit the Schedule of Values to the Owner:

a. No later than 10-days after issuance of the Notice-to-Proceed.
b. Not less than 7-days before submitting the initial Application for Payment submittal of the initial Applications for Payment.

2. Where requested by Owner, provide sub-schedules for work separated into phases requiring separately phased payments.

B. Format and Content: Use a format approved by the A/E and UMBC for preparation of the Schedule of Values.

1. Identification: Include the following Project identification on the Schedule of Values:

a. Project name and location;
b. Owner’s Project Number;
c. Construction Manager's name and address;
d. Date of submittal
.

2. Arrange schedule of values consistent with format of AIA Document G703.
3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of ten percent of Contract Sum.

a. Provide breakdown of costs for General Conditions and General Requirements
b. Separate material and equipment costs from labor costs.
c. Include separate line items under subcontracts for contract closeout requirements.

4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.

5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed
6. Allowances: Provide a separate line item in the schedule of values for each allowance.
7. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders result in a change in the Contract Sum Price.

1.3 APPLICATIONS FOR PAYMENT

A. Requests for Payment: Each Application for Payment shall be consistent with previous applications and payments as approved and paid for by the Owner.

B. Application Preparation: Use forms approved by Owner for Applications for Payment.

1. Application for Payment Form: Consistent with AIA Document G702, except that Architect's Certificate for Payment language is not required.
2. Payment Detail Form: Consistent with AIA Document G703.
3. Include the following information for identification:

    a. Project name and location.
    b. "Bill to" line stating UMBC.
    c. UMBC Project number.
    d. Contractor's name, address, and phone number.
    e. Contractor's Federal Tax ID number.
    f. Invoice submittal date.
    g. Unique invoice number that relates to Contractor's bookkeeping system.
    h. Invoice sequence number beginning with 01.
    i. Description of goods and services received.

C. Application Preparation: Complete every entry on form. Complete certification required by General Conditions of Contract. Owner will return incomplete applications without action.

1. Entries shall match data on the schedule of values.
2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
3. Include amounts of Change Orders executed before last day of construction period covered by application.
4. Include itemization and adequate evidence to support Contractor's right to payment claimed.

D. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to Owner, and, if requested, consent of surety to payment, for stored materials.

2. Provide supporting documentation that verifies amount requested, such as invoices and statements from subcontractors and suppliers. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:
    a. Materials previously stored and included in previous Applications for Payment.
    b. Work completed for this Application utilizing previously stored materials.
    c. Additional materials stored with this Application.
4. Total materials remaining stored, including materials with this Application.

E. Transmittal: Submit one signed Application for Payment to Owner.

1. Transmit with a transmittal form listing attachments and recording appropriate information about application.
2. Deliver Application for Payment to University representative identified in the Owner/Contractor Pre-construction Meeting.

F. Waivers of Mechanic's Lien: When requested by Owner, include waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
2. When an application shows completion of an item, submit conditional final or full waivers.
3. Owner reserves the right to designate which entities must submit waivers.
4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
5. Waiver Forms: Submit executed waivers of lien on forms, acceptable to Owner.

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

1. List of subcontractors.
2. Schedule of values.
3. Contractor's construction schedule (preliminary if not final).
4. List of Contractor's staff assignments and key personnel.

H. Application for Payment at Substantial Completion: After issuance of Certificate of Substantial Completion, submit an Application for Payment showing 100-percent completion for that portion accepted as substantially complete.

1. Include statement showing an accounting of changes to the Contract Sum.

I. Final Payment Application: After completing closeout requirements, submit final Application for Payment with lien releases and supporting documentation to establish University's title to materials and give assurance that claims against the project do not exist. In addition, submit the following:

1. Evidence of completion of Project closeout requirements
2. Updated final statement, accounting for final changes to the Contract Sum
3. Evidence that claims have been settled
4. Consent of surety to final payment
5. Electric certificate from independent electrical inspection agency

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION 01 2900

WAIVER, RELEASE AND INDEMNITY AGREEMENT
FOR
ELECTRONIC DOCUMENTS FORWARDED TO CONTRACTOR

Whereas, Page Southerland Page Company Inc. hereinafter "Architect" has utilized certain electronic BIM, CADD, or other electronic document files (Electronic Media) in preparation of drawings for Sherman Hall Renewal on behalf of University of Maryland hereinafter "Owner"; and

Whereas, Architect is willing and able to provide copies of the Electronic Media to the **_____,** hereinafter "Contractor" only under certain express conditions of understanding, acknowledgement and covenants of protection, which Contractor accepts without reservation and covenants as herein provided without qualification.

Now therefore, Architect and Contractor agree as follows:

1. ACKNOWLEDGMENT AND LIMITATIONS: Electronic Media is being utilized by the Architect and its consultants solely as a design tool to assist the design team in the production of physical, two-dimensional Construction Documents for the Project. It is not being created to be used for cost estimating, calculating quantities, or for the management of building systems. The Parties acknowledge that Electronic Media transferred in any manner or translated from the system and format used by Architect to another system or format are subject to errors and modifications that may affect the accuracy and reliability of the data, and that the data may be altered, whether inadvertently or otherwise. Owner acknowledges that (1) Architect's instruments of professional services are the hard copy drawings and specifications issued and sealed by Architect hereinafter "Instruments", (2) the Electronic Media are not substitutions for said Instruments, (3) differences may exist between said Instruments and the Electronic Media which Architect is under no obligation to discover or disclose if known, (4) the Electronic Media may be incompatible with Owner's software and hardware configurations. In all ways, including those enumerated, Contractor accepts the Electronic Media "as is" and Architect is under no obligation to correct, update for changes, enhance or maintain the Electronic Media for Contractor. Architect does not represent or warrant that the Electronic Media are complete, free from defects, or accurate now or in the future. Architect makes no representations or warranties, whether expressed or implied, as to the accuracy of the information transferred and, as such, only the Architect's stamped Construction Documents shall be utilized and relied upon for construction purposes.

2. WAIVER AND RELEASE: Contractor accepts all risk of incomplete, inaccurate, defective and variant information contained in the Electronic Media, and waives, quits and forever discharges and releases the Architect and its officers, directors, principals, consultants, employees and successors from every claim arising out of or related to any error, discrepancy, inaccuracy, variation or other defect in the Electronic Media, whether or not resulting in whole or in part from any act, omission, negligence, or negligent misrepresentation of the Architect, and whether or not such claim is known or unknown as of the date of this waiver and release.

3. TRANSMISSION: The Architect has no obligation to distribute Electronic Media to any third party other than the Contractor. The Contractor may only distribute Electronic Media contingent upon a third party agreeing in writing with the Contractor to the terms and conditions set forth in this Agreement. Specifically, language shall be included which provides for the indemnification of the Owner, Architect and its consultants for any use of its Electronic Media. The Contractor acknowledges that in the event that in the event a third party, including the Owner, utilizes the Electronic Media for construction purposes, which may or may not be complete or accurate, and such Electronic Media is inconsistent with Architect's hard copy Instruments of Service, that Architect is not responsible for, and Contractor hereby agrees to indemnify and defend Architect from, and change order costs or other damages arising out of such third party's use. The Architect will remove views, unused model components and all detail components from the model prior to submission to the Contractor. The Architect will not be required to convert any electronic media to a different format prior to transmitting to the Contractor, including but not limited to conversions from REVIT to AutoCAD.

4. LIMITED REUSE: It is the intent of the parties that the Electronic Media shall not be used in connection with any building or construction project other than The Project and that any reuse of the Electronic Media shall be limited as provided herein.

5. INDEMNITY: As consideration for the transfer and use of the Electronic Media as described herein, to the fullest extent permitted by law, the Contractor shall indemnify, defend, and hold harmless the Architect, the Owner and their respective officers, directors, partners, principals, shareholders, employees, representatives, agents, successors, and consultants (the "Indemnitees") from and against all claims, damages, and loss of any nature (including without limitation, personal injury, death, property damage, or economic loss) and any expense (including without limitation reasonable attorneys' fees and costs of litigation and defense) which arise, in whole or in part, in connection with any Electronic Media provided to the Owner, or the use, transmission, conversion, modification, formatting, integrity, or security thereof (collectively, "Loss"), regardless of whether the Loss is caused, or is alleged to be caused, in whole or in part by the negligent acts or omissions of an Indemnitee. This Indemnity provision shall survive termination of this Agreement or of any license granted by this Agreement. The defense obligation shall be fulfilled by reimbursement to any Indemnitees for counsel selected by any Indemnitees.

5. DISPUTES: Due to the risk of damage, anomalies in transcription or copying and modification of the Electronic Media during use by Contractor whether intended or otherwise, it is agreed the Architect's archived copy of the Electronic Media, if Architect chooses to maintain same, shall be conclusive, unrebuttable proof in all disputes over the content of the Electronic Media furnished to Contractor by this Agreement.

Wherefore, the parties have signed this Release, Waiver and Indemnity Agreement on the **<Insert Date>**.

CONTRACTOR	**ARCHITECT**
(Type Name of Contractor)	**Page Southerland Page Company Inc.**
Print Name	**Print Name**
Signature	**Signature**
Title	**Title**

SECTION 01 3100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes administrative and supervisory requirements necessary for coordinating construction operations on the project including, but not limited to the following:
   1.
   2. General project coordination procedures.
   3. Conservation.
   4. Coordination Drawings.
   5. Administrative and supervisory personnel.
   6. Project Meetings
   7. Request for Interpretation (RFIs)
   8. Partnership Agreement

B. Related Sections: The following Sections contain requirements that relate to this Section:
   1.
   2. Division 1 Section "CPM Schedule and Reports" for preparing and submitting the General Construction Manager's Construction Schedule.
   3. Division 1 Section "Execution Requirements" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
   4. Division 1 Section "Closeout Procedures" for coordinating Contract closeout.

1.2 COORDINATION

A. Coordination: Coordinate construction operations included in various Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, which depend on each other for proper installation, connection, and operation. Anticipate areas where the installation of mechanical and electrical work will be restricted, congested or difficult. Coordinate the work of all affected Trade Contractors.
   1.
   2. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
   3. Coordinate installation of different components with other Trade Contractors to ensure maximum accessibility for required maintenance, service, and repair.
   4. Make adequate provisions to accommodate items scheduled for later installation.

B. If necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
   1.
   2. Prepare similar memoranda for Owner and separate Trade Contractors if coordination of their work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other Trade Contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
   1.
   2. Preparation of Construction Manager's Construction Schedule.
   3. Preparation of the Schedule of Values.
   4. Installation and removal of temporary facilities and controls.
   5. Delivery and processing of submittals.
   6. Coordination meetings.
   7. Progress meetings.
   8. Pre-installation conferences.
   9. Project commissioning and closeout activities.

D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.
   1.
   2. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work.

1.3 SUBMITTALS

A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.
   1.
   2. Indicate relationship of components shown on separate Shop Drawings.
   3. Indicate required installation sequences.
   4. Refer to Division 15 Section "Basic Mechanical Materials and Methods" and Division 16 Section "Basic Electrical Materials and Methods" for specific Coordination Drawing requirements for mechanical and electrical installations.

B. Staff Names: Within 15 days of starting construction operations, submit a list of principal staff assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
   1.

2. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone.

1.4 QUALITY ASSURANCE

A. No progress payments will be made for any work affected by coordination drawings until coordination drawings and mock-ups governing that work have been approved.

B. Any work installed prior to approval of coordination drawings shall be modified or replaced, as necessary, to conform to subsequently-approved construction drawings, at no additional cost to Owner.

C. Any construction delays required to accomplish coordination, approval of submittals or re-submittals, or consequent to coordination work, shall be incurred at no additional cost to Owner. Such delays may include, but not be limited to, the following:
1.
2. Time taken for preparation and submission of acceptable coordination drawings, including a reasonable period for Architect's review and approval.
3. Time taken for preparation and approval of acceptable mock-ups.
4. Time taken for modifications and replacements of non-conforming work.

1.5 COORDINATION DRAWINGS

A. Prepare Coordination Drawings as follows:
1.
2. Format:
a.
b. Prepare Coordination Drawings in PDF form;
c. Use scale not less than 1/4" = 1'-0";
d. Detail complex areas at larger scale than typical floor plans;
e. Show ductwork and pipes to scale; use single lines for smaller mechanical conduits and all electrical work. Draw busways to scale;
f. Circle and clearly note deviations from Contract Documents with reason for deviation stated.
3.
4. Content:
a.
b. Structural (including fireproofing).
c. Architectural;
d. Mechanical Work, including plumbing;
e. Electrical Work;
f. Fire Protection (Sprinkler system and alarm system);
g. Elevators;
h. Ceiling systems;
i. Openings and sleeves in structural slabs;
j. Equipment;
k. Service Space;

l. Owner Supplied Equipment.
m. Owner furnished – Construction Manager installed equipment.
n. Owner furnished – Owner installed equipment.
o. Construction Manager furnished – Construction Manager installed equipment.

5.

6. Mechanical Work Information Required on Coordination Drawings includes but is not limited to the following:
   a.
   b. Sizes and bottom elevations of rectangular ductwork and piping;
   c. Sizes and center line elevations of round ductwork, piping and conduit runs;
   d. Acoustical lining in ductwork;
   e. Identification of low, medium and high pressure ductwork;
   f. Dimensions of major components, such as dampers, large valves, diffusers, and cleanouts.

7.

8. Electrical Work Information Required on Coordination Drawings:
   a.
   b. Electrical distribution equipment;
   c. Panel board, switch board, switchgear, transformer, busway, generator and motor control center;
   d. Runs of vertical and horizontal conduit 1-1/4 inch diameter and larger;
   e. Light fixture locations;
   f. Location of pull boxes dimensioned from column center lines
   g. Smoke detector locations;
   h. Exit sign and emergency battery pack locations.

9.

10. Sprinkler System Information Required on Coordination Drawings: Locations of pipes and sprinkler heads.
11. Ceiling system information required on coordination drawings:
    a.
    b. Suspension and layouts;
    c. Access panel sizes and locations;
    d. Ceiling heights: Maintain heights indicated on architectural drawings without exception.

12.

13. Structural Work Information Required on Coordination Drawings:
    a.
    b. Openings and sleeve locations required in slabs, walls, beams and other structural elements, including required openings not indicated on Contract Documents;
    c. Slab edge locations.
    d. Fireproofing.
    e. Rooftop structural steel dunnage with mechanical equipment.
14. Equipment: Prepare base coordinating drawings on specific equipment and devices to be installed. Owner will furnish shop drawings and/or installation information on Owner-furnished equipment for incorporation in coordination drawings.

B. General: Submit Coordination Drawings for all areas where close and careful coordination of trades is required. The Construction Manager shall be fully responsible for coordinating trades, coordinating work between mechanical, plumbing, electrical and other Trade Contractors coordinating construction sequence and schedules, and coordinating actual installed location and interface of work.

C. Timing: Prior to fabricating materials or beginning work, supervise and direct the creation of one complete set of Coordination Drawings showing complete coordination and integration of work, including, but not limited to all items indicated above.

D. Intent: Coordination Drawings are for the Construction Manager's use during construction and are not to be construed as replacing Shop Drawings or Record Drawings. Architect's review of submitted Coordination Drawings shall not relieve Construction Manager from his overall responsibility for the coordination of Work of the Contract.

E. HVAC: Construction Manager shall circulate Coordination Drawing base sheets to HVAC Trade Contractor(s) and require HVAC Trade Contractor(s) to accurately and neatly show actual size and location of HVAC equipment and work. HVAC Trade Contractor(s) shall note apparent conflicts, suggest alternate solutions, and return Coordination Drawings to Construction Manager.

F. Plumbing: Construction Manager shall circulate Coordination Drawings to plumbing Trade Contractor and require plumbing Trade Contractor to accurately and neatly show actual size and location of all plumbing equipment and work. Plumbing Trade Contractor shall note apparent conflicts, suggest alternate solutions, and return the Coordination Drawings to the Construction Manager.

G. Electrical: Construction Manager shall circulate Coordination Drawings to electrical Trade Contractor(s) and require electrical Trade Contractor(s) to accurately and neatly show actual size and location of electrical equipment and work. Electrical Trade Contractor(s) shall note apparent conflicts, suggest alternate solutions, and return Coordination Drawings to Construction Manager.

H. Fire Protection: Construction Manager shall circulate Coordination Drawings to fire protection Trade Contractor and require fire protection Trade Contractor to accurately and neatly show actual size and location of fire protection equipment and work. Fire protection Trade Contractor shall note any apparent conflicts, suggest alternate solutions, and return Coordination Drawings to the Construction Manager.

I. Other Trade Contractors: The Construction Manager shall circulate Coordination Drawings to other Trade Contractors whose work might conflict with other work. Require these Trade Contractors to accurately and neatly show actual size and location of their equipment and work. These Trade Contractors shall note apparent conflicts, suggest alternate solutions, and return Coordination Drawings to the Construction Manager.

J. Construction Manager Review and Submission: Construction Manager shall carefully review, modify and approve Coordination Drawings in cooperation with Trade Contractors to assure conflicts are resolved before work in field is begun and to ensure location of work exposed to view is as indicated or as approved by Architect. Construction Manager shall stamp, sign, and submit Coordination Drawing originals to Architect for review and approval following specified procedures and policies for "Submittals". Do not commence work in these areas until Coordination Drawings have been received and reviewed by Owner and Architect.

K. Distribution: When Coordination Drawings have been completed and approved by all parties, make PDFs, and distribute to Owner, Trade Contractors, suppliers, fabricators, and other parties requiring information from Coordination Drawings for proper coordination and performance of Work. Print copies of Coordination Drawings from approved reproducibles, only.

1.6 PROJECT MEETINGS

A. This Section specifies administrative and procedural requirements for project meetings including but not limited to:
1.
2. Work Initiation Conference (WIC);
3. Pre-Installation Conferences;
4. Progress Meetings.
5. Coordination Meetings.
6. Owner’s Meetings.

B. Work Initiation Conference (WIC)
1.
2. A Work Initiation Conference will be convened by the University no later than 15 days after execution of the Agreement and prior to commencement of construction activities. This meeting will review responsibilities and discuss preliminary information necessary for the effective initiation of work. Owner will announce time and place of meeting.
3. Attendees: The University, Architect and their consultants, the Construction Manager and its project manager, superintendent, major Trade Contractors, manufacturers, suppliers and other concerned parties. Each shall be represented at the conference by persons familiar with and authorized to conclude matters relating to the Work.
4. Agenda:
a.
b. Include the following items as a minimum:
1)
2) Routing of Correspondence
3) Preliminary Submittals/Notifications
4) Submittal Procedures
5) Test Reports
6) Requests for Payment
7) Changes in Work
8) Equipment Staging

9) Progress Meetings
10) Material Storage
11) Equipment Staging
12) Parking
13) Start/Completion Dates (Phases)
14) Safety/Health
15) Security
16) Noise Control
17) Outages
18) Sexual Harassment
19) MBE Requirements
20) Construction Manager Evaluations

C. Pre-Installation Conferences

1.

2. Conduct a pre-installation conference at the site for all construction activities that require coordination, where required by the Project Manual or when deemed appropriate by the Owner. The Owner, Architect, Construction Manager's superintendent, all affected Trade Contractors and suppliers and manufacturers' representatives involved in or affected by the installation, and its coordination or integration with other work, shall attend the meeting. Advise the Owner and Architect of scheduled meeting dates, times, and locations.

3. Review the progress of other construction activities and preparations for the particular activity under consideration at each pre-installation conference. Review requirements for work including:

a.
b. Contract Documents requirements;
c. Approved Submittals, Samples & Product Data
d. Related Change Orders;
e. Procurement and Delivery Schedule;
f. Possible conflicts;
g. Compatibility problems;
h. Work schedule;
i. Weather limitations;
j. Manufacturer's recommendations;
k. Compatibility of materials;
l. Acceptability of substrates;
m. Temporary facilities;
n. Space and access limitations;
o. Governing regulations;
p. Safety, Health, Noise Control, and Security;
q. Inspection and Testing requirements;
r. Required performance results;
s. Recording requirements;
t. Protection.

4.

5. Record significant discussions and agreements and disagreements of each conference, along with the approved schedule. Distribute the record of the meeting to everyone concerned, promptly, including the Owner and Architect.

6. Do not proceed if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of Work and reconvene the conference at the earliest feasible date.

D. Progress Meetings
1.
2. Schedule progress meetings every two weeks, unless otherwise agreed to by the University, at the Project site until Substantial Completion. Notify the Owner of scheduled meeting dates. Coordinate dates of meetings with preparation of the payment request if possible.
3. These meetings will be conducted by the Architect with the assistance of the Construction Manager:
4. Attendees: In addition to representatives of the Owner, Architect and Construction Manager; each Trade Contractor, supplier or other entity concerned with current progress or involved in planning, coordination or performance of future activities shall be represented at these meetings by persons familiar with the Project and authorized to conclude matters relating to progress.
5. Review of Work in Progress: The Construction Manager, Owner, Architect and their consultants shall conduct a joint walk through of the Work in conjunction with each progress meeting. They shall identify deficiencies and problems to be addressed by the Construction Manager. A report of this walkthrough, listing required actions by the Construction Manager, shall be included with the meeting minutes and all outstanding issues shall be reviewed at each progress meeting.
6. Agenda: Review, correct if required, and approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the current status of the Project.
7. Construction Manager's Construction Schedule: The Construction Manager shall present a combined, two-week Look-Ahead Schedule with a two-week As-Built Schedule for the previous two weeks for review during the progress meeting. Review progress since the last meeting. Review problems which impact schedule. Determine where each activity is in relation to the Construction Manager's Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
8. Review the present and future needs for effective progress of the Work including such items as:
   a.
   b. Submittal schedule and status of submittals;
   c. Status of Requests for information (RFIs);
   d. Status of pending change orders/anticipated changes;
   e. Sequences;
   f. Deliveries;
   g. Interface requirements;
   h. Field observations, problems and decisions;

i. Outages required;
j. Hot work permits or confined space entry permits issued/required;
k. Off-site fabrication problems;
l. Access;
m. Site utilization;
n. Temporary facilities and services;
o. Hours of Work;
p. Hazards and risks;
q. Housekeeping;
r. Quality and Work standards;
s. Review draft request for payment (once a month),
t. Demonstrate that Project Record Documents as required in Section 01720 have been maintained in a current status.

9.
10. Reporting:
a.
b. The Architect shall prepare detailed minutes of each progress meeting and distribute them electronically to attendees and others as requested by the University within 72 hours of the meeting. The Architect shall incorporate comments received and issue the official meeting minutes not later than 72 hours before the subsequent progress meeting. In case of disagreement with a comment, the University will make the final determination.
c. Schedule Updating: Revise the construction CPM schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule CPM schedule concurrently with the report of each meeting.

E. Coordination Meetings
1.
2. Conduct Project coordination meetings at regularly scheduled times convenient for all parties involved. Project coordination meetings are in addition to specific meetings held for other purposes, such as regular progress meetings and special pre-installation meetings.
a.
b. All parties involved with the coordination and planning of current Construction activities shall be represented. These include but are not limited to the Construction Manager, Trade Contractors, suppliers, and Owner's representative.

1.7 DAILY CONSTRUCTION REPORTS

A. Prepare a daily construction report, recording the following information concerning events at the site. Submit duplicate copies to the Owner at weekly intervals, of the following
1.
2. List of Trade Contractors at the site,
3. List of major items of equipment on site,
4. List of construction activities performed (for each trade)
5. Approximate count of personnel at the site for each trade.
6. High and low temperatures, general weather conditions,

7. Accidents and unusual events,
8. Meetings and significant decisions,
9. Stoppages, delays, shortages, losses,
10. Meter readings and similar recordings,
11. Emergency procedures,
12. Orders and requests of governing authorities,
13. Change Orders received, implemented,
14. Services connected, disconnected,
15. Equipment or system tests and start-ups,
16. Partial Completions, occupancies,

1.8 REQUEST FOR INTERPRETATION (RFI)

A. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, prepare and submit an RFI in the online construction management portal (e-Builder).
1.
2. RFIs shall originate with the Construction Manager. RFIs submitted by entities other than the Construction Manager will be returned with no response.
3. Coordinate and submit RFIs in a prompt manner so as to avoid delays in the Construction Manager's work or work of Trade Contractors.

B. Content of the RFI: Include a detailed, legible description of the item needing interpretation and the following:
1.
2. Project Name.
3. Date.
4. Name of Construction Manager.
5. Name of Architect/Engineer.
6. RFI Number, numbered sequentially.
7. Specification Section number and title and related paragraphs, as appropriate.
8. Drawing number and detail reference, as appropriate.
9. Field dimensions and conditions, as appropriate.
10. Construction Manager's suggested solution(s). If the Construction Manager's solution(s) impact the Contract Time or the Guaranteed Maximum Price, Construction Manager shall state in the RFI.
11. Construction Manager's signature.
12. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.
13. Supplementary drawings prepared by the Construction Manager shall include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies and attachments.

C. Architects/Engineer's Action: Architect/Engineer will review each RFI, determine the action required, and send to Owner for review before returning to Construction Manager. Allow seven (7) working days for Architect/Engineer's response for each RFI.
1.

2. The following RFI will be returned without action:
   a.
   b. Request for approvals of submittals.
   c. Request for approvals of product substitutions.
   d. Request for coordination information already indicated in the Contract Documents.
   e. Requests for interpretation of Architect/Engineer's actions on submittals.
   f. Incomplete RFIs or RFIs with numerous errors.
   g. Architect/Engineer's action may include a request for additional information, in which case the Architect/Engineer's time for response will start again.
3.
4. Architect/Engineer's action on RFIs that may result in a change to the Contract Time or the Guaranteed Maximum Price may be eligible for the Construction Manager to submit a Change Proposal in accordance with Division 1 Section "Contract Modification Procedures.
   a.
   b. If the Construction Manager believes that the RFI response warrants a change to the Contract Time or Guaranteed Maximum Price, he shall notify the Architect/engineer and the Owner in writing within 10 days of receipt of the RFI response

D. Upon receipt of the Architect/Engineer's action, the Construction Manager shall update the RFI log and immediately distribute the RFI response to affected parties. Review the response and notify the Architect/Engineer within seven (7) days if Construction Manager disagrees with the response.

E. RFI Log: Prepare, maintain and submit a tabular log of RFIs organized by RFI number. Submit the log prior to each Progress Meeting.
   1.
   2. Project Name.
   3. Name and Address of Construction Manager.
   4. RFI number including RFIs that were dropped and not submitted.
   5. RFI description.
   6. Date the RFI was submitted.
   7. Date the Architect/Engineer's response was received.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION 01 3100

SECTION 01 3110 - SCHEDULES AND REPORTS

PART 1 – GENERAL

1.1 SUMMARY

A. General: This Section specifies administrative and procedural requirements for the critical path method (CPM) of scheduling and reporting progress of the Work.

1. Refer to General Conditions and the Agreement, for definitions and specific dates of Contract Time.
2. The Submittal Schedule is included in Division 1 Section 01300 “Submittals”.
3. An independent consulting firm with a minimum of five years experience in scheduling shall be retained for the entire duration of the contract to prepare the CPM schedule submissions. Construction Management Firms with In-house scheduling capabilities can prepare the CPM schedule provided that the assigned scheduler meets the requirements of this specification.
4. The Construction Manager and Trade Contractors shall assist in the development of the network plan and schedule to meet contract requirements.

1.2 DEFINITIONS

A. Contract Schedule: The Contract Schedule is the document that controls Construction Manager's timely execution of the Work. It is initially defined by the number of Work Days listed in the Contract Documents for completion of each Milestone and for completion (in calendar days) of the Work. Upon submittal and acceptance, by the Owner, of the Preliminary Construction Schedule (PCS), the PCS becomes the Contract Schedule. Upon submittal and acceptance, by the Owner, of the Detailed Construction Schedule (DCS), the DCS becomes the Contract Schedule. Upon acceptance by Owner of mutually agreed change orders, which amend the DCS, the most current such accepted amended version of the DCS becomes the Contract Schedule.

B. Critical Path Method (CPM): A construction scheduling technique using network analysis diagrams to plan and organize construction activities in an orderly manner along the critical path.

C. Network: A network diagram is a graphic representation showing the relationship of activities and events in the correct sequences required to complete the Project within the Contract Time.

D. Activity: One single identifiable task in the Project.

E. Critical Activity: Tasks with no (zero) float time which determine the critical path and control project completion.

F. Event: The starting or ending point of an activity.

G. Float: Time available for a given activity in excess of its estimated duration. It represents the amount of leeway available in scheduling an activity. All float time belongs to the Owner.

1. Free float: The amount of time an activity can be delayed without adversely affecting the early start of the following activity.
2. Total float: The amount of time an activity can be delayed without adversely affecting overall time for Project completion.

H. Work Day: The days in the calendar during the period of Work performance, excluding Saturdays, Sundays and holidays submitted by the Construction Manager and agreed to by the Owner. This list of holidays must be submitted in writing and accompany the Preliminary Construction Schedule.

I. Extended Overhead Cost: Cost incurred by Construction Manager in the event the Contract Time is extended beyond the completion date set for the entire Work as of NTP. Only costs incurred by Construction Manager on the Project site are eligible to be classified as Extended Overhead Costs. These shall be limited to direct daily costs associated with temporary facilities on the Project site, site vehicles, site offices, site office supplies, equipment and supplies, cleaning equipment and supplies, sanitary facilities and supplies, superintendence assigned full-time to the Project site and general conditions (assigned exclusively to cleaning and safety) personnel.

J. Milestones: The dates indicated in the most current approved updated Contract Schedule for completion of defined portions and/or phases of the Work and the entirety of the Work. Such dates are calculated by counting the number of Work Days or calendar days specified for each Milestone. Show Milestones in the Contract Schedule as zero duration activities with "Finish-No-Later-Than" dates. Milestones listed in the Contract Documents represent only the major items of construction work or interface dates. Milestones are considered essential to the satisfactory performance of this Contract and to the coordination of all work on the Project.

1.3 CONSTRUCTION MANAGER'S REPRESENTATIVE

A. The Construction Manager shall designate an authorized representative in his firm who will be responsible for assisting in the preparation of the CPM Schedule and review/report progress of the project with Owner's representative. The Construction Manager's representative shall have direct project control and complete authority to act on behalf of the Construction Manager in fulfilling requirements of this section of the specification and such authority will not be interrupted throughout the duration of the project.

1.4 CONSTRUCTION MANAGER'S CONSTRUCTION SCHEDULE (Network Analysis Schedules)

A. The Construction Manager shall prepare and maintain a detail cost and resource loaded progress schedule as described below. This schedule shall be the

Construction Manager's working schedule and used to plan, organize and execute the work, record and report actual performance and progress, and show how the Construction Manager plans to complete all remaining work as of the end of each progress report period.

B. The schedule shall be in the form of an activity oriented network diagrams (Critical Path Method) and the principles and definition of the terms used herein shall be as set forth in "The Use of CPM in Construction - A Manual for General Construction Managers and the Construction Industry", The Associated General Construction Managers of America (AGC), Washington, DC, 1976 edition or "CPM in Construction Management", James O'Brien, McGraw-Hill Book Company, New York, New York, 1984, third edition. In the event of discrepancies, this section shall govern the development and utilization of the progress schedule.

1.5 QUALITY ASSURANCE

A. Construction Manager's Administrative Personnel: Five years minimum experience in using and monitoring CPM schedules on comparable projects.

B. Scheduler: Consultant specializing in CPM scheduling with five years minimum experience in scheduling construction work of a complexity comparable to this project, and having use of computer facilities capable of delivering detailed graphic and tabular printouts, as well as electronic transfers of data, within 48 hours of request.

C. Program: Use a computer software program for network analysis that has been developed specifically to manage CPM construction schedules and is acceptable to the Owner's Representatives. Such software must be compatible with the latest version of Primavera Project Planner (P3) by Primavera Systems, Inc. All submissions will consist of both electronic and paper copies. Electronic copies will be in a format readable by P3 software.

1.6 PRELIMINARY CONSTRUCTION SCHEDULE (PCS)

A. Preliminary Construction Schedule (PCS): Within 14 days of the date established for commencement of the work (either by Letter of Intent or Notice to Proceed, whichever is earlier), submit a Preliminary Construction Schedule (PCS) package containing the following:

1. CPM network diagram containing detail activities for the first 90 days of construction and summary activities for the period after the first 90 days until the end of the project. The work for each phase or area must be represented by at least one summary activity such that the PCS indicates the entire Work. The following requirements must be met by all cost loaded activities:

a. Total cost loaded into detail and summary activities in the PCS by CSI division number should equal the total contract price,

b. Durations of individual detail activities should not exceed 15 working days except where those activities represent procurement and delivery tasks.
c. Costs allocated to individual detail activities should not exceed $20,000.

2. Narrative of Construction Manager's proposed construction methodology, including a proposed general sequencing plan.
3. Proposed calendar (meeting the constraints of "Work Day" definition, Sec 1.3.8), indicating holidays, other proposed non-working days and proposed time periods for shift work by trade, if any.
4. Key Items Procurement: For all "key" (major equipment and materials and long-lead (over 16 weeks, from order placement to delivery)) items fabricated or supplied for the Work, include in the PCS a tabular report detailing these items and indicating schedule dates for the following related activities:

   a. Preparation of submittals, including shop drawings and samples.
   b. Review and approval of submittals. Indicate Owner's review time of no less than 14 calendar days for any individual submittal. Adjust logic and/or duration of submittal activities as directed by Owner in event Owner determines that Construction Manager's proposed submittal schedule assumes an overly concentrated period of Architect or Owner review and approval.
   c. Manufacture or fabrication,
   d. In-plant testing,
   e. Packaging and loading, where applicable,
   f. Shipment and delivery,
   g. Receipt, inventory, off-loading, warehousing,
   h. Handling and re-handling,
   i. Erection or installation,
   j. Testing and inspection,
   k. Commissioning,
   l. Final inspection of installed equipment and materials.

5. Tabulation of Submittals: tabulation by date of submittals required during the first 90 days of construction. List those required to maintain orderly progress of the Work, and those required early because of long lead-time for manufacture or fabrication.
6. Distribution: Provide PDFs to Architect and Owner. Also distribute the PCS to subconstruction managers and suppliers that need to know about the timing of these construction activities.

1.7 DETAILED CONSTRUCTION SCHEDULE (DCS)

A. Submit a Detailed Construction Schedule (DCS), in CPM format, no later than 30 days after the date established for commencement of work.

B. Prepare network analysis diagrams and supporting mathematical analyses using the Critical Path Method (CPM), under concepts and methods outlined in the above referenced books.

C. The DCS shall illustrate order and interdependence of activities and sequence of work, restrictions of access and availability of work areas, how the start of a given activity depends on completion of preceding activities, and how completion of the activity may restrain start of subsequent activities.

D. Proceed with preparation of the DCS immediately following notification of Contract award.

E. Illustrate complete sequence of construction by activity. Provide dates for submittals including those for Owner furnished items, if any, and return of submittals, dates for procurement and delivery of products, and dates for installation and provision for testing. Provide legend for symbols and abbreviations.

F. The DCS shall provide sufficient detail and clarity of form and technique so that the Construction Manager can plan, schedule, and control his work properly and the Procurement Officer can readily monitor and follow the progress for all portions of work. The DCS shall comply with the various limits imposed by the scope of work and by contractually specified intermediate milestone dates included in the contract.

G. The degree of detail shall be to the satisfaction of the Owner, but the following factors shall be addressed in the network:

1. A phased breakdown of the entire project. Use clear and concise activity descriptions. The beginning and end of each activity shall be readily observable and verifiable during execution of the work.
2. The type of work to be performed and the labor trades involved,
3. All purchase, manufacture and delivery activities for all major materials and equipment,
4. Deliveries of Owner furnished equipment,
5. Preparation and processing of submittals,
6. Preparation and approval of coordination drawings,
7. Plans for all subcontract work,
8. Access and availability of work areas,
9. Testing, submission and approval of test results,
10. Incorporate time for pre-testing,
11. Provide list of all required tests and sequence accordingly,
12. Close-in inspections/correction of deficiencies,
13. Testing/balancing of systems,
14. Commissioning of CCMS system,
15. Potential Weather Delays,
16. Demonstrations and instructions,
17. Punch list inspection/correction of deficiencies,
18. Each project closeout activity as required by the Project Manager or his designated representative.
19. Activity durations over 15 working days or $20,000 in value shall be kept at a minimum except in the case of non-construction activities. The sum of the costs assigned shall be equal to the contract value. No activity costs are to be assigned to manufacture or delivery schedules.

H. The network shall clearly indicate the intermediate milestone events, the contract completion dates, substantial completion and final acceptance dates and the predicted status of these control points as the networks are updated. The primary path(s) of criticality shall be clearly and graphically identified on the network. The status of the work in progress shall also be similarly identified and the reported percent complete indicated for the last report period.

I. Follow the steps necessary to complete development of the network diagram in sufficient time so that the DCS can be submitted and accepted for use no later than 30 days after commencement of the Work.

J. Conduct educational workshops to train and inform key project personnel, including Trade Contractors' personnel, in proper methods of providing data and using the DCS information.

K. Establish procedures for monitoring and updating the CPM schedule and for reporting progress; coordinate procedures with progress meeting and payment request dates.

L. Construction Manager shall submit the following tabular reports with the DCS and every schedule update throughout the duration of the project:

1. Mathematical Analysis: Tabulate each activity of the DCS, using calendar dates and identifying for each activity:

    a. Preceding and succeeding event numbers,
    b. Activity description,
    c. Earliest start date,
    d. Earliest finish date,
    e. Actual start date,
    f. Actual finish date,
    g. Latest start date,
    h. Latest finish date,
    i. Total and free float,
    j. Monetary value of activity, keyed to Schedule of Values,
    k. Percentage of activity completed and remaining duration of activity,
    l. Identify each activity with applicable specification section number,
    m. Construction Manager’s earnings based upon activity’s reported percent complete.

2. Computer Outputs: Required as part of the initial schedule submission and each update thereafter. Construction Manager will furnish electronic files.

    a. Tabular report of all activities sorted by event number from lowest to highest.
    b. Tabular report of all activities sorted by early start date, early finish date and total float. This report must be grouped by early start dates.
    c. Tabular report of all activities sorted by total float, early start date and early finish date. This report must be grouped by total float.

d. Construction Manager's periodic payment request sorted in same order as the Schedule of Values listing referenced below.

1.8 CASH FLOW PROJECTIONS

A. Using the cost assigned to each activity of the DCS, the Construction Manager shall develop a cash flow analysis in graphic form depicting estimated cash draw down in aggregate, by month, over the life of the project. The cash flow projections will be updated each month to show a forecast of remaining payments and actual payments to date and submitted with the updated DCS.

1.9 SCHEDULE OF VALUES

A. Prepare schedule of values in coordination with preparation of construction schedule.

B. Itemized Data:

1. Provide itemization of Contract Sum in sufficient detail to facilitate continued evaluation of payment requests and progress reports.
2. Itemize principal subcontract amounts into separate labor and material items.
3. Round off figures to nearest whole dollar, but make total equal Contract Sum.
4. Unit Cost Allowance: Show line item value as product of unit cost x measured quantity as estimated from best indication in Contract Documents.

1.10 SUBMITTALS

A. The DCS (logic diagrams and computations), shall be submitted to the Owner and Architect for acceptance within thirty (30) calendar days after notice to proceed in the following quantities:

1. Detailed CPM Schedules, 30” x 42" and have a title block in the lower right hand corner. Exceptions to the size of the network sheets shall be subject to the approval of the Owner. Share PDFs with Owner and Architect.
2. Tabular Printouts Share PDFs with Owner and Architect. - 8-1/2" x 11" in size
3. Cash Flow Projections (Share PDFs with Owner and Architect.; 8-1/2" x 11" in size)
4. Electronic Files of Schedules.
5. Written certification that major Trade Contractors have reviewed and accepted proposed schedule.

B. The Owner and Architect shall accept or reject the Construction Manager's submission within fifteen (15) calendar days after receipt of all required information.

C. If the Construction Manager fails to submit the Preliminary Construction Schedule (PCS), Detailed Construction Schedules (DCS), Cashflow Projections and Tabular Printouts within the time prescribed, or revisions thereof within the requested time, the Procurement Officer may withhold approval of all progress payments until such time as the Construction Manager submits the required information.

D. At the request of the Contracting Officer or his authorized representative, the Construction Manager shall be required to participate in any meetings necessary to reach a mutual agreement and acceptance of the PCS, DCS or the Cash Flow Projections.

E. Submit updated DCS, Tabular Printouts and Cash Flow Projection with each Application for Payment.

F. If any of the required submissions are returned to the Construction Manager for corrections or revisions, they shall be submitted for acceptance within ten (10) calendar days after return mailing date. Re-submittal shall be in the same quantities as noted above. Review and response by the Architect and Owner shall occur within ten (10) days after each submission. Upon acceptance of the initial or updated DCS by the Owner, Construction Manager shall, within 3 calendar days,

1. Post copies in the Project meeting rooms and temporary field office,
2. Distribute copies of the accepted DCS to Trade Contractors, suppliers, Owner, A/E and other concerned parties,
3. Instruct recipients to promptly report, in writing, problems anticipated by the projections shown in the schedule,
4. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

G. Submit copies of each computer-produced report (listing) in triplicate and electronic files to both the Architect and Owner.

H. Owner's acceptance of proposed DCS signifies only that Owner's summary review of the DCS leads Owner to believe that Construction Manager has met the general requirements of this Section pertaining to DCS format and content. Acceptance by Owner of the DCS does not relieve Construction Manager of any of its responsibility whatsoever for the accuracy or feasibility of Construction Manager's plan for execution of the Work, or to perform the Work within specified time constraints. Such acceptance does not expressly or impliedly warrant, acknowledge or admit the reasonableness of the activities, logic, durations, manpower, cost or equipment loading of the Construction Manager's proposed or accepted Contract Schedule.

I. Owner's acceptance in no way makes Owner or its representatives insurers of success of Construction Manager's time performance or liable for time or cost overruns flowing from the shortcomings of Construction Manager-authored Contract Schedule. Owner disclaims and Construction Manager waives any

Owner obligation or liability by reason of Owner's acceptance of or acquiescence to Construction Manager's schedule submissions.

J. Should Construction Manager fail to define any element of Work, activity or logic and Owner review does not detect this omission or error, such omission or error, when discovered by Construction Manager or Owner, shall be corrected by Construction Manager before the next monthly schedule update and shall not be cause for delay of completion of the Work within the specified time constraints. Construction Manager acknowledges that Owner is not required or otherwise obligated to discover errors or omissions in Construction Manager's proposed Contract Schedule. Owner's acceptance of DCS does not relieve Construction Manager of its responsibility of the Contract Schedule.

1.11 REVIEW AND EVALUATION

A. Participate in joint review and evaluation of CPM Schedules and analysis with Owner and Architect at each submittal.

B. Evaluate project status to determine work behind schedule and work ahead of schedule.

C. After review, revise as necessary as result of review, and resubmit within 10 days.

1.12 UPDATING SCHEDULES

A. The initial updating shall take place during the first week after the acceptance of the Construction Manager's schedule by the Owner and Architect. Subsequent updates shall be submitted bi-weekly for presentation at periodic progress meetings or as designated by the Owner. Updates will include furnishing the Owner and Architect a copy of the electronic file(s) of the updated schedule. Update within 5 days any significant changes as a result of action agreed to in the periodic progress meeting. An updated schedule shall accompany each request for payment. Schedules shall include:

1. Actual start dates;
2. Actual completion dates;
3. Cost value of work reported in place;
4. Activity percent completion;
5. Revised logic (as-built and projected) and changes in activity duration and costs;
6. Influence of change orders;
7. Subsequent updates will be discussed at each progress meeting.

B. The Construction Manager shall come to the progress meetings with the above data prepared in advance of each meeting, to provide, as of the end of the updating period, a complete and accurate report of contract procurement and construction progress and showing how the Construction Manager plans to continue the work of this project to meet all contract completion dates.

C. Identify activities modified since previous submittal, major changes in Work and other identifiable changes.

D. Indicate changes required to maintain Date of Completion.

E. Submit sorts required to support recommended changes.

F. Provide narrative report to describe physical progress during the report period, plans for forthcoming report period, actions to correct any negative float predictions, problem areas, anticipated delays, and impact on Schedule. Report corrective action taken or proposed.

G. If the Construction Manager fails to timely submit any of the update deliverables, the Procurement Officer may withhold approval of all progress payments until such time as the Construction Manager submits the required update reports.

H. Submit computer reports and network graphics, which reflect the progress of the Work with respect to both cost and time, in accordance with the requirements of the initial Construction Manager-proposed DCS. Submit an updated cash flow graphic showing a) approved baseline schedule early start (ES) and late start (LS) curves, b) actual curve as of update and c) forecast ES and LS curves to complete Work. d) Adjust the selection and sort sequence, format and content of reports as directed by Owner.

I. Construction Manager acknowledges that updating the Contract Schedule to reflect actual progress made as of the date of update is not a modification to the Contract Schedule's Milestone requirements.

1.13 FLOAT TIME.

A. Float is not for the exclusive benefit of either Construction Manager or Owner. Manage work according to early start dates, by commencing activities on the early start date (calculated by the latest approved Contract Schedule) or earlier if possible, unless constrained by a bona fide resource limitation. Owner may reserve and apportion float time according to the needs of the Project. Actual or projected Owner-caused delays that do not exceed available float time shall not have any effect upon Construction Manager's adherence to specified time constraints and shall not be a basis for any time extension.

B. Construction Manager acknowledges the following:

1. Activity delays shall not automatically result in adjustment of specified time constraints,
2. A Change Order or other Owner action or inaction may not affect existing critical activities or cause non-critical activities to become critical,
3. A Change Order or delay may result in only absorbing a part of the available total float that may exist within an activity chain of the network, thereby not causing any effect on specified time constraints.

C. Pursuant to the above float sharing requirements, use of float released by elimination of float suppression techniques such as preferential sequencing,

special lead/lag logic restraints, unreasonably extended activity durations, or imposed dates shall be distributed by Owner to the benefit of Owner and Construction Manager.

D. In the event the Construction Manager wishes to complete the Work earlier than the time specified therefore:

1. Continue to calculate float based on the Work completion date specified as of Contract execution, by maintaining the specified Work completion date as a "finish-no-later-than" constraint.
2. The completion time for the Work shall not be amended by Owner's, acceptance of or acquiescence to Construction Manager's proposed earlier completion date.
3. Construction Manager shall not, under any circumstances, receive additional compensation for indirect, general, administrative or other forms of overhead costs, for the period between the time of earlier completion proposed by Construction Manager and the completion time for the Work specified as of NTP.

1.14 CHANGE ORDERS, DELAYS, AND TIME EXTENSIONS

A. When change orders or delays are experienced, the Construction Manager shall submit to the Project Manager or his authorized representative, a written Time Impact Analysis illustrating the influence of each change or delay of the current contract schedule completion dates. Each Time Impact Analysis shall include a fragnet (network analysis) demonstrating how the Construction Manager proposes to incorporate the change order or delay into the Detailed CPM Schedule. Additionally, the analysis shall demonstrate the time impact based on the date the change is given to the Construction Manager, the status of construction at that point in time, and the event time computation of all affected activities. The event times used in the analysis shall be those included in the latest update copy of the detailed progress schedule or as adjusted by mutual agreement. The Construction Manager will submit any supporting electronic files to the Owner when submitting a Time Impact Analysis.

B. Time extensions will be granted only to the extent that the equitable time adjustment for the activities affected exceed the total or remaining float along the path of activities at the time of actual delay or at the time notice to proceed was issued for the change. Each Time Impact Analysis shall be submitted in PDF and within fifteen (15) calendar days after a delay occurs or notice of direction for a change is given to the Construction Manager. In cases where the Construction Manager does not submit a Time Impact Analysis for a specific change order or delay within a specified period of time, he shall be deemed to have irrevocably waived his rights to any additional time and cost. Approval or rejection of each Time Impact Analysis by the Owner shall be made within fifteen (15) calendar days after receipt of each Time Impact Analysis unless subsequent meetings and negotiations are necessary. Upon approval, a copy of the Time Impact Analysis signed by the Owner shall be returned to the Construction Manager. Upon mutual agreement by both parties, fragnets illustrating the influence of change order and delays will be incorporated into the Detailed CPM Schedule during the first update after agreement is reached.

C. In the event the Construction Manager does not agree with the decision of the Procurement Officer regarding the impact of a change delay, it shall be resolved in accordance with the disputes clause of the contract.

1.15 WEATHER CAUSED DELAYS

A. The Owner and Construction Manager shall use the following table labeled "Monthly Anticipated Adverse Weather Days (in work days)" as the basis for determining the anticipated number of "unusually severe weather" workdays at the construction site.

Monthly Anticipated Adverse Weather Days (in work days**)**											
JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC
4	5	4	5	5	3	3	3	2	4	4	4

B. A lost work day shall be considered a weather delay when unusually severe weather exists and when such weather conditions directly cause work to be delayed on the activity or activities which are on the critical path according to the latest approved update of the Contract Schedule during that month. Weather-caused schedule losses shall be measured in 0.5 workday increments if the unusually severe weather affects work at the site only for one half of a normal workday. If unusually severe weather occurs during the first half of a normal work and also delays work during the second half of the day (e.g., due to employees not being required to report to work due to unusually severe weather), the entire work day shall be considered a weather caused lost work day. Construction Manager's request for weather caused time extensions during a given month shall be considered only for actual work days lost in excess of the number of work days listed in the table above and meeting the above criteria. Construction Manager shall meet the submittal and notification requirements and follow the procedures for requesting time adjustments to schedule as described in this section.

C. RESPONSES TO REVISIONS. Owner will respond in writing to each schedule update. Owner's response may include questions and/or requests for revisions. Respond in writing within twenty calendar days, either agreeing with Owner's proposed revisions and submitting a modified update, or setting forth justification why such revisions should not be implemented. If Construction Manager's justification for not implementing the revision is acceptable, in Owner's sole judgment, such revision will be waived. If Owner does not accept the Construction Manager's justification, the Owner-directed revisions shall be incorporated into the Contract Schedule. Construction Manager's failure to respond in writing within 20 calendar days shall constitute Construction Manager acceptance of the Owner-directed revisions, and such revisions shall be incorporated by Construction Manager into the Contract Schedule, with final and binding Construction Manager waiver of any potential Construction Manager requests for time extension or additional compensation.

1.16 RESPONSIBILITY FOR COMPLETION

A. Furnish sufficient forces, offices, materials, facilities, plant and equipment, to ensure the prosecution of the Work in accordance with the most current approved Contract Schedule update. If Owner advises that Construction Manager has fallen behind in meeting Milestones as presented in such approved update, take such steps as may be necessary to improve progress. Upon Owner's written advice that Construction Manager is behind schedule, as a result of inexcusable causes, immediately mediate such loss by increasing the hours of work, the number of shifts, overtime operations and/or the amount of construction plant and equipment without additional cost to Owner. Construction Manager acknowledges that such remedial action on his part is not compensable acceleration of the performance of the Work. The provisions of this paragraph shall not be construed as prohibiting work on Saturdays, Sundays, and holidays, without additional cost to the Owner, if the Construction Manager so elects and gives written notice to Owner two working days in advance of the work.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 3110

SECTION 01 3300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other miscellaneous submittals.

1.2 DEFINITIONS

A. Action Submittals: Written and graphic information that requires Architect/Engineer's responsive action.

B. Informational Submittals: Written information that does not require Architect/Engineer's approval. Submittals may be rejected for not complying with requirements.

C. Searchable PDF: Words, abbreviations, etc., in descriptions, drawing notes, etc., shall be recognizable by Adobe Reader's "search" feature as words, etc., matching the text that is visible on the screen. If images are converted to "text" by an "optical character recognition" function, edit the resulting strings of characters as necessary to match the text that is visible on Adobe Reader's screen prior to sending the submittal to the design team for review.

1.3 SUBMITTAL PROCEDURES

A. General: Electronic copies of CAD Drawings of the Contract Drawings will not be provided by Architect/Engineer for Construction Manager's use in preparing submittals.

B. Coordination: Coordinate the 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. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
    a. Architect/Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Submittals Schedule:

1. Preliminary: Within 14 days of Letter of Intent (or Notice to Proceed if no Letter of Intent is issued), prepare and submit a tabular Submittal Schedule, sorted by date, of all submittals required during the first 90 days of construction. List those required to maintain orderly progress of the Work, and those required early because of long lead time for manufacture or fabrication. Include the following information in this submittal:
    a. Heading, including project title and location and Construction Manager's name;
    b. Columnar organization with the following sub-headings
        1) Submittal No (Line numbers, serial order);
        2) Type of Submittal (Data, Shop Drawings, Reports, etc.);
        3) Specification Reference (Spec section number and paragraph reference);
        4) Description of Item Submitted (misc. metals, wood flooring, gyp board, etc.);
        5) Submit By (date);

6) Approve By Date
7) Long lead time item (yes or no)
8) Critical Path (yes or no)
9) Float;
10) Actual date of submittal;
11) Re-submittal Date
12) Final release or approval
13) Remarks.

2. Full Submittal: Within 60 days of Letter of Intent (or Notice to Proceed if no Letter of Intent is issued), prepare and submit a tabular Submittal Schedule, sorted by date, of all submittals required during the full duration of the project. The full submittal shall utilize the same format and provide the same type of information as specified for the preliminary submittal.
3. Give Owner two weeks notice of anticipated significant revisions to accepted schedule of submittals.
4. Identify all long lead time items and state impact on schedule.

D. Identification: Place a permanent label or title block on each submittal for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately 4 by 5 inches on label or beside title block to record Construction Manager's review and approval markings and action taken by Architect/Engineer.
3. Include the following information on the label for processing and recording action taken:
a. Project name.
b. Date.
c. Name and address of Architect/Engineer.
d. Name and address of Construction Manager.
e. Name and address of Trade Contractor.
f. Name and address of supplier.
g. Name of manufacturer.
h. Unique identifier, including revision number.
i. Number and title of appropriate Specification Section.
j. Drawing number and detail references, as appropriate.
k. Other necessary identification.

E. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals.

F. Transmittal: Transmit each submittal through online construction management tool (e-Builder). Architect/Engineer will return submittals, without review, received from sources other than Construction Manager.

G. Quantities and Processing Time:
1. Product Data:
a. Submit searchable PDF of each required submittal to Architect/Engineer, and Owner and primary reviewer simultaneously via e-Builder. Owner to provide comments to Architect/Engineer within 2 weeks of receipt of submittal. Architect/Engineer to incorporate Owner’s comments and consolidated response. Allow 1 additional week for Architect/Engineer's action.

b. If the Submittal Schedule indicates that the primary reviewer is the Architect/Engineer's Consultant, then submit two (2) additional copies directly to that party.
c. Construction Manager to determine and coordinate primary reviewer for submittal.

2. Shop Drawings:
   a. Submit searchable PDF Shop Drawing to Architect/Engineer and the Owner for simultaneous review via e-Builder. Owner will provide comments to Architect/Engineer within 2 weeks of receipt of submittal. Architect/Engineer shall incorporate Owner's comments into its consolidated response and return to Construction Manager with action indicated.
   b. Allow 1 additional week for Architect/Engineer's action.
   c. Resubmittals: Same as initial submittal; Note date of previous submittal; Use same submittal number with letter suffix to indicate first and subsequent resubmittals.
   d. Do not use Shop Drawings without an appropriate final stamp indicating action taken in connection with construction.
3. Samples:
   a. Submit four (4) sets: three (3) to Architect/Engineer, and one (1) to Owner. Owner will provide its comments to Architect/Engineer within two weeks of receipt of the submittal. Architect/Engineer shall incorporate Owner's comments into its consolidated response. Allow one additional week for Architect/Engineer's action. Architect/Engineer will retain one (1) set, will send one (1) to Owner, and will return one (1) to Construction Manager for action.
   b. If the Submittal Schedule indicates that the primary reviewer is Architect/Engineer's Consultant, then submit one (1) additional copy directly to that party.
   c. Maintain sets of Samples, as returned, at the Project site, for quality comparisons throughout the course of construction.

H. Distribution: Furnish copies of final submittals to manufacturers, Trade Contractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

I. Use for Construction: Use only final submittals with mark indicating action taken by Architect/Engineer in connection with construction.

J. Bookmarks: Include bookmarks for files larger than 15 pages. Provide a concise bookmark for each product in the submittal file.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

A. General: Prepare and submit Action Submittals required by individual Specification Sections.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
   1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.

2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:
    a. Manufacturer's written recommendations.
    b. Manufacturer's product specifications.
    c. Manufacturer's installation instructions.
    d. Standard color charts.
    e. Manufacture’s catalog cuts.
    f. Roughing-in and setting diagrams.
    g. Wiring diagram showing factory-installed wiring.
    h. Printed performance curves
    i. Operational range diagrams.
    j. Mill reports.
    k. Compliance with recognized trade association standards.
    l. Compliance with recognized testing agency standards.
    m. Application of testing agency labels and seals.
    n. Notation of coordination requirements.
4. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.
5. Preliminary Submittal: Submit a preliminary single-copy of Product Data where selection of options is required.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
1. Preparation: Include the following information, as applicable:
    a. Dimensions.
    b. Identification of products.
    c. Fabrication and installation drawings.
    d. Roughing-in and setting diagrams.
    e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
    f. Shop work manufacturing instructions.
    g. Templates and patterns.
    h. Schedules.
    i. Design calculations.
    j. Compliance with specified standards.
    k. Notation of coordination requirements.
    l. Notation of dimensions established by field measurement.
2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings searchable PDFs at least 8-1/2 by 11 inches but no larger than 36 by 48 inches.

D. Coordination Drawings: Comply with requirements in Division 1 Section "Project Management and Coordination."

E. Samples: Prepare physical units of materials or products, including the following:
1. Comply with requirements in Division 1 Section "Quality Requirements" for mockups.
2. 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.
3. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from the same material to be used for the Work,

cured and finished in manner specified, and physically identical with the product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following:
a. Partial sections of manufactured or fabricated components;
b. Small cuts or containers of materials;
c. Complete units of repetitively used materials;
d. Swatches showing color, texture, and pattern; color range sets;
e. And components used for independent testing and inspection.

4. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Architect/Engineer's sample where so indicated. Attach label on unexposed side that includes the following:
a. Generic description of Sample.
b. Product name or name of manufacturer.
c. Sample source.
5. Additional Information: On an attached separate sheet, prepared on Construction Manager's letterhead, provide the following:
a. Size limitations.
b. Compliance with recognized standards.
c. Availability.
d. Delivery time.
6. Submit Samples for review of kind, color, pattern, and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as delivered and installed.
a. If variation in color, pattern, texture, or other characteristic is inherent in the product represented by a Sample, submit at least three sets of paired units that show approximate limits of the variations.
b. Refer to individual Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.
7. 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 not incorporated into the Work, or otherwise designated as Owner's property, are the property of Construction Manager.

F. Delegated-Design Submittal: Comply with requirements in Division 1 Section "Quality Requirements."

2.2 INFORMATION SUBMITTALS

A. General: Prepare and submit Informational Submittals required by other Specification Sections.
1. Number of Copies: Submit searchable PDFs to Architect/Engineer and Owner of each submittal, unless otherwise indicated, through online construction management portal (e-Builder).
2. Certificates and Certifications: Provide a notarized 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.

3. Test and Inspection Reports: Comply with requirements in Division 1 Section "Quality Requirements."

B. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of Architect/Engineers and owners, and other information specified.

C. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements.

D. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements and, where required, is authorized for this specific Project.

E. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements. Include evidence of manufacturing experience where required.

F. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements.

G. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.

H. Preconstruction Test Reports: Prepare 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.

I. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

J. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, 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.

K. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements. 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.

L. Research/Evaluation Reports: Prepare 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:
   1. Name of evaluation organization.
   2. Date of evaluation.
   3. Time period when report is in effect.
   4. Product and manufacturers' names.
   5. Description of product.
   6. Test procedures and results.
   7. Limitations of use.

M. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design

criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

N. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:
   1. Preparation of substrates.
   2. Required substrate tolerances.
   3. Sequence of installation or erection.
   4. Required installation tolerances.
   5. Required adjustments.
   6. Recommendations for cleaning and protection.

O. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:
   1. Name, address, and telephone number of factory-authorized service representative making report.
   2. Statement on condition of substrates and their acceptability for installation of product.
   3. Statement that products at Project site comply with requirements.
   4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
   5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
   6. Statement whether conditions, products, and installation will affect warranty.
   7. Other required items indicated in individual Specification Sections.

P. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

Q. Construction Photographs: Comply with requirements in Division 1 Section "Construction Photographs."

PART 3 - EXECUTION

3.1 CONSTRUCTION MANAGER'S REVIEW

A. Review each submittal and check for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect/Engineer.

B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Construction Manager's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
   1. Submittals received without Construction Manager's review stamp will be returned unreviewed.

3.2 ARCHITECT/ENGINEER'S ACTION

A. General: Architect/Engineer will not review submittals that do not bear Construction Manager's approval stamp and will return them without action.

B. Action Submittals: Architect/Engineer will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect/Engineer will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
   1. "No Exceptions Taken": 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.
   2. “Make Corrections 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.
   3. "Revise and Resubmit": Do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity.
      a. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action mark.
      b. Do not permit submittals marked "Revise and Resubmit" to be used at the Project site, or elsewhere where Work is in progress.
   4. "Rejected": Not in compliance with Contract Documents. Submission has been returned without review.
      a. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action mark.
      b. Do not permit submittals marked "Revise and Resubmit" to be used at the Project site, or elsewhere where Work is in progress.

C. Informational Submittals: Architect/Engineer will review each submittal and will not return it, or will reject and return it if it does not comply with requirements. Architect/Engineer will forward each submittal to appropriate party.

D. Submittals not required by the Contract Documents will not be reviewed and may be discarded.

END OF SECTION 01 3300

SECTION 01 3573 - DELEGATED DESIGN PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Procedures for performing Delegated Design portions of Work.

1.2 DEFINITIONS

A. Delegated Design: Contractor to assume responsibility for defined elements or portions of Work to conform to provided performance criteria, aesthetics and building codes. Coordinate and assume responsibility for design, calculations, submittals, permits if required, fabrication, delivery, storage and installation of components.
B. Deferred Submittal: Portions of Work not submitted at time of permit application and are submitted to the building official or AHJ within a specific time period after permit application.
   1. Requirements as specified in Section 01 3000 - Administrative Requirements.
C. Delegated Design Components: Complete, operational systems, provided for their intended use matching Architect's aesthetic design intent as described in Project Manual and Drawings.
D. Applicant: Person applying for building permit and person coordinating Contractor Engineered systems with basic building and with each other. Includes coordination of required submittals.
E. AHJ: Authority Having Jurisdiction.
F. Delegated Design Engineer: Professional Engineer registered in state of Project location engaged by Contractor to provide Drawings, computations, and specifications required by AHJ for Delegated Design system.
G. Seal: Certification that Drawings, computations, and specifications were designed and prepared under direct supervision of Architect or Engineer whose name appears thereon.
H. Delegated Design Component Review Stamp: Confirmation that design Drawings have been reviewed for compatibility with design of the building.
I. Review Stamp: Certification that Architect has reviewed Drawings, computations and specifications bearing seal of Delegated Design Engineer, verifying conformance with information given and design concept set forth in Drawings and Specifications.
J. Approval Stamp: Certification that AHJ has reviewed submittal and finds it acceptable with respect to applicable code compliance.

1.3 ACTION SUBMITTALS

A. Delegated Design Component Submittals: Include the following with submittals:
   1. Performance criteria as specified in specifications and Drawings.
   2. Design assumptions.
   3. Details.
   4. Calculations.
   5. Structural elements certified by Delegated Design Engineer.
   6. Instructions for fabrication, assembly, installation, and interface with other trades.
B. Proposed Delegated Design Engineers: Submit list of engineers proposed for performing delegated design engineering a maximum of 15 days after executing Notice to Proceed.

1.4 SUBMITTAL REQUIREMENTS

A. Components are those subject to lateral or vertical loads and are not designed by Architect.
   1. These components require designing by Delegated Design Engineer who received subcontract or purchase order for component of Project.

B. Coordinate components adjunct systems whether designed by Architect or others.

C. Design components to align with specifications and Drawings to greatest possible extent.

D. Building Department Submittals:
   1. Provide submittals to Architect for General Design Conformance review prior to submitting to Building Department.
      a. Update submittals based on comments from Architect prior to Building Department submission.
   2. Submit Drawings and Specifications through online Project Portal clearly showing members, dimensions, connections, and materials, and in, attached to main structure.
      a. Design and prepare Drawing stamped by Delegated Design Engineer.
      b. Drawings require signature indicating General Design Conformance by Architect.
      c. Shop Drawings or erection Drawing not acceptable for above requirements.
   3. Submitcalculations, including criteria, design assumptions, substantiating computations, and additional data, sufficient to show correctness of Drawings and compliance with structural revisions of Structural Specialty Code for the State in which the Project is located.
      a. Prepare calculations stamped by Delegated Designed Engineer who prepared Drawings and is licensed in the state where Project is located.
      b. Calculations require signing by Architect indicating acceptance of design concepts, loading criteria and compatibility of designs.

E. Before Work is allowed to proceed the following must occur:
   1. Submit complete legible documents.
   2. Documents must be examined and approved by Building Department.

F. Documents not completed prior to issuance of building permit, must be completed and submitted for approval prior to fabrication.

G. Complete and submit list of Delegated Design Engineers' names, addresses, and telephone numbers prior to issuance of Components approval.

1.5 QUALITY ASSURANCE

A. Refer to specific Sections for Delegated Design Components.
   1. Quality Assurance described in specification Sections shall be minimum acceptable standards for Project.
   2. Should quality assurance not be defined within Specifications Sections, printed industry standards for "normal" quality practices shall govern.

B. Owner Responsibilities:
   1. Owner will not pay for progress delays, additional products, additional Work, restocking, or reworking required by Contractor's failure to coordinate Delegated Deign work with Project Work.

C. Contractor Responsibilities:
   1. Coordinate and assume complete responsibility for design, documentation, engineering, calculations, submittals, permits, fabrication, transportation, and installation of this Work.

2. Submit and coordinate Delegated Design documents to Authority Having Jurisdiction (AHJ) for separate permit.
3. Perform design and prepare design Drawings under direct supervision of a Professional Engineer experienced in design of this Work and licensed in the State in which the Project is located.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Architect's review of Delegated Design Engineered submittals is for general conformance with design intent.
   1. Architect not responsible for coordination of Delegated Design components with Contract Documents or review of materials submitted as result of Delegated Design components.
   2. Contractor may verify design intent of Contract Documents with Architect.
B. Owner not responsible to pay for delays, additional products, hours of work or overtime, restocking or rework required due to failure to coordinate work with other trades or to provide components in timely manner to meet Project Schedule.

2.2 SPECIFIC REQUIREMENTS

A. Delegated Design Components shown in contract Documents are shown for design intent.
B. Intent is to have Delegated Design Entity responsible to design, provide, coordinate and install Delegated Design Component.
C. Delegated Design Components are to include products specified.
D. Delegated Design Components attached to structural frame or supplemental to structural frame to be designed for anticipated loads outlined on Structural Drawings or found in Building Code, in which Project is located.
E. Coordinate Delegated Design Components with appropriate subcontractors.
F. Load reactions at interface between Delegated Design Components and structural frame to be clearly defined to allow for a review by Engineer of Record.

PART 3 - EXECUTION (NOT USED)
END OF SECTION 01 3573

SECTION 01 3800 - CONSTRUCTION PHOTOGRAPHS

PART 1 - GENERAL

1.1 SUMMARY

A. This section specifies administrative and procedural requirements for construction digital photographs.

1.2 SUBMITTALS

A. At monthly intervals throughout the construction period, terminating at substantial completion, submit to the Owner one digital photographic print of each selected view or a videotape of all selected views, as described below.

1. Digital photographs: Provide each required view. Photographs shall be mounted and labeled and dated.
2. Digital images shall be taken using a minimal camera quality setting of HQ – 1600 x 1200 dpi minimum resolution, and shall be kept as a .jpg file.
3. Electronic copy: The photographer shall place all digital images on a CD which shall become the property of the Owner.

PART 2 - PRODUCTS

2.1 PHOTOGRAPHIC COPIES

A. Photographs: Provide digital copies of photographs via CD-Rom or JPEG.

B. Identification: Label each photograph file with project name and date and location of where photograph was taken.

C. Upload photographs to e-Builder in organized fashion and properly named and dated.

PART 3 EXECUTION (Not Used)

END OF SECTION 01 3800

SECTION 01 4000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Construction Manager of responsibility for compliance with the Contract Document requirements.

1. Specific quality control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Construction Manager's other quality control procedures that facilitate compliance with the Contract Document requirements.
3. Requirements for the Construction Manager to provide quality control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

1.2 DEFINITIONS

A. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect and Owner.

B. Field Samples: Sample applications of materials or finishes, to demonstrate material selection aesthetic effects.

C. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Approved mockups may establish the standard by which the Work will be judged.

D. Preconstruction Testing: Tests and inspections that are performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.

E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.

F. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.

G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

I. Installer/Applicator/Erector: Contractor or another entity engaged by Construction Manager as an employee, Trade Contractor, or Sub-Trade Contractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

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

1.3 RESPONSIBILITIES

A. Construction Manager Responsibilities: The Construction Manager shall provide all inspections, tests and similar quality control services, specified in individual Specification Sections and required by governing authorities, except where they are specifically indicated to be the provided by another identified entity. These services include those specified to be performed by an independent agency.

1. Where the Owner has engaged a testing agency or consultant for testing and inspection of a part of the Work, the Construction Manager shall also engage an entity for the same or related element. The Construction Manager shall not employ the agency or consultant engaged by the Owner, unless otherwise agreed in writing with the Owner.

B. Retesting: The Construction Manager is responsible for the costs of retesting where results of required inspections, tests or similar services prove unsatisfactory and do not indicate compliance with Contract Document requirements, regardless of whether the original test was the Construction Manager's responsibility.
1. Cost of retesting construction revised or replaced by the Construction Manager is the Construction Manager's responsibility, where required tests were performed on original construction.
2. The Construction Manager is responsible for costs of testing due to changes made or proposed by the Construction Manager.
3. Associated Services: The Construction Manager shall cooperate with agencies performing required inspections, tests and similar services and provide reasonable auxiliary services as requested. Auxiliary services required include but are not limited to:

a. Providing access to the Work and furnishing incidental labor and facilities necessary to facilitate inspections and tests.

b. Taking representative samples of materials that require testing or assisting the agency in taking samples.
c. Providing facilities for storage and curing of test samples maintained according to ACI standards (or other industry standard as required), and delivery of samples to testing laboratories.
d. Security and protection of samples and test equipment at the Project site.

4. Duties of the Testing Agency: The independent testing agency engaged to perform inspections, sampling and testing of materials and construction specified in individual Specification Sections shall cooperate with the Owner, Architect and Construction Manager in performance of its duties, and shall provide qualified personnel to perform required inspections and tests. Testing agency shall evaluate the adequacy of Construction Manager's Quality Control Procedures.

a. The agency shall notify the Architect and Construction Manager promptly of irregularities or deficiencies observed in the Work during performance of its services.
b. The agency shall attend construction progress meeting as requested by the Owner or Architect.
c. The agency is not authorized to release, revoke, alter or enlarge requirements of the Contract Documents, or approve or accept any portion of the Work.
d. The agency shall not perform any duties of the Construction Manager.

5. Coordination: The Construction Manager and each agency engaged to perform inspections, tests and similar services shall coordinate the sequence of activities to accommodate required services with a minimum of delay. In addition to the Construction Manager, each agency shall coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.

a. The Construction Manager is responsible for scheduling times for inspections, tests, taking samples and similar activities. Construction Manager shall give agency at least 48 hours notice of time when Work requiring testing will be performed.
b. Provide agency with preliminary concrete design mix proposed for use and other material mixes which require quality control testing.
c. Furnish copies of manufacturer's test reports of products as required.
d. Inspect Work prior to independent agency inspection.
e. Make arrangements with agency and pay for additional samples, tests and inspections required when initial tests indicate Work does not conform to Contract Documents.

1.4 CONFLICTING REQUIREMENTS

A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties

and requirements that are different, but apparently equal, to Owner for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Owner for a decision before proceeding.

1.5 SUBMITTALS

A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

B. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification Section number and title.
2. Description of test and inspection.
3. Identification of applicable standards.
4. Identification of test and inspection methods.
5. Number of tests and inspections required.
6. Time schedule or time span for tests and inspections.
7. Entity responsible for performing tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

C. Reports: Prepare and submit certified written reports that include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and re-inspecting.

D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records,

and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.6 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

C. 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.

D. 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.

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 to those indicated for this Project in material, design, and extent.

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

1. Requirement for specialists shall not supersede building codes and regulations governing the Work.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to in-

spect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
2. Notify Owner seven days in advance of dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Owner's approval of mockups before starting work, fabrication, or construction.
5. Allow seven days for initial review and each re-review of each mockup.
6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
7. Demolish and remove mockups when directed, unless otherwise indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. 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 Owner.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Owner's reference during normal working hours.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
2. Comply with the Contract Document requirements for Division 1 Section "Cutting and Patching."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Construction Manager's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 4000

SECTION 01 4150 - AIR BARRIER SYSTEM QUALITY CONTROL TESTING REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Administrative and procedural requirements for providing an airtight building enclosure that controls infiltration or exfiltration of air.
2. Requirements for testing of building air tightness.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):
1. ASTM E779-19: Standard Test Method for Determining Air Leakage Rate by Fan Pressurization.
2. ASTM E1827.

1.3 DEFINITIONS

A. Air Barrier System:
1. An air barrier system is a continuous assembly of interconnected components within the exterior enclosure of a building which prevents air flow across the assembly, caused by air pressure differential from one side of the assembly to the other.
2. The air barrier system components of the building will generally consist of the following:
a. Fluid or sheet applied membrane air barrier systems applied over concrete or masonry back up wall or integral with exterior gypsum sheathing.
b. Closed windows and doors.
c. Roof air and vapor barrier membrane.
d. Membranes and seals connecting air barrier system elements.
e. Seals around penetrations in the air barrier system elements.

1.4 SYSTEM DESCRIPTION

A. Provide building enclosure with continuous air barrier systems to control air leakage into or out of the conditioned spaces to meet the specified performance requirements.
B. The air barrier system will have the following characteristics:
1. It must be continuous, with all joints sealed.
2. It must be structurally supported to withstand positive and negative air pressures applied to the building enclosure.
3. Connection will be made between:
a. Foundation and walls.
b. Wall air barrier system assemblies and windows or door assemblies.
c. Different wall systems as required.
d. Roof air & vapor barrier.
e. Wall, floor, and roof assemblies at construction, control and expansion joints.
f. Wall, floor, and roof air barrier system assemblies to utility, pipe and duct penetrations.
4. Air Barrier Penetrations: All penetrations of the air barrier and paths of air infiltration / exfiltration will be sealed.

1.5 PERFORMANCE REQUIREMENTS

A. The complete building shall be tested and the air leakage rate of the building envelope shall not exceed 0.17 cfm/ft2 under a pressure differential of 0.3 inches water gauge 1.27 L/s x m2 at 75 Pa when tested in accordance with ASTM E 779 or an equivalent method approved by the code official.
   1. Use smoke tracer to locate source of air leakage.
   2. Comply with SEC C406.11 Reduced Air Infiltration.

1.6 SUBMITTALS

A. Make submittals in accordance with Section 01 3300 - Submittal Procedures.
B. Assigned Staff: Submit the name of the staff members assigned to verify the air barrier systems and description of past work experience which qualifies them for the specified duties.

1.7 QUALITY ASSURANCE

A. Air Barrier System Pre-Installation Conference:
   1. Administer a pre-installation conference .
   2. Attendees: Architect, Envelope Consultant, Contractor, and all subcontractors installing air barrier system elements, including the following:
      a. Air barrier application and weather resistive air barrier subcontractor,
      b. Sealant subcontractor.
      c. Roofing subcontractors.
      d. Flashing and sheet metal subcontractor.
      e. Window and door installers
      f. Envelope consultant.
   3. Discuss air barrier system components and sequence of installation.
   4. Discuss all joints and penetrations and proposed methods for sealing.
   5. Identify and discuss all special conditions.
   6. Discuss exterior Mockups.
   7. Discuss where each trade begins and ends and the responsibility and sequence of installation of all the air-tight joints, junctures, and transitions between materials, products and assemblies of products specified in the different sections, to be installed by the different trades.
   8. Discuss testing requirements, including potential for testing in limited portions of the building.
B. Assigned Contractor Staff: Assign a staff member, and at least one alternate, to be responsible for verifying that air barrier system components have been properly installed and that the area is ready for cover. Selected staff members will have had experience in envelope construction.
C. Mock Ups: Where Mockups are required for exterior envelope components, incorporate Mockups of air barrier systems to verify an air tight seal.
D. On site Inspection:
   1. The air barrier system is subject to inspection by the Project Envelope Consultant.
   2. Provide a minimum of 48 hours notice prior to covering any air barrier system assembly.

1.8 CONTRACTOR RESPONSIBILITIES

A. Coordinate and sequence the Work as necessary to ensure the final continuity of the air barrier system, including joints, junctures and transitions between materials and assemblies of materials and products, from substructure to walls to roof.

B. Provide quality assurance procedures and verifications as specified here inches
C. Ensure the following:
   1. The air barrier system is continuous without gaps or holes.
   2. Air barrier system membranes are structurally supported to withstand design air pressures.
   3. Site conditions have been maintained for the application of air barrier system materials.
   4. Surfaces to receive membranes have been properly cleaned and primed.
   5. Laps in self-adhered membranes are 2 minimum, lapped to weather (or mastic sealed on exposed edges), with no fish-mouths.
   6. Self-adhered and liquid applied membranes are properly bonded.
   7. Thickness of liquid-applied materials meet manufacturer's specifications.
   8. Installation of the weather resistive air barrier system be installed per manufacture's installation instructions and per Drawings.
D. Associated Services:
   1. Cooperate with agencies performing required inspections, tests, and similar services, and provide auxiliary services as requested.
   2. Provide access to the Work.
   3. Furnish temporary construction and incidental labor and facilities necessary to support inspection and testing operations.
   4. Provide security and protection of assemblies and test equipment at the Project Site.
E. Coordination:
   1. Coordinate the sequence of activities to accommodate required services with a minimum of delay.
   2. Coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.
   3. Schedule times for inspections, tests, sample taking, and similar activities.
F. If testing shows that the building does not meet the specified overall building envelope air barrier system performance requirements, perform repair and reconstruction of the envelope assemblies as necessary to meet the specified performance requirements as approved by the Architect. Additional tests required to verify performance after repair and reconstruction will be paid for by the Contractor without additional charge to the Owner.

1.9 FIELD TESTING
A. The Owner may will hire an independent testing agency to perform testing to verify that the building meets the specified air barrier system performance requirements.
B. Qualifications for Air Barrier System Testing Agency: Independent air barrier system testing agency that specializes in and has the equipment for the types of air barrier system tests to be performed.
C. The testing laboratory will be authorized to perform the following:
   1. Submit a certified written report to the Architect, Owner's Representative, Envelope Consultant, and the Contractor after each testing operation.
   2. Written reports may include, without limitation, the following:
      a. Date of issue.
      b. Project title and number.
      c. Name, address, and telephone number of testing agency.
      d. Dates and locations of samples and tests or inspections.
      e. Names of individuals making the inspection or test.
      f. Designation of the Work and test method.

g. Identification of product and Specification Section.
h. Complete inspection or test data shall include the tested surface area, floor area, air by volume, stories above grade, and leakage rates.
i. Test results and an interpretation of test results.
j. Ambient conditions at the time of sample taking and testing.
k. Comments or professional opinion on whether inspected or tested Work complies with Contract Document requirements.
l. Name and signature of laboratory inspector.
m. Recommendations on retesting.

3. Duties of Testing and Inspection Agency:
a. Provide qualified personnel to perform required inspections and tests.
b. Coordinate with the Contractor as necessary to develop an effective air barrier system testing program for the Project.
c. Notify the Architect and the Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
d. The agency is not authorized to release, revoke, alter, or enlarge requirements of the Contract Documents or approve or accept any portion of the Work.
e. The agency may not perform any duties of the Contractor.

D. Full Envelope Testing:
1. Testing agency will test the completed building envelope air barrier system in accordance with the requirements of ASTM E779.
2. Provide all equipment and construction as necessary to perform the tests.
3. Make corrections and repairs to the building envelope and retest in accordance with the requirements of ASTM E779 until the building envelope meets the performance requirements specified.

1.10 REPAIR AND PROTECTION
A. Upon completion of testing operations, repair damaged construction and restore substrates and finishes. Comply with requirements for Cutting and Patching described in Division One.
B. Protect construction exposed by or for quality-control service activities, and protect repaired construction.
C. Repair and protection is the Contractor's responsibility.

PART 2 - PRODUCTS

2.1 AIR LEAKAGE SEALANT
A. Waterborne acrylic sealant, used as needed to reduce air leakage to meet performance requirements.
1. Basis of Design: Provide Aerobarrier by Aeroseal Inc. or accepted equal:
a. Green Guard Gold certified.

PART 3 - EXECUTION

3.1 REPAIR
A. Install Air Leakage Sealant according to manufacturer's published installation instructions where failure occurs.

END OF SECTION 01 4150

SECTION 01 4200 - REFERENCES

PART 1 - GENERAL

1.1 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.

1.2 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.

1.3 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in 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 shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.

C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up to date as of the date of the Contract Documents.

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 4200

SECTION 01 4339 - MOCKUPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Integrated exterior mockups.

1.2 ALLOWANCES

1.3 DEFINITIONS

A. Integrated Exterior Mockups: Mockups of the exterior envelope constructed on-site as part of permanent construction, consisting of multiple products, assemblies, and subassemblies.
B. Preconstruction Laboratory Mockups: Integrated exterior mockups constructed at testing facility to verify performance characteristics.
C. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes; doors; windows; millwork; casework; specialties; furnishings and equipment; and lighting as indicated.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Meet with Owner, Construction Manager, Architect, testing and inspecting agency representative, and installers of major systems whose Work is included in integrated exterior mockups.
   2. Review coordination of equipment and furnishings provided by the Owner for room mockups.
   3. Review locations and extent of mockups.
   4. Review testing procedures to be performed on mockups.
   5. Review and finalize schedule for mockups, and verify availability of materials, personnel, equipment, and facilities needed to complete mockups and testing and maintain schedule for the Work.

1.5 ACTION SUBMITTALS

A. Shop Drawings: For integrated exterior mockups.
   1. Include plans, elevations, sections, and mounting and support details.
   2. Indicate manufacturer and model number of individual components, subassemblies, and assemblies.
   3. Include site location drawing[indicating orientation of mockup].
   4. Revise and resubmit Shop Drawings to reflect approved modifications in details and component interfaces resulting from changes made during testing procedures.
B. Delegated Design Submittal: For temporary structural supports for mockups not attached to building structure, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.
B. Preconstruction Test Reports: For integrated exterior mockups.

1.7 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified in accordance with ASTM E699 for testing indicated and acceptable to Owner and Architect.

B. Build mockups to do the following:
   1. Verify selections made under Sample submittals.
   2. Demonstrate aesthetic effects.
   3. Demonstrate the qualities of products and workmanship.
   4. Demonstrate acceptable coordination between components and systems.
   5. Perform preconstruction testing, such as window air- and water-leakage testing.

C. Fabrication: Before fabricating or installing portions of the Work requiring mockups, build mockups for each form of construction and finish required. Use materials and installation methods as required for the 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. Employ supervisory personnel who will oversee mockup construction. Employ workers who will be employed to perform same tasks during the construction at Project.
   4. Demonstrate the proposed range of aesthetic effects and workmanship.
   5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.

D. Notifications:
   1. Notify Architect and Construction Manager seven days in advance of the dates and times when mockups will be constructed.
   2. Notify Architect and Construction Manager 14 days in advance of the dates and times when mockups will be tested.
   3. Allow seven days for initial review and each re-review of each mockup.

E. Approval: Obtain Architect's and Construction Manager's approval of mockups before starting fabrication or construction of corresponding Work.
   1. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
   2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 COORDINATION

A. Coordinate schedule for construction of mockups, so construction, testing, and review of mockups do not impact Project schedule.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 4000 "Quality Requirements," to design support structure for free-standing mockups.

B. Structural Performance:
   1. Seismic Performance: Mockups and support structure to withstand the effects of earthquake motions determined in accordance with ASCE/SEI 7.

2. Wind Loads: As indicated on Drawings.

C. Mockup Testing Performance Requirements: Perform tests using design pressures and performance criteria indicated for assemblies and products that are specified in other Sections and incorporated into integrated exterior mockups.

2.2 INTEGRATED EXTERIOR MOCKUPS

A. Construct integrated exterior mockups according to approved mockup Shop Drawings. Construct mockups to demonstrate constructability, coordination of trades, and sequencing of Work; and to ensure materials, components, subassemblies, assemblies, and interfaces integrate into a system complying with indicated performance and aesthetic requirements.

B. Build integrated exterior mockups using installers and construction methods that will be used in completed construction.

C. Use specified products that have been approved by Architect. Coordinate installation of materials and products specified in individual Specification Sections that include Work included in integrated exterior mockups.

D. The Work of integrated exterior mockups includes, but is not limited to, the following:
1. Cold-formed metal framing and sheathing.
2. Air and weather barriers.
3. Thermal insulation.
4. Through-wall flashing.
5. Flashing and sheet metal trim.
6. Joint sealants.
7. Metal wall panels.
8. Aluminum-framed entrances and storefront.
9. Glazed curtain walls.
10. Glazing.

E. Photographic Documentation: Document construction of integrated exterior mockups with photographs in accordance with Section 01 3233 "Photographic Documentation." Provide photographs showing details of interface of different materials and assemblies.
1. Document testing procedures, including water leakage and other deficiencies. Photograph modifications to component interfaces intended to correct deficiencies.

F. Provide and document modifications to construction details and interfaces between components and systems required to properly sequence the Work, or to pass performance testing requirements. Obtain Architect's approval for modifications.

G. Retain approved mockups constructed in place. Incorporate fully into the Work.

PART 3 - EXECUTION

3.1 TESTING OF INTEGRATED EXTERIOR MOCKUPS

A. Integrated Exterior Mockup Testing Services: Perform the following tests in the following order:
1. Water-Spray Test: Before installation of interior finishes has begun, test areas designated by Architect in accordance with AAMA 501.2 for evidence of water penetration.
a. Perform a minimum of two tests in areas as directed by Architect.
2. Water Penetration: Test in accordance with ASTM E1105 at a minimum cyclic static-air-pressure differential of 0.67 times the static-air-pressure differential specified for laboratory testing in "Mockup Testing Performance Requirements"

Paragraph in "Performance Requirements" Article, but not less than 6.24 lbf/sq. ft. (300 Pa), and verify no evidence of water penetration.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and installations, including connections, and also to observe testing as specified in specific systems and assemblies sections.

C. Integrated exterior mockup will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

3.2 TESTING OF PRECONSTRUCTION LABORATORY MOCKUPS

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

1. Testing and inspecting agency will interpret tests and state in each report whether tested Work complies with or deviates from requirements.

B. Testing Criteria: Where the following tests are indicated, use criteria indicated.

1. Air Leakage in Accordance with ASTM E283: Static-air-pressure differential of 1.57 lbf/sq. ft. (75 Pa).
2. Water Penetration in Accordance with ASTM E331: Minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 15 lbf/sq. ft. (720 Pa).

C. Unlock, open, and relock operable windows and doors five times. Perform necessary hardware adjustments, if any, and repeat cycling.

D. Preconstruction Laboratory Mockup Testing: Perform the following tests in the following order.

1. Structural, 50 Percent: ASTM E330/E330M at 50 percent of positive test load for not less than 10 seconds.
2. Air Leakage: ASTM E283.
3. Water Penetration under Static Pressure: ASTM E331.
4. Thermal Cycling: AAMA 501.5. Repeat the following:
   a. Air Leakage: ASTM E283.
   b. Water Penetration under Static Pressure: ASTM E331.
5. Structural, 100 Percent: ASTM E330/E330M at 100 percent of positive and negative test loads for not less than [**10**] <**Insert number**> seconds. Repeat the following:
   a. Air Leakage: ASTM E283.
   b. Water Penetration under Static Pressure: ASTM E331.
   c. Water Penetration under Dynamic Pressure: AAMA 501.1.
6. Structural, 150 Percent: ASTM E330/E330M at 150 percent of positive and negative test loads for not less than 10 seconds.
7. Interstory Drift: AAMA 501.4 at 150 percent of design displacement.

E. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and installations, including connections, and also to observe testing for the following systems and assemblies.

F. Preconstruction laboratory mockup will be considered defective if it does not pass tests and inspections.

G. Prepare test and inspection reports.

END OF SECTION 01 4339

SECTION 01 5000 - TEMPORARY FACILITIES

PART 1 – GENERAL

1.1 SUMMARY

A. This Section specifies requirements for temporary services and facilities, including utilities, construction and support facilities, security, and protection.

1. Temporary utilities required include but are not limited to:

   a. Potable water service and distribution.
   b. Temporary electric power and light.
   c. Temporary ventilation (for dust, vapor, or fume control, and for humidity or temperature control).
   d. Temporary heating equipment and energy source.
   e. Temporary cooling and humidity control equipment and energy source.
   f. Temporary Voice/Data service. Separate Voice/Data lines are required for the Construction Manager and the University site representative field offices to allow simultaneous use of voice, fax, and electronic mail capabilities.

2. Temporary construction and support facilities required include but are not limited to:

   a. Field offices and storage containers,
   b. Toilet and wash facilities,
   c. Drinking water,
   d. Dewatering facilities and drains,
   e. Temporary enclosures,
   f. Lifts and hoists,
   g. Installation of University's project sign,
   h. Waste disposal services,
   i. Construction aids and miscellaneous services and facilities.

3. Security and protection facilities required include but are not limited to:

   a. Temporary fire protection.
   b. Barricades, warning signs, lights.
   c. Environmental protection.

1.2 SUBMITTALS

A. Site plan for construction Fence designed in compliance with Part 3 Article Temporary Construction and Support Facilities Installation, below. Include layout showing entire construction site and access roads; include openings and construction details. Obtain University approval prior to installation.

B. Computer hardware and software product data to satisfy the requirement for electronic communication, data, and text processing capability as stipulated in this section.

1.3 QUALITY ASSURANCE

A. Regulations: Comply with University Standards, industry standards, applicable laws, regulations, and direction of authorities having jurisdiction, including but not limited to:

1. Building Code requirements;
2. Health and safety regulations;
3. University Design & Construction Standards;
4. UMBC Facilities Management requirements;
5. Utility company requirements;
6. Police, Fire Department, Fire Marshal, and Rescue Squad requirements;
7. Maryland Department of the Environment (MDE)
8. Environmental Protection Agency (EPA)

B. Standards:

1. Comply with NFPA Code 241, "Building Construction and Demolition Operations", ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition", and NECA Electrical Design Library, "Temporary Electrical Facilities."
2. Refer to "Guidelines for Bid Conditions for Temporary Job Utilities and Services", prepared jointly by AGC and ASC, for industry recommendations.
3. Electrical Service: Comply with NEMA, NECA and UL standards and regulations for temporary electric service. Install service in compliance with National Electric Code (NFPA 70).

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

1.4 PROJECT CONDITIONS

A. Temporary Utilities: Submit a schedule indicating dates for start and termination of each temporary utility to the Architect and University. Provide updates monthly.

B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities, or permit them to interfere with progress. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist on the site.

C. Parking: Construction Manager may use space within the construction fence for parking of up to eight vehicles belonging to construction personnel. No other

spaces will be provided on the campus, and Construction Manager Personnel shall park off campus or in paid parking on campus.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide new materials. If acceptable to the Architect, undamaged previously used materials in serviceable condition may be used. Provide materials suitable for the use intended.

B. Lumber and Plywood:

1. For job-built temporary offices or shops within the construction area, provide UL labeled, fire treated lumber and plywood for framing, sheathing and siding.
2. For safety barriers and similar uses, provide minimum 5/8" thick exterior plywood.

C. Open-Mesh Fencing: Provide 11-gage, galvanized 2-inch, chain link fabric fencing 6-feet high with galvanized steel pipe posts, 1-1/2" I.D. For line posts and 2-1/2" I.D. For corner posts.

D. Water: Provide potable water approved by local health authorities.

2.2 EQUIPMENT

A. General: Provide new equipment. If acceptable to the Architect, undamaged, previously used equipment in serviceable condition may be used. Provide equipment suitable for use intended.

B. Water Hoses: Provide 3/4" heavy-duty, abrasion-resistant, flexible rubber hoses 100 ft. Long, with pressure rating greater than the maximum pressure of the water distribution system; provide adjustable shut-off nozzles at hose discharge.

C. Electrical Outlets: Provide properly configured NEMA polarized outlets to prevent insertion of 110-120 volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button and pilot light, for connection of power tools and equipment.

D. Electrical Power Cords: Provide grounded extension cords; use "hard-service" cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords, if single lengths will not reach areas where construction activities are in progress.

E. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered glass enclosures, where exposed to breakage. Provide exterior fixtures where exposed to moisture.

F. Heating Units: Provide temporary heating units that have been tested and labeled by UL, FM or another recognized trade association related to the type of fuel being consumed.

G. Temporary Toilet Units: Provide self-contained single-occupant chemical toilet units, properly vented and fully enclosed with a glass fiber reinforced polyester shell or similar nonabsorbent material.

H. First Aid Supplies: Comply with governing regulations.

I. Fire Extinguishers: Provide hand-carried, portable UL-rated, class "A" fire extinguishers for temporary offices and similar spaces.

1. In other locations provide hand-carried, portable, UL-rated, class "ABC" dry chemical extinguishers, or a combination of extinguishers of NFPA recommended classes for the exposures.
2. Comply with NFPA 10 and 241 for classification, extinguishing agent and size required by location and class of fire exposure.

PART 3 - NOT USED

END OF SECTION 01 5000

SECTION 01 5639 - TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes general protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.

B. Related Requirements:

1. Section 31 1000 "Site Clearing" for erosion and sediment control requirements, surface marking of existing utilities, removing existing trees, shrubs and vegetation.

2. Section 31 2000 “Earth Moving” for excavation, backfilling, and compaction requirements in adjoining construction areas.

3. Section 32 9113 “Soil Preparation” for Planting Mix requirements.

1.3 DEFINITIONS

A. ANSI: American National Standards Institute.

B. ASCA: American Society of Consulting Arborists.

C. ASTM: American Society for Testing and Materials International.

D. Arborist: A licensed or certified professional experienced in the cultivation, management, and horticultural practices necessary to promote the health and safety of trees, shrubs, and woody plants.

E. Caliper (DBH): Diameter at breast height. Diameter of a trunk as measured by a diameter tape at a height fifty-four (54) inches above the ground line.

F. DNR: Maryland Department of Natural Resources.

G. ISA: International Society of Arboriculture.

H. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction as indicated.

I. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction as indicated.

J. Tree Service Firm: A professional tree service firm operating in the State of Maryland as a “Licensed Tree Expert” as noted in Maryland DNR’s current Forest Service “Tree Expert List”.

The tree service firm shall employ a full-time Arborist licensed in the State of Maryland, and shall have at least 10-years' of successful experience performing these services.

K. Vegetation: Trees, shrubs, groundcovers, grass, and other woody and herbaceous plants.

1.4 PRE-INSTALLATION MEETING

A. Pre-installation Conference: Conduct conference at Project site.

1. Review methods and procedures related to temporary tree and plant protection including, but not limited to, the following:

a. Tree-service firm's personnel and equipment required to make progress and avoid delays in the Work.
b. Arborist's responsibilities.
c. Quality-control program.
d. Coordination of site clearing operations and equipment movement adjacent to plant protection-zone locations.
e. Trenching by hand or with air spade within protection zones.
f. Extent of root and crown pruning.
g. Field quality control.

2. Submit Meeting Notes to Landscape Architect and Owner's Representative from Pre-Installation Conference.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:

1. Include plans, elevations, sections, and locations of protection-zone fencing, signage, and gates. Show relationship of equipment-movement routes and material storage locations in relation to plant protection-zones.

2. Detail fabrication and assembly of protection-zone fencing, gates, and signage.

3. Indicate extent of trenching by hand or with air spade within protection zones.

C. Samples: For each type of the following:

1. Shredded Hardwood Mulch: One (1) quart volume of shredded hardwood mulch, in sealed plastic bag labeled with composition of materials by percentage of weight and source of mulch.

2. Protection-Zone Signage: One (1) full-size sample of each required, showing size and text, ready for installation.

D. Protection-Zone Fencing Mockups:

1. Install at least one (1) fully assembled mockup panel for each type of protection-zone fencing. Mockup panel may be incorporated into the Work if approved by the Landscape Architect or Owner's Representative.

E. Tree Branch, Root, and Crown Pruning Schedule: Submit written schedule that details the scope and extent of pruning for trees to remain that interfere with or are affected by construction.

1. Species and size of tree.

2. Location on site plan. Include unique identifier for each.

3. Reason for pruning.

4. Description of pruning to be performed.

5. Description of maintenance following pruning.

F. Written Certification from Arborist: Certifying that trees have been protected during construction in accordance with referenced standards, and that trees were promptly and properly treated and repaired when damaged.

G. Written Maintenance Recommendations: From Arborist, for care and protection of trees affected by construction during and after completion of the Work.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Arborist and Tree Service firm.

B. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.

1. Submit sufficiently detailed digital photographs or video recordings to document conditions of existing specimen trees and plant material to remain.

2. Include diagrams with notations to indicate specific wounds and damage conditions of each tree or other plants to remain.

C. Quality-control program from Arborist and Tree Service firm.

1.7 QUALITY ASSURANCE

A. American National Standards Institute (ANSI): Referenced standards and publications.

B. American Society for Testing and Materials International (ASTM): Referenced standards and publications.

C. Arborist Qualifications: Certified Arborist as certified by ISA, Certified Arborist-Municipal Specialist as certified by ISA, Licensed Arborist in the State of Maryland, or Registered Consulting Arborist as designated by ASCA.

D. Tree Service Firm Qualifications: An experienced tree service firm that has successfully completed temporary tree and plant protection work similar to that required for this Project and will assign an experienced, qualified Arborist to Project site during execution of the Work.

E. Quality-Control Program: Prepare and submit a written program to demonstrate systematically the ability of personnel to properly follow procedures and handle materials and equipment during the Work without damaging trees and plantings.

1. Include Arborist's and Tree Service firm's responsibilities.

2. Include dimensioned diagrams for proposed placement of protection-zone fencing, gates and signage,

3. Instructions given to workers on the use and care of protection zones, and enforcement of requirements for protection zones.

1.8 FIELD CONDITIONS

A. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, and excavated material.

2. Moving or parking vehicles or equipment.

3. Foot traffic.

4. Erection of sheds or structures.

5. Impoundment of water.

6. Excavation and proposed disturbances, unless otherwise indicated or prior written permission is provided by the Arborist and Landscape Architect.

7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

B. Do not direct vehicle or equipment exhaust toward protection zones.

C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Planting Mix for Adjusting Grades: Satisfactory stockpiled on-site topsoil mixed with prepared Planting Mix (refer to Section 32 9113 “Soil Preparation” for Planting Mix requirements), having satisfactory moisture content and granular texture for installing around trees and plants.

1. Planting Mix shall be free of stones, roots, plants, sod, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and all other extraneous materials harmful to plant growth.

B. Shredded Hardwood Mulch: Free from deleterious materials and suitable as a top dressing for trees and shrubs, consisting of the following:

1. Type: Shredded hardwood bark and wood chips, aged.

2. Size Range: Three (3) inches maximum length, one-half (1/2) inch minimum length, one (1) inch maximum diameter.

UMBC SHERMAN HALL RENEWAL
50% CONSTRUCTION DOCUMENTS SUBMISSION 24 February 2023
UMBC Project: 21-116; UMB Project: 22-323 EYP; A Page Company

3. Color: Natural, dark brown.

C. Protection-Zone Fencing: Fencing shall be installed in temporary positions indicated and meeting the following requirements.

1. Plastic Mesh Protection-Zone Fencing: Plastic construction fencing constructed of high-density extruded and stretched polyethylene 'Blaze Orange' mesh fabric with 2-inch maximum opening in pattern, weighing a minimum of 0.4 lb./ft. Fencing shall remain flexible from minus 60 to plus 200 deg F, inert to most chemicals and acids, minimum tensile yield strength of 2000 psi, and ultimate tensile strength of 2680 psi. Secure to posts with plastic bands or galvanized-steel wire ties.

a. Anchor Posts: Minimum 2-inch diameter galvanized steel 'U' channel or 'T' posts. Minimum length: 6 feet, or as indicated.
b. Hardware: Provide hardware as required for mounting rail cross-braces to top of posts and hinges to mount gates on posts.
c. Top Rail Cross-Braces: #2, Ground-Contact, Pressure-treated 2"x 4" lumber; Lengths as required.
d. Fence Height: As indicated.
e. Wire 'U' Staples: Minimum 8" long or as indicated, to secure plastic mesh into the ground.
f. High Visibility Flagging: As indicated and noted.

2. Gates to allow access for maintenance activities within plant protection-zones, if indicated: Pressure-treated wood, single or double leaf swing, sizes as indicated. Access gate fabric shall match the material and appearance of fencing fabric. .

D. Protection-Zone Signage: Shop-fabricated, rigid plastic or metal sheet with attachment holes pre-punched and reinforced; legibly printed with nonfading lettering in accordance with local regulations, and as follows:

1. Size and Text Height: As indicated.

2. Lettering: 3-inch- high, black characters on white background.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Erosion and Sediment Control Devices and Measures: Examine the site to verify that temporary erosion and sediment control devices and measures are in place.

1. Meet on-site with the Arborist and Grading/Sediment Control Inspector to resolve potential conflicts, and to make minor adjustment of devices and measures with the Inspector's approval in the field.

2. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

B. Prepare written report from Arborist to Landscape Architect listing conditions detrimental to tree and plant protection. Provide written recommendations for proposed corrective action.

UMBC SHERMAN HALL RENEWAL
50% CONSTRUCTION DOCUMENTS SUBMISSION 24 February 2023
UMBC Project: 21-116; UMB Project: 22-323 EYP; A Page Company
UMBC Project: 21-116; UMB Project: 22-323 SITE RESOURCES INC.

3.2 PREPARATION

A. Locate and clearly identify trees, shrubs and shrub beds, and all other designated vegetation to remain with sequential numbering and labeled as such on a copy of the applicable Existing Conditions & Demolition Plan. Submit the marked-up Drawing to the Landscape Architect and Architect for review and approval.

1. For trees to remain, label and tie a 1-inch blue vinyl tape around each tree trunk at fifty-four (54) inches above the ground.

B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

C. Tree-Protection Zones: Mulch areas inside tree-protection zones and other areas indicated. Do not exceed indicated thickness of mulch.

1. Apply 4-inch uniform thickness of shredded hardwood mulch unless otherwise indicated. Do not place mulch within six (6) inches of tree trunks.

3.3 PLANT PROTECTION-ZONES

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

1. Plastic Mesh Protection-Zone Fencing: Install as indicated and noted.

a. Posts: Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing paving or concrete to remain, provide appropriate means of post support acceptable to Landscape Architect and Owner's Representative.
b. Access Gates, if indicated: Install where indicated; adjust to operate smoothly, easily, and quietly; free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.

B. Plant Protection-Zone Signage: Install protection-zone signage in visibly prominent locations in a manner approved by Landscape Architect. Install one sign spaced approximately every twenty (20) feet on protection-zone fencing, but no fewer than four (4) signs with each facing a different direction.

C. Maintain protection-zone free of weeds and trash, fencing and signage in good condition as acceptable to Landscape Architect. Remove when construction operations are complete and equipment has been removed from the site.

1. Do not remove protection-zone fencing, even temporarily, to allow deliveries or equipment access through the protection zone.

2. Temporary access might be allowed, subject to preapproval in writing by Arborist, if recommended root buffer protection to avoid soil compaction is installed as directed by Arborist. Maintain root buffer as long as temporary access is allowed.

3.4 EXCAVATION

A. General: Excavate at edge of protection zones where indicated adjacent to protection zones according to requirements in Section 31 2000 "Earth Moving".

B. Trenching within Protection Zones: With Arborist and Landscape Architect's advance written permission, where utility trenches are required within Plant Protection-Zones, excavate under or around tree roots by hand or with air spade, tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. With Arborist's approval, cut roots as required for root pruning. If excavating by hand, use narrow-tine spading forks to comb soil and expose roots.

C. Redirect roots in backfill areas where possible. If encountering large, main lateral roots, with Arborist's direction expose roots beyond excavation limits as required to bend and redirect them without breaking. If encountered immediately adjacent to location of new construction, and redirection is not practical, cut roots approximately three (3) inches back from new construction and as required for root pruning.

D. Do not allow exposed roots to dry out before backfilling with Planting Mix. With Arborist's approval, install temporary earth cover or pack using peat moss and wrap with burlap. Water as required to maintain in a satisfactory moist condition. Install temporary support and protect roots from damage until they are permanently relocated and covered with Planting Mix.

3.5 ROOT PRUNING

A. Prune tree roots that are affected by temporary and permanent construction. Prune roots as directed by Arborist and in accordance with ANSI Standard A300, Part 8, as amended to date and as follows:

1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.

2. Cut Ends: Do not paint cut root ends.

3. Temporarily support and protect roots from damage until they are permanently redirected and covered with Planting Mix.

4. Cover exposed roots with burlap and water regularly.

5. Backfill as soon as possible as directed by Arborist.

B. Root Pruning at Edge of Plant Protection-Zones: Prune tree roots six (6) inches inside of the protection zone by cleanly cutting all roots to the depth of the required excavation.

C. Root Pruning within Plant Protection-Zones: Clear and excavate by hand or with air spade to the depth of the required excavation to minimize damage to tree root systems as directed by Arborist. If excavating by hand, use narrow-tine spading forks to comb soil to expose roots. Cleanly cut roots as close to excavation as possible.

UMBC SHERMAN HALL RENEWAL
50% CONSTRUCTION DOCUMENTS SUBMISSION 24 February 2023
UMBC Project: 21-116; UMB Project: 22-323 EYP; A Page Company
UMBC Project: 21-116; UMB Project: 22-323 SITE RESOURCES INC.

3.6 CROWN PRUNING

A. Prune branches that are affected by temporary and permanent construction. Prune branches as directed by Landscape Architect and Arborist.

1. Prune to remove only injured, broken, dying, or dead branches and do not prune for shape unless directed by Landscape Architect.

2. Do not remove or reduce living branches to compensate for root loss caused by damaging or cutting root system.

3. Pruning Standards: Prune trees according to ANSI A300 (Part 1) as amended to date.

a. Type of Pruning: Cleaning, raising, reducing, and thinning as directed by Landscape Architect and Arborist.

B. Unless directed by Landscape Architect and Arborist, do not cut tree leaders.

C. Cut branches with sharp pruning instruments; do not break or chop.

D. Do not paint or apply sealants to wounds.

E. Provide subsequent maintenance pruning during the Project Warranty period as recommended by Arborist.

F. Chip removed branches and dispose of off-site.

3.7 REGRADING

A. Lowering Grade beyond Plant Protection-Zones: Where proposed finish grades are indicated to be lower than existing grade beyond the Plant Protection-Zone, provide satisfactory slope and grade transition as directed by Arborist and Landscape Architect. Maintain existing grades within the Plant Protection-Zone.

B. Lowering Grade within a Plant Protection-Zone: Where proposed finish grade is indicated to be lower than existing grade around existing trees and vegetation, install Planting Mix and other measures indicated. Provide satisfactory slope and grade a transition away from existing trees and vegetation as directed by Landscape Architect and Arborist.

1. Root Pruning: Prune tree roots exposed by lowering the grade.

2. Do not cut main lateral roots or taproots; cut only smaller roots. Cut roots as directed for root pruning.

C. Raising Grade within a Plant Protection-Zone: Where proposed finish grade is indicated to be higher than existing grade around existing trees and vegetation, install Planting Mix and other measures as indicated. Provide satisfactory slope and grade a transition within and beyond the Plant Protection-Zone as directed by Arborist and Landscape Architect.

D. Minor Fill within Plant Protection-Zones: Where existing grade is two (2) inches or less below proposed finish grade elevations, fill with Planting Mix as indicated. Place Planting Mix in a single layer, hand grade and lightly compact to designated proposed s finish grade elevations.

3.8 FIELD QUALITY CONTROL

A. Inspections: Engage a qualified Arborist to direct plant-protection measures, root and crown pruning, and other necessary Work for trees, shrubs, and other vegetation to remain in a healthy condition.

1. Prepare and submit inspection reports to the Landscape Architect and Owner's Representative.

3.9 REPAIR AND REPLACEMENT

A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain, or be relocated, that are damaged by construction operations, as directed by Arborist and Landscape Architect.

1. Submit details of proposed pruning and repairs for approval by Arborist and Landscape Architect.

2. Perform repairs of damaged trunks, branches, and roots within twenty-four (24) hours according to Arborist's written instructions.

3. Replace trees and other plants that cannot be repaired and restored to full-growth status, as directed by Landscape Architect.

B. Trees: Remove and replace trees indicated to remain that are more than twenty-five (25) percent dead, or in an unhealthy condition, due to damage during construction operations that Landscape Architect determines are incapable of restoring to normal growth pattern.

1. Small Trees: Provide one (1) new tree of same size and species as those being replaced for each tree that measures four (4) inches or smaller in caliper size.

2. Large Trees: Provide three (3) new trees of 6-inch caliper size for each tree being replaced that measure more than six (6) inches in caliper size.

3. Species: To be selected by Landscape Architect.

4. Plant and maintain replacement trees as specified in Section 329300 "Plants."

C. Soil Aeration: Where directed by Arborist or Landscape Architect, aerate surface soil compacted during construction. Aerate six (6) feet beyond drip line and no closer than 36 inches to tree trunk. Drill 4-inch diameter holes and 18 inches deep at 24 inches on-center. Backfill holes with #57 washed gravel up to finish grade elevations.

3.10 DISPOSAL OF SURPLUS SOIL, TRIMMINGS, MULCH AND WASTE MATERIALS

A. Trimmings: Immediately dispose of branches and limbs removed as the result of crown thinning and selective thinning.

B. Excess Mulch: Rake mulched area within protection zones, being careful not to injure roots. Rake to loosen and remove mulch that exceeds a 4-inch uniform thickness.

C. Remove all excess excavated soil and temporary protection-zone fence at the completion of construction. Dispose of trees removed for replacement, branches and related trimmings, trash, and debris. Legally dispose of materials off of the Owner's property.

END OF SECTION 01 5639

SECTION 01 5721 - INDOOR AIR QUALITY CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Material and handling procedures during manufacture, shipping, and job site storage prior to installation to prevent degradation of indoor air quality.
   2. Construction procedures to promote adequate indoor air quality during and after construction.
   3. Building flush-out after construction and before occupancy.

1.2 PROJECT GOALS

A. Dust and Airborne Particulates: Prevent deposition and accumulation of mold, dust and other particulates in HVAC ducts and equipment.
   1. Pay cost of cleaning required due to failure to protect ducts and equipment from construction dust.

B. Airborne Contaminants: Procedures and products have been specified to minimize indoor air pollutants.
   1. Provide products meeting Specifications.
   2. Avoid construction practices that could result in contamination of installed products leading to indoor air pollution.

C. Protection of Duct interior, Equipment, Housings, and Pipes:
   1. Keep pipe, ductwork, and conduit openings closed with plugs or caps to prevent entrance of contaminants and foreign matter, dirty water, chemical, or mechanical damage from manufacture to delivery, and both before and after installation. Restore damaged or contaminated fixtures, equipment, or apparatus to original conditions or replace at no cost to the Owner.
   2. Protect bright finished shafts, bearing housings, and similar items until in service. No rust will be permitted.
   3. Cover or otherwise suitably protect equipment and materials stored on the job site.

D. Coordinate goal of maintaining high indoor air quality with requirements of Mechanical Division 23.

1.3 REFERENCE STANDARDS

A. ASHRAE Std 129 - Measuring Air-Change Effectiveness; 1997 (Reaffirmed 2002).
B. SMACNA (OCC) - IAQ Guidelines for Occupied Buildings Under Construction; 2007.

1.4 DEFINITIONS

A. Absorptive Materials: Gypsum board, acoustical ceiling tile and panels, carpet and carpet tile, fabrics, fibrous insulation, and other similar products that will absorb moisture.
B. Contaminants: Gases, vapors, regulated pollutants, airborne mold and mildew.
C. Particulates: Dust, dirt, and other airborne solid matter.
D. Wet Work: Concrete, plaster, coatings, and other products that emit water vapor or volatile organic compounds during installation, drying, or curing.

1.5 INFORMATIONAL SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures.

B. Indoor Air Quality Management Plan: Describe in detail measures to be taken to promote adequate indoor air quality upon completion; use SMACNA (OCC) as a guide.
   1. Submit not less than 60 days before enclosure of building.
   2. Identify potential sources of odor and dust.
   3. Identify construction activities likely to produce odor or dust.
   4. Identify areas of Project potentially affected, especially occupied areas.
   5. Evaluate potential problems by severity and describe methods of control.
   6. Describe construction ventilation to be provided, including type and duration of ventilation, use of permanent HVAC systems, types of filters and schedule for replacement of filters.
   7. Describe cleaning and dust control procedures.
   8. Describe coordination with commissioning procedures.
   9. Describe methods by which absorptive materials (installed or stored on site) will be protected from moisture damage during construction and preoccupancy phases.

C. Interior Finishes Installation Schedule: Identify each interior finish that either generates odors, moisture, or vapors or is susceptible to adsorption of odors and vapors, and indicate air handling zone, sequence of application, and curing times.

D. Indoor Air Quality Report: Provide one of the following:
   1. Digital photographs taken during construction and preoccupancy phase to document that moisture protection methods for absorptive materials have been provided.
   2. A narrative describing methods by which absorptive materials were protected from moisture damage during construction and preoccupancy phases.

E. Duct and Terminal Unit Inspection Report.

F. Building Flush-Out Plan: Identify:
   1. Projected dates and duration of flush-out period.
   2. Outdoor air delivery rates.
   3. Indoor temperature and relative humidity goals.
   4. Occupancy patterns if occupancy will occur prior to completion of flush-out.

G. Building Flush-Out Report: Indicate:
   1. Dates of flush-out period.
   2. Outdoor air delivery rates.
   3. Indoor temperature and relative humidity during flush-out period.
   4. Occupancy patterns if occupancy occurred prior to completion of flush-out.

H. Ventilation Effectiveness Test Plan: Identify:
   1. Testing agency qualifications.
   2. Description of test spaces, including locations of air sampling.
   3. Test procedures, in detail; state whether tracer gas decay or step-up will be used.
   4. Test instruments and apparatus; identify tracer gas to be used.
   5. Sampling methods.

I. Ventilation Effectiveness Test Reports: Show:
   1. Include preliminary tests of instruments and apparatus and of test spaces.
   2. Calculation of ventilation effectiveness, E.
   3. Location where each sample was taken, and time.
   4. Test values for each air sample.
   5. HVAC operating conditions.
   6. Other information specified in ASHRAE Std 129.

7. Other conditions or discrepancies that might have influenced results.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Low-VOC Materials: As specified in Sections for specific material requirements.

PART 3 - EXECUTION

3.1 CONSTRUCTION PROCEDURES

A. Prevent absorption of moisture and humidity by absorptive materials by:
   1. Sequencing delivery of such materials so that they are not present in building until wet Work is completed and dry.
   2. Delivery and storage of such materials in fully sealed moisture-impermeable packaging.
   3. Provide sufficient ventilation for drying within reasonable time frame.

B. Begin construction ventilation when building is substantially enclosed.

C. Use of HVAC equipment and ductwork for ventilation during construction is not permitted, unless accepted by Owner:
   1. Provide temporary ventilation equivalent to 1.5 air changes per hour, minimum.
   2. Exhaust directly to outside.
   3. Seal HVAC air inlets and outlets immediately after duct installation.

D. Do not store construction materials or waste in mechanical or electrical rooms.

E. Prior to use of return air ductwork without intake filters clean up and remove dust and debris generated by construction activities.
   1. Inspect duct intakes, return air grilles, and terminal units for dust. Remove any dust and dirt using a HEPA vacuum.
   2. Clean plenum spaces, including top sides of lay-in ceilings, outsides of ducts, tops of pipes and conduit.
   3. Clean tops of doors and frames.
   4. Clean mechanical and electrical rooms, including tops of pipes, ducts, and conduit, equipment, and supports.
   5. Clean return plenums of air handling units.
   6. Remove intake filters last, after cleaning is complete.

F. Do not perform dusty or dirty Work after starting use of return air ducts without intake filters.

G. Use other relevant recommendations of SMACNA (OCC) for avoiding unnecessary contamination due to construction procedures.

H. Vacuum carpeted and soft surfaces, including upholstery, with a HEPA vacuum just prior to occupancy.

3.2 BUILDING FLUSH-OUT

A. Perform building flush-out before occupancy.

B. Do not start flush-out until:
   1. Construction is complete.
   2. HVAC systems have been tested, adjusted, and balanced for proper operation.
   3. Inspection of inside of return air ducts and terminal units confirms that cleaning is not necessary.
   4. New HVAC filtration media have been installed.

C. Building Flush-Out: Operate ventilation systems[continuously] at normal flow rates with 100 percent outside air until a total air volume of 14,000 cubic feet per square foot of floor area has been supplied.
   1. Begin flush-out immediately after Substantial Completion and before the building is occupied.
   2. Maintain interior temperature of at least 60 degrees F. and no higher than 80 degrees F. and interior relative humidity no higher than 60 percent.
   3. If touch-ups required provide temporary construction ventilation during Work and extend the building flush-out by a minimum of 4 days after touch-up installation.
   4. If interior spaces must be occupied prior to completion of the flush-out, supply a minimum of 25 percent of the total air volume prior to occupancy, and:
      a. Begin ventilation at least 3 hours prior to daily occupancy.
      b. Continue ventilation during occupied periods.
      c. Provide minimum outside air volume of 0.30 cfm per square foot or design minimum outside air rate, whichever is greater.

D. Install new HVAC filtration media after completion of flush-out and before occupancy or further testing.

END OF SECTION 01 5721

SECTION 01 6000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies administrative and procedural requirements governing the Construction Manager's selection and handling of products for use in the Project.

1.2 DEFINITIONS

A. Products: Items purchased for incorporation into the Work, whether purchased for the 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 designation, indicated in the manufacturer's published product literature, that is current as of the date of the Contract Documents.
2. Materials: Products that are substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.
3. Equipment: A product with operational parts, whether motorized or manually operated, that requires service connections such as wiring or piping.

B. Substitutions: Request for changes in products, materials, equipment, and Methods of construction required by Contract Documents proposed by the Construction Manager after award of the Contract are considered requests for “substitutions.” The following are not considered substitutions:

1. Substitutions requested by Bidders during the bidding period, and accept prior to submission of bids, are considered as included in the Contract Documents and are not subject to requirements specified in this Section for substitutions.
2. Revisions to Contract Documents requested by the Owner or Architect.
3. Specified options of products and construction methods included in Contract Documents.
4. The Construction Manager’s determination of and compliance with governing regulations and orders issued by governing authorities.

C. Basis-of-Design Product Specification: Where a specific manufacturer’s product is named and accompanied by the words “basis of design,” including make or model number or other designation to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufactures

1.3 SPECIFIED METHODS AND PRODUCT OPTIONS

A. General Product Requirements:

1. Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, unused at the time of installation.
2. Provide products complete with all accessories, trim, finish, safety guards and other devices and details needed foe a complete installation and for the intended use and effect.
3. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.

B. Acceptable Manufacturers: Products are specified by naming one or more manufacturers. The terms “equal” or “or equal” or “approved equal” are implied in reference to all named manufacturers, unless otherwise stated in the individual sections of the specifications. Only products fully equal will be considered by the Architect and his judgment will be final. The use of the term “equal” in these specifications does not represent or warrant that that there exists an equal to any item specified. A submitted “approval equal” product will not be approved if said product installation causes any adjustment to the base bid design. If product is installed and a cost increase incurred for the other building those costs will be passed onto the Construction Manager

C. Acceptable Manufacturer (Design Standard): Products are specified by naming one manufacturer as the “Design Standard” for the Project. Other manufacturers may be named as “Acceptable Manufacturers.” Under this method, note the following:

1. Firms listed as “Acceptable Manufactures” are considered acceptable as manufacturers only, due to their reputation and experience
2. Products furnished by an “Acceptable Manufacturer” shall meet or exceed the “Design Standard.” The standard products of “Acceptable Manufacturers” are not automatically approved as a result of being named. Products may require adaptation to meet the characteristics of the “design standard.”
3. Proposals shall be based on the “Design Standard.”

D. Product Selection Procedures:

1. Proprietary Specification Requirements: Where only a single product or manufacturer is named, provide the product indicated. No substitutions or options will be permitted.
2. Semi-proprietary Specification Requirements:

    a. Where two or more products or manufacturers are named, provide one of the products indicated. No substitutions will be permitted.
    b. Where products or manufacturers are specified by name, accompanied by the term "or equal," or "or approved equal" comply with the Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.

3. Non-Proprietary Specifications: When the Specifications list products or manufacturers that are available and may be incorporated in the Work, but

do not restrict the Construction Manager to use of these products only, the Construction Manager may propose any available product that complies with Contract requirements. Comply with Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.

4. Descriptive Specification Requirements: Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.
5. Performance Specification Requirements:

    a. Where Specifications require compliance with performance requirements, provide products that comply with these requirements, and are recommended by the manufacturer for the application indicated. General overall performance of a product is implied where the product is specified for a specific application.
    b. Manufacturer's recommendations may be contained in published product literature, or by the manufacturer's certification of performance.

6. Compliance with Standards, Codes and Regulations: Where the Specifications only require compliance with an imposed code, standard or regulation, select a product that complies with the standards, codes or regulations specified.): Products are specified by reference standard only. Any product meeting that standard may be used. Construction Manager assumes responsibility for compatibility of products selected.
7. Visual Matching:

    a. Where Specifications require matching an established Sample, the Architect's decision will be final on whether a proposed product matches satisfactorily.
    b. Where no product available within the specified category matches satisfactorily and also complies with other specified requirements, comply with provisions of the Contract Documents concerning "substitutions" for selection of a matching product in another product category, or for noncompliance with specified requirements.

8. Visual Selection: Where specified product requirements include the phrase "...as selected from manufacturer's standard colors, patterns, textures..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Architect will select the color, pattern, and texture from the product line selected.

1.4 QUALITY ASSURANCE

A. Source Limitations:

1. To the fullest extent possible, provide products of the same kind, from a single source.
2. When specified products are available only from sources that do not or cannot produce a quantity adequate to complete project requirements in a timely manner, consult with the Architect for a determination of the most

important product qualities before proceeding. Qualities may include attributes relating to visual appearance, strength, durability, or compatibility. When a determination has been made, select products from sources that product products that possess these qualities, to the fullest extent possible

B. Compatibility of Options: When the Construction Manager is given the option of selecting between two or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.

C. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products which will be exposed to view in occupied spaces or on the exterior.

D. Labels: Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface that is not conspicuous.

E. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface which is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data:

1. Name of product and manufacturer.
2. Model and serial number.
3. Capacity.
4. Speed.
5. Ratings.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle products in accordance with the manufacturer's recommendations, using means and methods that will prevent damage, deterioration and loss, including theft.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at the 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 the site in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting and installing. Protect sensitive equipment and finishes from impact, abrasion, and other damage.
4. Inspect products upon delivery to ensure compliance with the Contract Documents, and to ensure that products are undamaged and properly protected, and that quantities are correct.

C. Storage:

1. Store loose, granular material on clean solid surfaces. Prevent mixing with foreign materials.
2. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.
3. Store heavy materials away from the Project structure in a manner that will not endanger the supporting construction.
4. Store products subject to damage by the elements above ground, under cover in a weather tight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions. Inspect regularly to verify proper storage.
5. Provide equipment and personnel to handle products by methods to prevent oiling and damage. Lift heavy products at designated lifting points only.

PART 2 – PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 6000

SECTION 01 6200 - PRODUCT AND MATERIAL SAFETY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. General requirements for the use of products and materials with hazardous constituents.

1.2 SUBMITTALS

A. Hazard Communication Program: Submit a written hazard communication program as required in OSHA standard 29 CFR 1910.1200 (e) "Written Hazard Communication Program."

B. Material Safety Data Sheets: Submit Material Safety Data Sheets (MSDS) for products and materials with hazardous constituents to be used in construction activities.

1. Products for which this information is required may include, but are not limited to, solvents, floor treatments, spray paints, paints and other finishes, adhesives, absorbent materials, lacquers, waxes, strippers, concrete curing agents, gas cylinders, welding rods, alloy metals, pesticides, herbicides, and roofing products.
2. Submit material safety data sheets at least two weeks prior to commencement of applicable project activity. No product shall be used for which a material safety data sheet has not been submitted.
3. If additional or substitute materials are to be used at any time during the Project, submit additional material safety data sheets. Submit at least one week prior to actual use of these materials.

C. Chemical Information Lists:

1. Submit a list of products and materials with hazardous constituents to be used in construction activities. Separate lists may be submitted by each trade. Prepare chemical information list using an inventory of products and materials with hazardous constituents and their respective material safety data sheets. Arrange list in alphabetical order according to common name. Include chemical name and identify locations where the products and materials with hazardous constituents are intended to be used.
2. Submit complete chemical information list of products and materials with hazardous constituents and associated material safety data sheets at least two weeks after Notice to Proceed.
3. Submit updated list prior to additional products being brought on to the Project site, but not less than once every six weeks.

D. Entry into Existing Permit Required Confined Space (PRCS):

1. Review Owner's list of existing "Permit Required Confined Spaces," maintained by the Owner in accordance with 29 CFR 1910.146 General Industry Standard, and submit a written plan for entry into existing PRCS 21 days after Notice to Proceed.
2. Submit to the Owner a permit application for entry into existing PRCSs one week prior to entry.

E. Entry into Permit Required Confined Space (PRCS) Resulting from the Project:

1. Submit to the Owner a written plan for entry into new PRCSs 21 days after Notice to Proceed.
2. Submit to the Owner a permit application for entry into each PRCS one week prior to entry.
3. Submit record drawings for PRCSs resulting from the Project.

1.3 QUALITY ASSURANCE

A. Reference Standards: Comply with federal, state and local regulations pertaining to hazard communication. These regulations include but are not limited to:

1. 29 CFR 1910.1200, Occupational Safety and Health Administration Safety and Health Standards, Hazard Communication.
2. Title 29 CFR Part 1926 - OSHA Standards for the Construction Industry

a. Subpart D - Occupational Health and Environmental Controls.

1) 1926.55 - Gases, Vapors, Fumes, Dusts and Mists.
2) 1926.56 – Ventilation
3) 1926.59 - Hazard Communication

b. Subpart E - Personal Protective and Life Saving Equipment

3. Maryland Access to Information About Hazardous and Toxic Substances Act, Article 89, Sections 32A - 320. This regulation applies to any employer who uses or stores any hazardous chemical(s) in the State of Maryland.
4. COMAR 09.12.35 Maryland Occupational Safety and Health Standard for Confined Spaces.
5. IBC Chapter 33 Safeguards During Construction.

1.4 STORAGE AND HANDLING

A. Comply with manufacturers' recommendations for handling, storage, use, and disposal of products and materials as applicable to the work.

PART 2 - PRODUCTS

2.1 PRODUCTS AND MATERIALS WITH HAZARDOUS CONSTITUENTS

A. The Owner reserves the right to require substitution of less hazardous materials serving the same purpose, if acceptable substitutes are available.

2.2 MATERIALS AND EQUIPMENT

A. Special facilities, devices, equipment, clothing, and similar items shall comply with applicable regulations and materials' manufacturers' recommendations.

PART 3 – EXECUTION (Not Used)

END OF SECTION 01 6200

SECTION 01 7300 - EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. General installation of products.
4. Coordination of Owner-installed products.
5. Progress cleaning.
6. Starting and adjusting.
7. Protection of installed construction.
8. Correction of the Work.

1.2 SUBMITTALS

A. Qualification Data: For professional engineer to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

B. Certificates: Submit certificate signed by professional engineer certifying that location and elevation of improvements comply with requirements.

C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

D. Final Property Survey: Submit 4 copies showing the Work performed and record survey data.

1.3 QUALITY ASSURANCE

A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION 01 7300

SECTION 01 7329 - CUTTING AND PATCHING

PART 1 – GENERAL

1.1 SUMMARY

A. This Section specifies administrative and procedural requirements for cutting, fitting, and patching work, including attendant excavation and backfill, required to complete the Work or to:

1. Make its several parts fit together properly.
2. Uncover portions of the Work to provide for installations of ill-timed work.
3. Remove and replace defective work.
4. Remove and replace work not conforming to requirements of Contract Documents.
5. Remove samples of installed work as specified for testing.
6. Provide routine penetrations of non-structural surfaces for installation of piping, ductwork, and conduit.

1.2 RELATED REQUIREMENTS

A. Examine Contract Documents for requirements that affect work of this Section. Other Specification Sections that directly relate to work of this Section include, but are not limited to: Divisions 1, 15 and 16.

1.3 QUALITY ASSURANCE

A. Permission to patch any items of work does not imply a waiver of the Architect's right to require complete removal and replacement in said areas and of said items if, in Architect's opinion, patching does not satisfactorily restore quality and appearance of work.

B. Requirements for Structural Work: Do not cut-and-patch structural work in a manner resulting in a reduction of load-carrying capacity or load/deflection ratio.

C. Operational and Safety Limitations: Do not cut-and-patch operational elements and safety-related components in a manner resulting in a reduction of capacities to perform in the manner intended or resulting in decreased operational life, increased maintenance, or decreased safety.

D. Visual Requirements: Do not cut-and-patch work that is exposed on exterior or in occupied spaces of building, in a manner resulting in reduction of visual qualities or resulting in substantial evidence of cut-and-patch work, both as judged solely by the Architect. Remove and replace work judged by the Architect to be visually unsatisfactory.

1.4 SUBMITTALS

A. Submit a written request to Architect well in advance of executing any cutting or alteration which affects:

1. Building operations, building systems (elec, mech, fire, safety, telecom, water, sewer, etc), access or egress to or from building, roads or parking areas.
2. Work of Owner or separate contractor.
3. Structural value or integrity of any element of the building.
4. Integrity or effectiveness of weather-exposed or moisture-resistant elements or systems.
5. Efficiency, operational life, maintenance, or safety of building systems, equipment, or operational elements.
6. Visual qualities of sight-exposed elements.
7. Existing utilities

B. Request shall include:

1. Identification of the Project.
2. Description of affected work.
3. The necessity for cutting, alteration, or excavation.
4. Effect on items listed in subparagraph A above
5. Description of proposed work:

    a. Description of why cutting-and-patching cannot (reasonably) be avoided.
    b. Scope of cutting, patching, alteration, or excavation.
    c. How it will be performed.
    d. How structural elements (if any) will be reinforced.
    e. Trades who will execute the work.
    f. Products proposed to be used.
    g. Extent of refinishing to be done.
    h. Anticipated dates of the work, and anticipated results in terms of variations from the work as originally completed (structural, operational, visual, and other qualities of significance).

6. Alternatives to cutting and patching.
7. Cost proposal, when applicable.
8. Written permission of any separate contractor whose work will be affected.

C. Should conditions of Work or the schedule indicate a change of products from original installation, Construction Manager shall submit request for substitution as specified in Section 01600, MATERIAL AND EQUIPMENT and Section 01631, PRODUCT SUBSTITUTION.

D. Submit written notice to Owner and Architect designating date and time the work will be performed.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Except as otherwise indicated or authorized by the Architect, provide materials for cutting-and-patching which will result in equal-or-better work than the work being cut-and-patched, in terms of performance characteristics and including visual effect where applicable. Comply with the requirements, and use materials identical with the original materials where feasible and where recognized that satisfactory results can be produced thereby.

B. Comply with specifications and standards for each specific product involved.

PART 3 EXECUTION

3.1 INSPECTION

A. Inspect existing conditions of Project, including elements subject to damage or to movement during cutting and patching.

B. After uncovering work, inspect conditions affecting installation of Products, or performance of work.

C. Report unsatisfactory, unsafe or questionable conditions to Owner and Architect in writing; do not proceed with work until Owner and Architect have provided further instructions.

3.2 PREPARATION

A. Provide adequate temporary support as necessary to assure structural value or integrity of affected portion of the building or Work.

B. Provide devices and methods to protect other portions of building or Project from damage.

C. Provide protection from elements for that portion of the Project which may be exposed by cutting and patching work, and maintain excavations free from water.

3.3 PERFORMANCE

A. Execute cutting and demolition by methods which will prevent damage to other work, and will provide proper surfaces to receive installation of repairs.

1. In general, where mechanical cutting is required, cut work with sawing and grinding tools, not with hammering and chopping tools. Core drill openings through concrete work.

2. Comply with the requirements of applicable sections of Division 2 - SITEWORK where cutting-and-patching requires excavating and backfilling.

B. Execute excavating and backfilling by methods which will prevent settlement or damage to other work.

C. Employ original installer or fabricator or retain a firm with at least five years specialized experience in the installation, fabrication or restoration of the type of exposed work to be cut and patched, to perform cutting and patching for:

1. Weather-exposed or moisture-resistant elements.
2. Sight-exposed finished surfaces.

D. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances, and finishes.

E. Restore work, which has been cut or removed; install new products to provide completed Work in accordance with requirements of Contract Documents.

F. Fit work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

G. Patch with seams which are durable and as invisible as possible. Comply with specified tolerances for the work.

H. Restore exposed finishes of patched areas; and, where necessary extend finish restoration onto retained work adjoining, in a manner which will eliminate evidence of patching.

1. Where patch occurs in a smooth painted surface, extend final paint coat over the entire unbroken surface containing the patch.

I. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes:

1. For continuous surfaces, refinish to nearest intersection.
2. For an assembly, refinish entire unit.

3.4 CLEANING

A. Thoroughly clean areas and spaces where cutting and patching is performed. Thoroughly clean piping and conduit and similar features before painting or other coating or finishing is applied.

END OF SECTION 01 7329

SECTION 01 7419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 DEFINITIONS

A. Construction Waste: Building, structure, and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building, structure, and site improvement materials resulting from demolition operations.

C. Disposal: Removal of demolition or construction waste and subsequent salvage, sale, recycling, or deposit in landfill, incinerator acceptable to authorities having jurisdiction, or designated spoil areas on Owner's property.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.3 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition and construction waste becomes property of Contractor.

1.4 ACTION SUBMITTALS

A. Waste Management Plan: Submit plan within 7 days of date established for the Notice to Proceed.

1.5 INFORMATIONAL SUBMITTALS

A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Use Form CWM-7 for construction waste and Form CWM-8 for demolition waste. Include the following information:
   1. Material category.
   2. Generation point of waste.
   3. Total quantity of waste in tons (tonnes).
   4. Quantity of waste salvaged, both estimated and actual in tons (tonnes).
   5. Quantity of waste recycled, both estimated and actual in tons (tonnes).
   6. Total quantity of waste recovered (salvaged plus recycled) in tons (tonnes).
   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. Qualification Data: For waste management coordinator.
H. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.6 QUALITY ASSURANCE

A. Waste Management 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 serve as Waste Management Coordinator.
B. Regulatory Requirements: Comply with transportation and disposal regulations of authorities having jurisdiction.
C. Waste Management Conference(s): Conduct conference(s) at Project site to comply with requirements in Section 01 3100 "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.

1.7 WASTE MANAGEMENT PLAN

A. General: Develop a waste management plan according to requirements in this Section. Plan shall consist of 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] [and] [construction] waste generated by the Work. Use [Form CWM-1 for construction waste] [and] [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 and Form CWM-4 for demolition waste. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.

1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
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 and Form CWM-6 for demolition waste. 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

2.1 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 the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials.

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
1. Comply with operation, termination, and removal requirements in Section 01 5000 "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.
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 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 5000 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 SALVAGING DEMOLITION WASTE
A. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:
   1. Clean salvaged items.
   2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
   3. Store items in a secure area until installation.
   4. Protect items from damage during transport and storage.
   5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.
B. Salvaged Items for Owner's Use: Salvage items for Owner's use and handle as follows:
   1. Clean salvaged items.
   2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
   3. Store items in a secure area until delivery to Owner.
   4. Transport items to Owner's storage area designated by Owner.
   5. Protect items from damage during transport and storage.
C. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.
D. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.
E. Plumbing Fixtures: Separate by type and size.
F. Lighting Fixtures: Separate lamps by type and protect from breakage.
G. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL
A. General: Recycle paper and beverage containers used by on-site workers.
B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.
C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives,

solvents, petroleum contamination, and other substances deleterious to the recycling process.

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

3.4 RECYCLING DEMOLITION WASTE

A. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.

B. Metals: Separate metals by type.
   1. Structural Steel: Stack members according to size, type of member, and length.
   2. Remove and dispose of bolts, nuts, washers, and other rough hardware.

C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.

D. Piping: Reduce piping to straight lengths and store by material and size. Separate supports, hangers, valves, sprinklers, and other components by material and size.

E. Conduit: Reduce conduit to straight lengths and store by material and size.

3.5 RECYCLING CONSTRUCTION WASTE

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

B. Wood Materials:
   1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
   2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.
   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 9300 "Plants" for use of clean ground gypsum board as inorganic soil amendment.

D. Paint: Seal containers and store by type.

3.6 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged or recycled, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
   1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
   2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

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

C. Burning: Do not burn waste materials.

END OF SECTION 01 7419

SECTION 01 7700 - CONTRACT CLOSEOUT

PART 1 - GENERAL

1.1 SUMMARY

A. Description: Work of this Section includes submittals and procedures required for Contract close-out.

B. Requirements for Contract Close-out specified in this Section are in addition to provisions of GENERAL CONDITIONS.

1.2 RELATED SECTIONS

A. Division 1 Section Final Cleaning for final cleaning requirements.

B. Division 1 Section Project Record Documents for requirements for Project Record Documents, Maintenance Manuals, and Product Data Manuals.

1.3 SUBSTANTIAL COMPLETION

A. In order to comply with the requirements of Article 7.15 General Conditions, the Construction Manager will notify the Owner and Architect of Substantial Completion only after complying with the following in addition to all other contract requirements.

1. Completion of all testing, balancing, demonstration, and commissioning of the following systems, and receipt of acceptance and/or approval for operation by governing authorities, Owner and A/E.

    a. HVAC
    b. CCMS
    c. Plumbing
    d. Electrical
    e. Fire protection (including fire separations, sprinklers, smoke controls, detectors and alarms)
    f. Elevators
    g. Security system
    h. Telecommunications
    i. Clean Rooms

2. Submission of all approved balance reports, all required certificates of inspection, operation and maintenance manuals, and all specified warranty documentation and warranty contact list.
3. Submission of written notice simultaneously to the Owner and Architect indicating items of work remaining to be completed or corrected for final acceptance (Construction Managers punch list).
4. Completion of Instruction of Owner Personnel:

a. Prior to Substantial Completion, instruct Owner's designated personnel in operation, adjustment, and maintenance of products, equipment, and systems, at agreed upon times.
b. For equipment requiring seasonal operation, perform instructions for other seasons within six months.
c. Use Maintenance Manual as basis of instruction. Review contents of manual with personnel in detail to explain operation and maintenance.
d. Prepare and insert additional data in Project Record Data when need for such data becomes apparent during instruction.
e. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at equipment location.
f. Provide Owner's maintenance personnel with combined classroom and field training and instruction. See Divisions 15, 16, (and 17, and 18 if included in Contract specifications) for additional requirements.

5. Delivery of Extra Stock and Parts:

a. Deliver to Owner extra stock of materials, spare parts, and loose accessories required by Contract Documents.
b. Include special tools for items such as thermostats and adjustable dampers and give instructions for use.
c. Provide protective wrapping or packaging labeled with full identification of item.
d. Store at site in locations designated by Owner.
e. Following completion of items A1 through A5 above and correction of all Construction Manager’s punch list items, the Construction Manager will notify the Owner and Architect that the Work is ready for the Substantial Completion Inspection. Within two weeks of this notification, the Owner and Architect will inspect the project and prepare a list of observed deficiencies.

B. Should the Architect and Owner find that work is not substantially complete, the Architect will promptly notify the Construction Manager in writing, listing observed significant deficiencies or excessive minor deficiencies. In order for the Work to be considered substantially complete, there can be no more than an average of three (3) minor deficiencies per room, or more than 150 minor deficiencies total for the entire phase (whichever is greater). Deficiencies which impact operation of building systems are considered significant deficiencies and must be corrected before the Work can be considered substantially complete.

C. Construction Manager shall remedy deficiencies and send a second written notice that the Work is ready for the Substantial Completion Inspection. Within two weeks of this notification, the Owner and Architect will re-inspect.

D. When the Architect and Owner find the work to be substantially complete, a Certificate of Substantial Completion will be prepared in compliance with the General Conditions. This certificate and the remaining list of uncorrected minor deficiencies (Owner’s punch list) will be sent to the Construction Manager. The

Certificate of Substantial Completion shall specify the timeframe for the Construction Manager's correction of all remaining minor deficiencies.

1.4 FINAL ACCEPTANCE AND COMPLETION

A. In order to achieve Final Acceptance of the Work, the Construction Manager shall complete the following:

1. Construction Manager shall submit Closeout Submittals to the Owner as listed below.
2. No later than the date established in the Certificate of Substantial Completion, the Construction Manager shall submit written confirmation that:

a. Work has been completed in accordance with Contract Documents, and deficiencies listed with Certificate of Substantial Completion have been corrected.
b. Work is complete and ready for Final Acceptance.

B. Within two weeks of this written confirmation, the Owner and Architect will inspect the Work.

C. Should the Owner and Architect inspection find that work incomplete, the Architect will promptly notify Construction Manager in writing listing observed deficiencies and proceed in accordance with Article 7.15 of the General Conditions.

1.5 CLOSEOUT SUBMITTALS

A. Before making request for final inspection, certify in writing that:

1. Contract Documents have been reviewed.
2. Project complies with Contract Documents.
3. Equipment and systems have been tested and are operational.
4. Project is complete and ready for final inspection.

B. Submit properly executed releases or waivers of lien, submitted in duplicate and notarized.

C. Submit properly executed Consent of Surety Company to Final Payment, and information for Owner on coordination of shifting insurance coverages, including proof of extended coverages required.

D. Submit Certificates of Inspection, Permits, and similar approvals or certifications by governing authorities and franchised services, assuring Owner's full access and use of completed work.

E. Submit Project Record Documents in compliance with Division 1 Section Project Record Documents.

1.6 POST OCCUPANCY INSPECTIONS

A. Approximately six months, 12 months and 24 months after Final Acceptance and Completion of the Project, the University will schedule inspections of the Project with representatives of the Construction Manager, including key Trade Contractors, the Architect and the University.

B. The inspections will be to identify and schedule for correction any defects or other problems that have appeared, and are covered by applicable guarantees and warranties in effect at the time.

C. Any defect not identified at these times shall not be exempt from the provisions of the guarantees or warrantees, and shall be corrected by the Construction Manager.

1.7 END OF GUARANTEE INSPECTION

A. Thirty (30) days prior to specified end of first year and second year Guarantee period, Construction Manager shall arrange to meet with Architect and Owner representatives (including users) to assemble a list of items which require correction under specified guarantee. Guarantee shall be automatically extended until such time as the deficiencies are all corrected if such deficiencies occurred under original guarantee.

PART 2 PRODUCTS (Not Applicable.)

PART 3 EXECUTION (Not Applicable.)

END OF SECTION 01 7700

SECTION 01 7823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory.
2. Emergency manuals.
3. Operation manuals for systems, subsystems, and equipment.
4. Maintenance manuals for the care and maintenance of products, materials, and finishes and systems and equipment.

B. Related Sections include the following:

1. Division 1 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
2. Division 1 Section "Closeout Procedures" for submitting operation and maintenance manuals.
3. Division 1 Section "Project Record Documents" for preparing Record Drawings for operation and maintenance manuals.
4. Divisions 2 through 16 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

1.2 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

C. Searchable PDF: As defined in Section 01 3300.

1.3 SUBMITTALS

A. Outline Submittal: Submit searchable PDFs via online construction management portal (e-Builder) to Architect/Engineer and Owner at least 1 month before training and testing. Maintenance requirements for finishes (with cleaning instructions) and landscaping should be included.

B. Initial Submittal: Submit searchable PDFs via online construction management portal (e-Builder) at least 1 month before requesting inspection for Substantial Completion. Include a complete operation and maintenance directory. Architect will mark whether general scope and content of manual are acceptable.

C. Final Submittal: Submit searchable PDF copy of each manual in final form through online construction management portal (e-Builder) at least 15 days be-

fore final inspection. Architect will return with comments within 15 days after final inspection.

1. Correct or modify each manual to comply with Architect's comments. Submit corrected searchable PDF within 15 days of receipt of Architect comments.

1.4 COORDINATION

A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

A. Organization: Include a section in the directory for each of the following:

1. List of documents.
2. List of systems.
3. List of equipment.
4. Table of contents.

B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.

C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.

D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.2 MANUALS, GENERAL

A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.

3. Manual contents.

B. Title Page: Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name, address, and telephone number of Contractor.
6. Name and address of Architect.
7. 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. Organize digital searchable PDF manuals by separate bookmarked sections, as listed in the Table of Contents. Include hyperlinked Table of Contents.

2.3 EMERGENCY MANUALS

A. Content: Organize digital searchable PDF manual into a separate bookmarked sections for each of the following; Include hyperlinked table of contents:

1. Type of emergency.
2. Emergency instructions.
3. Emergency procedures.

B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire.
2. Flood.
3. Gas leak.
4. Water leak.
5. Power failure.
6. Water outage.
7. System, subsystem, or equipment failure.
8. Chemical release or spill.

C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's

operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

D. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

2.4 OPERATION MANUALS

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions.
2. Performance and design criteria if Contractor is delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

1. Product name and model number.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

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

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

2.5 PRODUCT MAINTENANCE MANUAL

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. 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.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list

and source information, maintenance service contracts, and warranty and bond information, as described below.

B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

1. Standard printed maintenance instructions and bulletins.
2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training videotape, if available.

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts and part numbers identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.
2. Include a directory with emergency contacts. The list should include sub-contractors and manufacturer's representatives.

PART 3 – EXECUTION (Not Used)

END OF SECTION 01 7823

SECTION 01 7839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Administrative and procedural requirements for Project Record Documents.

B. Project Record Documents required include:
1.
2. Marked-up copies of Contract Drawings.
3. Marked-up copies of Shop Drawings.
4. Newly prepared Drawings.
5. Marked-up copies of Specifications, addenda and Change Orders.
6. Field records for variable and concealed conditions.
7. Record information on Work that is recorded only schematically.

C. Related Sections:
1.
2. Specific record copy requirements that expand requirements of this Section are included in the individual Sections of Divisions-2 through -16.
3. General project closeout requirements are included in Section Project Closeout.
4. General requirements for submittal of construction administration documents are included in Section Submittals.

D. Maintenance of Documents and Samples: Store record documents and Samples in the field office apart from Contract Documents used for construction. Do not permit Project Record Documents to be used for construction purposes. Maintain record documents in good order, and in a clean, dry, legible condition. Make documents and Samples available at all times for inspection by the Architect.

1.2 RECORD DRAWINGS

A. Mark-up Procedure: During the construction period, maintain on site a set of blue- or black-line white-prints of Contract Drawings and Shop Drawings for Project Record Document purposes.
1.
2. Mark these Drawings regularly as the Project proceeds to indicate the actual installation where the installation varies appreciably from the installation shown originally. Give particular attention to information on concealed elements which would be difficult to identify or measure and record later. Items required to be marked include but are not limited to:
a.
b. Dimensional changes to the Drawings.
c. Revisions to details shown on the Drawings.
d. Depths of foundations below the first floor.

e. Locations and depths of underground utilities.
f. Revisions to routing of piping and conduits.
g. Revisions to electrical circuitry.
h. Actual equipment locations.
i. Duct size and routing.
j. Locations of concealed internal utilities.
k. Changes made by Change Order.
l. Details not on original Contract Drawings.

3.

4. Mark completely and accurately record prints of Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions. Where Shop Drawings are marked, show cross-reference on Contract Drawings location.
5. Maintain record sets where they can be inspected regularly by the Architect, and include a report on the status of the documents at each progress meeting.
6. Mark record sets with red erasable colored pencil; use other colors to distinguish between changes for different categories of the Work at the same location.
7. Mark important additional information which was either shown schematically or omitted from original Drawings.
8. Note construction change directive numbers, alternate numbers, Change Order numbers and similar identification.
9. Responsibility for Markup: Where feasible, the individual or entity who obtained record data, whether the individual or entity is the installer, Trade Contractor, or similar entity, is required to prepare the mark-up on record Drawings.
   a.
   b. Accurately record information in an understandable Drawing technique.
   c. Record data as soon as possible after it has been obtained. In the case of concealed installations, record and check the mark-up prior to concealment.
10.
11. At time of Substantial Completion, submit record Drawings to Architect for the preparation of the Owner's record "As-Built" set. Organize into sets, bind and label sets for Architect's use.

1.3 NEWLY PREPARED RECORD DRAWINGS:

A. Prepare new Drawings instead of following procedures specified for preparation of record Drawings where new Drawings are required by a Change Order issued as a result of acceptance of an alternate, substitution, or other modification, and the Architect determines that neither the original Contract Drawings nor Shop Drawings are suitable to show the actual installation. Consult with the Architect for the proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. When completed and accepted, integrate newly prepared Drawings with procedures specified for organizing, copying, binding and submittal of record Drawings.

1.4 RECORD SPECIFICATIONS

A. During the construction period, maintain one copy of the Project Specifications, including addenda and modifications issued, for Project Record Document purposes.
   1.
   2. Mark the Specifications to indicate the actual installation where the installation varies substantially from that indicated in Specifications and modifications issued. Note related Project Record Drawing information, where applicable. Give particular attention to substitutions, selection of product options, and information on concealed installations that would be difficult to identify or measure and record later.
      a.
      b. In each Specification Section where products, materials or units of equipment are specified or scheduled, mark the copy with the proprietary name and model number of the product furnished.
      c. Record the name of the manufacturer, supplier and installer, and other information necessary to provide a record of selections made and to document coordination with record Product Data submittals and maintenance manuals.
      d. Note related record Product Data, where applicable. For each principal product specified, indicate whether record Product Data has been submitted in maintenance manual instead of submitted as record Product Data.
   3.
   4. Upon completion of mark-up, submit record Specifications to the Architect for Owner's records.

1.5 MAINTENANCE MANUAL SUBMITTAL

A. When each construction activity that requires submittal of maintenance manuals is nominally complete, but before Substantial Completion, submit maintenance manuals specified.
   1.
   2. Organize operating and maintenance manuals into suitable sets of manageable size.
   3. In each maintenance manual include information specified in individual Specification Sections and the following:
      a.
      b. Emergency instructions.
      c. Spare parts list.
      d. Copies of specific warranties.
      e. Wiring diagrams.
      f. Recommended maintenance procedures and turn-around times.
      g. Inspection and system-test procedures.
      h. Copies of applicable Shop Drawings and Product Data.
      i. Listing of required maintenance materials and services.
      j. Names and addresses of sources of maintenance materials.
      k. Maintenance Drawings and diagrams.
      l. Precautions against improper maintenance and exposure.

1.6 MISCELLANEOUS RECORD SUBMITTALS

A. Refer to other Specification Sections for miscellaneous record- keeping requirements and submittals in connection with various construction activities. Immediately prior to Substantial Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for use and reference. Submit to the Architect for the Owner's records. Categories of requirements resulting in miscellaneous records include, but are not limited to the following:

1.
2. Field records on excavations and foundations.
3. Field records on underground construction and similar Work.
4. Survey showing locations and elevations of underground lines.
5. Invert elevations of drainage piping.
6. Surveys establishing building lines and levels.
7. Records of plant treatment.
8. Ambient and substrate condition tests.
9. Certifications received in lieu of labels on bulk products.
10. Load and performance testing.
11. Inspections and certifications by governing authorities.
12. Leakage and water-penetration tests.
13. Fire resistance and flame spread test results.
14. Final inspection and correction procedures.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 RECORDING

A. Post changes and modifications to the Documents as they occur. Do not wait until the end of the Project. The Architect will periodically review record documents to assure compliance with this requirement.

END OF SECTION 01 7839

SECTION 01 7900 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
   1.
   2. Demonstration of operation of systems, subsystems, and equipment.
   3. Training in operation and maintenance of systems, subsystems, and equipment.
   4. Demonstration and training DVDs.

1.2 SUBMITTALS

A. Instruction Program: Submit one bookmarked PDF and one binder copy of outline of instructional program for demonstration and training, including 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.
   2. At completion of training, submit one complete training manual(s) for Owner's use.
   3. At completion of training, submit one complete copy of all warranties in PDF form for Owner’s use.

B. Qualification Data: For instructor.

C. Attendance Record: For each training module, submit list of participants and length of instruction time.

D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

E. Demonstration and Training DVDs: Submit 1 copy within 7 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 photographer.
      c. Name of Architect.
      d. Name of Construction Manager.
      e. Date DVD was recorded.
      f. Description of vantage point.

1.3 QUALITY ASSURANCE

A. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 1 Section "Quality Requirements," experienced in operation and maintenance procedures and training.

B. Pre-instruction Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "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.

1.4 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Owner.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections, and as follows:

1. Motorized doors.
2. Equipment, including projection screens loading dock equipment.
3. Fire-protection systems, including fire alarm and fire-extinguishing systems.
4. Intrusion detection systems.
5. Conveying systems.
6. Heat generation.
7. Refrigeration systems.
8. HVAC systems.
9. HVAC instrumentation and controls.
10. Electrical service and distribution.

11. Lighting equipment and controls.
12. Communication systems.

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:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:

a. System, subsystem, and equipment descriptions.
b. Performance and design criteria if Construction Manager is delegated design responsibility.
c. Operating standards.
d. Regulatory requirements.
e. Equipment function.
f. Operating characteristics.
g. Limiting conditions.
h. Performance curves.

2. Documentation: Review the following items in detail:

a. Emergency manuals.
b. Operations manuals.
c. Maintenance manuals.
d. Project Record Documents.
e. Identification systems.
f. Warranties and bonds.
g. Maintenance service agreements and similar continuing commitments.

3. Emergencies: Include the following, as applicable:

a. Instructions on meaning of warnings, trouble indications, and error messages.
b. Instructions on stopping.
c. Shutdown instructions for each type of emergency.
d. Operating instructions for conditions outside of normal operating limits.
e. Sequences for electric or electronic systems.
f. Special operating instructions and procedures.

4. Operations: Include the following, as applicable:

a. Startup procedures.
b. Equipment or system break-in procedures.
c. Routine and normal operating instructions.
d. Regulation and control procedures.
e. Control sequences.
f. Safety procedures.
g. Instructions on stopping.

h. Normal shutdown instructions.
i. Operating procedures for emergencies.
j. Operating procedures for system, subsystem, or equipment failure.
k. Seasonal and weekend operating instructions.
l. Required sequences for electric or electronic systems.
m. Special operating instructions and procedures.

5. Adjustments: Include the following:

a. Alignments.
b. Checking adjustments.
c. Noise and vibration adjustments.
d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:

a. Diagnostic instructions.
b. Test and inspection procedures.

7. Maintenance: Include the following:

a. Inspection procedures.
b. Types of cleaning agents to be used and methods of cleaning.
c. List of cleaning agents and methods of cleaning detrimental to product.
d. Procedures for routine cleaning
e. Procedures for preventive maintenance.
f. Procedures for routine maintenance.
g. Instruction on use of special tools.

8. Repairs: Include the following:

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

PART 3 - EXECUTION

3.1 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a combined training manual; include PDFs with hyperlinked movie files.

B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

A. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

1. Owner will furnish an instructor to describe Owner's operational philosophy.
2. Owner will furnish Construction Manager with names and positions of participants.

B. 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 with at least seven days' advance notice.

C. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of an oral performance-based test.

D. Cleanup: Collect used and leftover educational materials. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

3.3 DEMONSTRATION AND TRAINING DVDS

A. General: Record demonstration and training on DVDs. 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. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to show area of demonstration and training. Display continuous running time.

END OF SECTION 01 7900

SECTION 01 8113.14 - SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 BD+C: NEW CONSTRUCTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general requirements and procedures for compliance with USGBC's LEED prerequisites and credits needed for Project to obtain LEED Silver certification based on USGBC's "LEED Version 4 for Building Design and Construction" (hereafter, LEED v4 BD+C).

1. Specific requirements for LEED are also included in other Sections.
2. Other LEED prerequisites and credits needed to obtain LEED certification depend on product selections and may not be specifically identified as LEED requirements. Compliance with requirements needed to obtain LEED prerequisites and credits may be used as one criterion to evaluate substitution requests and comparable product requests.
3. A copy of LEED Project scorecard is attached at end of this Section for information only.
    a. Some LEED prerequisites and credits needed to obtain indicated LEED certification depend on Architect's design and other aspects of Project that are not part of the Work of the Contract.

1.2 DEFINITIONS

A. BUG Rating: Classification system for luminaires defined in terms of backlight (B), uplight (U), and glare (G).

B. Chain-of-Custody Certificates: Certificates signed by manufacturers certifying that wood used to make products was obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001. Certificates shall include evidence that manufacturer is certified for chain of custody by an FSC-accredited certification body.

C. Cradle-to-Gate Assessment: Analysis of a product's partial life-cycle from extraction (cradle) to gate (factory completion prior to distribution).

D. LEED: USGBC's "LEED Version 4 for Building Design and Construction." Definitions that are part of this document apply to this Section.

E. Life-Cycle Assessment: Evaluation of environmental impacts of a product from cradle to gate, defined by ISO 14040 and ISO 14044.

F. Life-Cycle Inventory: Database that defines environmental input and output for each step in a material or assembly's life cycle.

G. Recycled Content: The recycled content value of a material assembly shall be determined by weight. The recycled fraction of the assembly is then multiplied by the cost of assembly to determine the recycled content value.

1. "Postconsumer" material is defined as waste material generated by households or by commercial, industrial, and institutional facilities in their role as end users of the product, which can no longer be used for its intended purpose.
2. "Preconsumer" material is defined as material diverted from the waste stream during the manufacturing process. Reutilization of materials (such as rework, regrind, or scrap generated in a process and capable of being reclaimed within the same process that generated it) is excluded.

H. Regional Materials: Materials that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles (160 km) of Project site. If only a fraction of a product or material is extracted/harvested/recovered and manufactured locally, then only that percentage (by weight) shall contribute to the regional value.

I. Solar Reflectance Index (SRI): The measure of a constructed surface's ability to stay cool in the sun by reflecting solar radiation and emitting thermal radiation. SRI values range from zero (solid black surface) to 100 (solid white surface). SRI value of a material is calculated according to ASTM E1980 and based on the aged tested values of solar reflectance and thermal emittance.

J. Vertical Illuminance: Illuminance levels calculated at a point on a vertical service or plane.

1.3 PREINSTALLATION MEETINGS

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

1.4 ADMINISTRATIVE REQUIREMENTS

A. Respond to questions and requests from Architect about USGBC's LEED prerequisites and credits that are Contractor's responsibility, that depend on product selection or product qualities, or that depend on Contractor's procedures, until USGBC has made its determination on Project's LEED certification application.

B. Submit documentation to USGBC and respond to questions and requests from USGBC about its LEED prerequisites and credits that are Contractor's responsibility, that depend on product selection or product qualities, or that depend on Contractor's procedures, until USGBC has made its determination on Project's LEED certification application.
   1. Document correspondence with USGBC as informational submittals.

1.5 ACTION SUBMITTALS

A. General: Submit sustainable design submittals required by other Sections.

B. Sustainable design submittals are in addition to other submittals.
   1. If submitted item is identical to that proposed to comply with other requirements, include additional copy with other submittal as a record of compliance with indicated LEED requirements instead of separate sustainable design submittal. Mark additional copy "Sustainable design submittal."
   2. IAQ Assessment:
      a. Signed statement describing the building air flush-out procedures, including dates when flush-out was begun and completed and statement that filtration media was replaced after flush-out.
      b. Product Data for filtration media used during flush-out and occupancy.
      c. Report from testing and inspecting agency indicating results of IAQ testing and documentation that show compliance with IAQ testing procedures and requirements.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Sustainability Consultant.

B. Project Materials Cost Data: Provide statement indicating total cost for materials used for Project. Costs exclude labor, overhead, and profit. Include breakout of costs for the following categories of items:
   1. Plumbing.
   2. Mechanical.
   3. Electrical.

4. Specialty items such as elevators and equipment.

C. Sustainable Design Action Plans: Provide preliminary submittals within 14 days of date established for commencement of the Work, indicating how the following requirements will be met:
   1. List of proposed products with EPDs.
   2. List of proposed products complying with requirements for multi-attribute optimization.
   3. List of proposed products complying with requirements for raw material and source extraction reporting.
   4. List of proposed products complying with requirements for material ingredient reporting.
   5. List of proposed products complying with requirements for material ingredient optimization.
   6. List of proposed products complying with requirements for product manufacturer supply chain optimization.
   7. Waste management plan complying with Section 01 7419 "Construction Waste Management and Disposal."
   8. Construction IAQ management plan.

D. Sustainable Design Progress Reports: Concurrent with each Application for Payment, submit reports comparing actual construction and purchasing activities with sustainable design action plans.

1.7 QUALITY ASSURANCE

A. Sustainability Consultant: Engage an experienced LEED Accredited Professional to coordinate LEED requirements. Sustainability Consultant may also serve as waste management coordinator.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Provide products and procedures necessary to obtain LEED credits indicated as Contractor's responsibility. Although other Sections may specify some requirements that contribute to these LEED credits, Contractor shall provide additional materials and procedures necessary to obtain LEED credits indicated.

2.2 LOW-EMITTING MATERIALS

A. Paints and Coatings: For field applications that are inside the weatherproofing system, paints and coatings shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:
   1. Flat Paints and Coatings: 50 g/L.
   2. Nonflat Paints and Coatings: 50 g/L.
   3. Primers, Sealers, and Undercoaters: 100 g/L.
   4. Rust-Preventive Coatings: 100 g/L.
   5. Zinc-Rich Industrial Maintenance Primers: 100 g/L.
   6. Pretreatment Wash Primers: 420 g/L.
   7. Clear Wood Finishes, Varnishes: 275 g/L.
   8. Clear Wood Finishes, Lacquers: 275 g/L.

B. Paints and Coatings: For field applications that are inside the weatherproofing system, 90 percent of paints and coatings shall comply with requirements of California Department of Public Health's "Standard Method for the Testing and Evaluation of

Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

C. Adhesives and Sealants: For field applications that are inside the weatherproofing system, adhesives and sealants shall comply with VOC content limits of authorities having jurisdiction for VOC content limits:

D. Adhesives and Sealants: For field applications that are inside the weatherproofing system, 90 percent of adhesives and sealants shall comply with requirements of California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

E. Flooring: Shall comply with requirements of California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

F. Composite Wood, Agrifiber Products, and Adhesives: Shall be made using ultra-low-emitting formaldehyde resins as defined in California Air Resources Board's "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products" or shall be made with no added formaldehyde.

G. Ceilings, Walls, and Thermal Insulation: Shall comply with requirements of California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

PART 3 - EXECUTION

3.1 NONSMOKING BUILDING

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

3.2 CONSTRUCTION WASTE MANAGEMENT

A. Comply with Section 01 7419 "Construction Waste Management and Disposal."

3.3 CONSTRUCTION INDOOR-AIR-QUALITY (IAQ) MANAGEMENT

A. Comply with SMACNA's "SMACNA IAQ Guideline for Occupied Buildings under Construction."

1. If Owner authorizes use of permanent heating, cooling, and ventilating systems during construction period as specified in Section 01 5000 "Temporary Facilities and Controls," install MERV 8 filter media at each return-air inlet for the air-handling system used during construction.
2. Replace air filters immediately prior to occupancy with new filters specified in Section 23 4100 "Particulate Air Filtration."

3.4 INDOOR-AIR-QUALITY (IAQ) ASSESSMENT

A. Flush-Out:

1. After construction ends, prior to occupancy and with all interior finishes installed, perform a building flush-out by supplying a total volume of 14,000 cu. ft. (4 300 000 L) of outdoor air per sq. ft. (sq. m) of floor area while maintaining an internal temperature of at least 60 deg F (16 deg C) and a relative humidity no higher than 60 percent.

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

1. Conduct baseline IAQ testing, after construction ends and prior to occupancy, using testing protocols consistent with the EPA's "Compendium of Methods for the Determination of Air Pollutants in Indoor Air," and as additionally detailed in USGBC's "LEED Reference Guide for Building Design and Construction v4."
2. Demonstrate that contaminant maximum concentrations listed below are not exceeded:
    a. Formaldehyde: 27 ppb.
    b. Particulates (PM10): 50 mcg/cu. m.
    c. Ozone: 0.075 ppm, according to ASTM D5149.
    d. Total Volatile Organic Compounds (TVOC): 500 mcg/cu. m.
    e. 4-Phenylcyclohexene (4-PH): 6.5 mcg/cu. m.
    f. Carbon Monoxide: 9 ppm and no greater than 2 ppm above outdoor levels.
    g. Target Chemicals in California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers," Table 4-1 (except formaldehyde).
3. For each sampling point where maximum concentration limits are exceeded, take corrective action until requirements have been met.
4. Air-sample testing shall be conducted as follows:
    a. All measurements shall be conducted prior to occupancy but during normal occupied hours, and with building ventilation system starting at the normal daily start time and operated at the minimum outside airflow rate for the occupied mode throughout the duration of the air testing.
    b. Building shall have all interior finishes installed including, but not limited to, millwork, doors, paint, carpet, and acoustic tiles. Nonfixed furnishings such as workstations and partitions are encouraged, but not required, to be in place for the testing.
    c. Number of sampling locations varies depending on the size of building and number of ventilation systems. For each portion of building served by a separate ventilation system, the number of sampling points shall not be less than one per 5000 sq. ft. (465 sq. m). For large open spaces, one sampling point per 50,000 sq. ft. (4654 sq. m) may be used.
    d. Air samples shall be collected between 3 and 6 ft. (0.9 and 1.8 m) from the floor to represent the breathing zone of occupants, and over a minimum four-hour period.

END OF SECTION 01 8113.14

LEED v4 for BD+C: New Construction and Major Renovation

Project Checklist

Project Name: UMBC Sherman Hall
Date: February 24, 2023

Y	?	N			
1			Credit	Integrative Process	1

10	2	3	Location and Transportation		16
			Credit	LEED for Neighborhood Development Location	16
1			Credit	Sensitive Land Protection	1
		1	Credit	High Priority Site	2
4	1		Credit	Surrounding Density and Diverse Uses	5
5			Credit	Access to Quality Transit	5
	1		Credit	Bicycle Facilities	1
		1	Credit	Reduced Parking Footprint	1
		1	Credit	Green Vehicles	1

4	3	2	Sustainable Sites		10
Y			Prereq	Construction Activity Pollution Prevention	Required
1			Credit	Site Assessment	1
	1		Credit	Site Development - Protect or Restore Habitat	2
1			Credit	Open Space	1
	1	2	Credit	Rainwater Management	3
2			Credit	Heat Island Reduction	2
	1		Credit	Light Pollution Reduction	1

5	4	2	Water Efficiency		11
Y			Prereq	Outdoor Water Use Reduction	Required
Y			Prereq	Indoor Water Use Reduction	Required
Y			Prereq	Building-Level Water Metering	Required
2			Credit	Outdoor Water Use Reduction	2
2	2	2	Credit	Indoor Water Use Reduction	6
	2		Credit	Cooling Tower Water Use	2
1			Credit	Water Metering	1

14	7	10	Energy and Atmosphere		33
Y			Prereq	Fundamental Commissioning and Verification	Required
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Building-Level Energy Metering	Required
Y			Prereq	Fundamental Refrigerant Management	Required
5	1		Credit	Enhanced Commissioning	6
9	2	5	Credit	Optimize Energy Performance	18
	1		Credit	Advanced Energy Metering	1
		2	Credit	Demand Response	2
		3	Credit	Renewable Energy Production	3
	1		Credit	Enhanced Refrigerant Management	1
	2		Credit	Green Power and Carbon Offsets	2

6	5	2	Materials and Resources		13
Y			Prereq	Storage and Collection of Recyclables	Required
Y			Prereq	Construction and Demolition Waste Management Planning	Required
1	2	2	Credit	Building Life-Cycle Impact Reduction	5
1	1		Credit	Building Product Disclosure and Optimization - Environmental Product Declarations (v4.1)	2
1	1		Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials (v4.1)	2
1	1		Credit	Building Product Disclosure and Optimization - Material Ingredients (v4.1)	2
2			Credit	Construction and Demolition Waste Management	2

10	4	2	Indoor Environmental Quality		16
Y			Prereq	Minimum Indoor Air Quality Performance	Required
Y			Prereq	Environmental Tobacco Smoke Control	Required
2			Credit	Enhanced Indoor Air Quality Strategies	2
3			Credit	Low-Emitting Materials (v4.1)	3
1			Credit	Construction Indoor Air Quality Management Plan	1
2			Credit	Indoor Air Quality Assessment	2
	1		Credit	Thermal Comfort	1
	2		Credit	Interior Lighting	2
2		1	Credit	Daylight (v4.1)	3
	1		Credit	Quality Views	1
		1	Credit	Acoustic Performance	1

2	4	0	Innovation		6
1	4		Credit	Innovation	5
1			Credit	LEED Accredited Professional	1

3	1	0	Regional Priority		4
1			Credit	Regional Priority: Enhanced Commissioning (5 point threshold)	1
1			Credit	Regional Priority: Sensitive Land Protection (1 point threshold)	1
1			Credit	Regional Priority: Water Metering (1 point threshold)	1
	1		Credit	Regional Priority: Site Development - Protect or Restore Habitat (1 poin threshold)	1

55	30	21	TOTALS	Possible Points:	110

Certified: 40 to 49 points, **Silver:** 50 to 59 points, **Gold:** 60 to 79 points, **Platinum:** 80 to 110

SECTION 01 9100 - COMMISIONING REQUIREMENTS

PART 1 - GENERAL

1.1 DEFINITIONS

A. Commissioning is the process of documenting that the components and systems provided, manufactured or installed are in accordance with the Contract Documents, and that these components and systems have been properly integrated so as to function reliably and repeatedly in conformance with the design intent. A part of the Commissioning process is the training of operating personnel and the supply of documentation in the form of manuals, Drawings and test data, in the quantity and form as prescribed by the Contract Documents that will properly prepare the operating personnel for the efficient operation of the components and systems over their intended useful life.

B. Punchlisting is the process of documenting in the form of detailed lists, on a scheduled basis as the Work is being completed, the defects and deficiencies in the Work and the transmitting of such lists of defects and deficiencies on a timely basis such that these defects and deficiencies can be corrected prior to the completion of Commissioning.

C. Critical Punchlist Items are items that, in the discretion of the Owner or Commissioning Authority, must be completed before startup shall commence.

D. Installation and Operational checks are the Commissioning steps that, through the completion of Prefunctional Checklists, witnesses that the components and systems as installed conform to the Contract Documents and that the documentation deliverable requirements have been met.

E. Startup is the Commissioning step that, through the following of approved Startup Procedures, witnesses that the components and systems as installed have the correct alignment, balance, calibration, fluid levels, power and controls, that the required safety reviews have been performed, and that activation of the components and systems can be accomplished without obvious malfunction.

F. Startup Procedures are the written series of operational and diagnostic steps that will be followed prior to and during the activation of equipment and systems.

G. Functional Performance Tests are the Commissioning steps that, through the completion of Functional Performance Test forms, witness that the components and systems as installed will function reliably and repeatedly in conformance with the design intent as detailed in the Contract Documents.

H. Operational Staff Training is the Commissioning step that witnesses that the operator training has been accomplished.

I. Checklists are any of the various Commissioning record documents provided as an attachment to this Section and which require signoff by members of the Commissioning Team.

J. Test Reports are any of the various deliverables which document the measurements made of component or system parameters.

1.2 SUMMARY

A. Commissioning will commence after general punchlist items are completed by Trade Contractors. The steps associated with Commissioning activities as follows:

1. Step One: Commissioning Scoping Meeting.
2. Step Two: Collect Preliminary Field Use Operation and Maintenance Manuals.
3. Step Three: Installation Checks.
4. Step Four: Complete Critical Punchlist Items.
5. Step Five: Manufacturer Start-up, Operational Checks and Operational Staff Training.
6. Step Six: Functional Performance Tests.
7. Step Seven: Submit Operation and Maintenance Manuals and Warranty Manuals.
8. Step Eight: Operational Staff Training.

B. The Commissioning Team shall include representatives of the Owner, Commissioning Authority, Construction Manager, Equipment Manufacturers, Installing Sub-Contractors, and the Design Professional. Equipment manufacturers' representatives and the Installing Sub-Contractors will participate in the process as specified in the applicable equipment Specification Sections and on an as-needed basis as required. A certified Testing and Balancing Sub-Contractor will participate per the detailed specifications for testing and balancing of systems as specified in Division 15 and as required to assist with activities listed in detailed description of responsibilities included herein.

C. Prefunctional checklist forms that are associated with each commissioned system are attached. The forms identify the critical components requiring commissioning.

D. Equipment manufacturers' recommended installation and start-up requirements shall be included in the scope of the Installing Trade Contractor's Work.

E. The results of the Commissioning process as well as the baseline performances of Commissioned systems' for future reference to operations and maintenance personnel shall be documented by the Construction Manager.

F. The Construction Manager shall be responsible for performing all procedures presented in the Specifications and on Drawings. Members of the designated Commissioning Team will assist with and witness the Commissioning process. Responsibilities for these activities are listed in the following paragraphs.

Responsibilities listed for each Commissioning Team member are only a guide. The Construction Manager is responsible for assigning final responsibility for all activities. Commissioning Team members will sign-off on appropriate sections as required.

G. The Construction Manager will organize and manage the Work in this Section so that all testing is performed and can be witnessed by the Commissioning Team during normal working hours.

H. If satisfactory results are not achieved, corrective measures shall be identified and corrective action taken before re-testing. All discrepancies and variations shall be documented on a "Commissioning Issues Log" report form. The components or systems shall be re-tested until the results are satisfactory. For areas in dispute, final authority resides with the Owner.

I. At the completion of the commissioning work per facility system, all components, both singularly and collectively, shall be adjusted and left in a satisfactory operating condition as approved by the Owner.

1.3 RELATED SECTIONS

A. Section 01 9110

B. Section 01 9119

1.4 QUALITY ASSURANCE

A. Comply with the following: in accordance with Division 1

1. Associated Air Balance Council (AABC) National Standards for Total System Balance
2. National Environmental Balancing Bureau (NEBB) Procedural Standards for Testing, Adjusting, Balancing of Environmental Systems
3. Air-Conditioning and Refrigeration Institute (ARI) Standards
4. American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standards for Commissioning
5. American Society of Mechanical Engineers (ASME) Standards
6. National Fire Protection Association (NFPA) Standards including, but not limited to, NFPA 70, National Electrical Code (NEC)
7. U.S. Department of Labor, Occupational Safety and Health Administration (OSHA), 29 CFR 1910, Occupational Safety and Health Standards

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION 01 9100