

PROJECT MANUAL

DOVER HIGH SCHOOL & CAREER TECHNICAL CENTER

Dover, New Hampshire

These specifications are a compilation of the original August 12, 2016 100% Construction Documents and published Addenda, including other specific changes communicated by PC Construction during the bidding period. These compiled specifications were prepared for convenience. The completeness and/or accuracy of the information is not guaranteed; any inconsistencies with the 100% Construction Documents and the published addenda and specific changes communicated by PC Construction during bidding period do not alter the requirements of the Contract Documents

HMFH Architects, Inc.

130 Bishop Allen Drive

Cambridge, MA 02139

617 492 2200

***100% Conformed Set
For Construction
VOLUME 1 OF 2***



SET# _____

September 12, 2016

DOCUMENT 000105
LIST OF CONSULTANTS

Architect:	HMFH Architects, Inc. 130 Bishop Allen Drive Cambridge, MA 02139
Structural Engineer:	Foley Buhl Roberts & Associates, Inc. 2150 Washington Street Newton, MA 02462
Plumbing, Fire Protection, HVAC, Electrical, Technology, and Security:	Garcia Galuska DeSousa Consulting Engineers 370 Faunce Corner Road Dartmouth, MA 02747
Civil Engineer	Nobis Engineering Inc. 18 Chenell Drive Concord, NH 03301
Landscape Architect:	Halvorson Design Partnership, Inc. 25 Kingston Street Boston, MA 02111
Cost Estimator:	PM & C 59 South Street Hingham, MA 02043
Specifications:	Kalin Associates, Inc. 1121 Washington Street Newton, MA 02465
Geotechnical:	McPhail Associates, Inc. 2269 Massachusetts Avenue Cambridge, MA 02140
Hardware:	Arc Spec 331 Page St., Ste 4 Stoughton, MA 02072
Furniture and Equipment:	Point Line Space P.O. Box 151 Carlisle, MA 01741

HMFH PROJECT NO. 403114
September 12, 2016

Dover High School & Career Technical Center
Dover, NH

Food Service:

Crabtree McGrath Associates, Inc.
161 West Main Street
Georgetown, MA 01833

Hazardous Materials:

Universal Environmental Consultants
12 Brewster Road
Framingham, MA 01702

Acoustics, Theater and Sound System:

Cavanaugh Tocci Associates, Inc.
327 F Boston Post Road
Sudbury, MA 01776

END OF DOCUMENT

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Dover High School & Career Technical Center
Dover, NH

DOCUMENT 000107
PROFESSIONAL SEALS

SPECIFICATIONS FOR
Dover High School & Career Technical Center

Designer
Architects

Structural Engineers

Landscape Architects

Civil Engineers

Fire Protection Engineers

PROFESSIONAL SEALS
000107-1

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Dover High School & Career Technical Center
Dover, NH

HVAC Engineers

Plumbing Engineers

Electrical Engineers

END OF DOCUMENT

PROFESSIONAL SEALS
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Dover High School & Career Technical Center
Dover, NH

SECTION 011100
SUMMARY OF WORK

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the Contract and General Conditions and all Sections within Division 1 – GENERAL REQUIREMENTS, which are hereby made a part of this Section of the Specifications.
- B. Examine all other Sections of the Specifications for requirements that affect work under this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Work covered by the Contract Documents
 - 2. Contract Method
 - 3. Contract Conditions
 - 4. Work under other contracts
 - 5. Work Sequence
 - 6. Owner-furnished products
 - 7. Construction Manager use of premises
 - 8. Permits, inspection and testing required by Governing Authorities
 - 9. Specification formats and conventions.
 - 10. Reference standards.
 - 11. Miscellaneous Provisions.
 - 12. Available project information.

1.3 WORK UNDER THIS CONTRACT

- A. Project Identification:
Dover High School & Career Technical Center
- B. Project Location:
Dover, NH
- C. Owner:
Dover School Board
- D. Architect:
HMFH Architects, Inc.
130 Bishop Allen Drive

Cambridge, MA 02139
Contact Person: Bobby Williams

E. Description of the Work

1. Project consists of constructing a new 3-story high school building and ancillary buildings; abatement/demolition of the existing school building, and associated site work in Dover, NH. Refer to drawings and specifications for additional requirements.

1.4 CONTRACT METHOD:

1.5 CONTRACT CONDITIONS

- A. This Contract is subject to applicable State and local laws and all amendments thereto. Where any requirements contained herein do not conform to statutes governing the Work of this Contract, the statutes shall govern.
- B. The provisions of the Federal Occupational Safety and Health Act (OSHA) apply to the execution of the Work of this Contract, in addition to all other laws, ordinances, rules, regulations, and orders of any Federal, State, or local public authority bearing on the performance of the Work.
- C. Each and every provision of law and clause required by law to be inserted in this Contract shall be deemed to be inserted herein and the Contract shall be read and enforced as though it were included herein, and if, through mistake or otherwise, any such provision is not inserted, or is not correctly inserted, then upon application of either part the Contract shall forthwith be physically amended to make such insertion or correction.

1.6 WORK UNDER OTHER CONTRACTS

- A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract. Coordinate the Work of this Contract with work performed under separate contracts.

1.7 WORK SEQUENCE

- A. General: The Construction Manager's attention is directed toward the critical activities and limitations listed in this Article to highlight unusual conditions present in this Project.
 1. The Construction Manager shall be responsible for scheduling the Work accordingly, and in conformance with requirements of all other specifications for the Project.
 2. Sequencing requirements shall be clearly identified on all construction schedules required under Section 013200 - Construction Progress Documentation.
 3. General Sequence of Work and Phasing:
 - a. Sitework phasing.
 - b. New Construction.
 - c. Abatement and demolition.
 - d. Sitework completion.
- B. Owner Responsibility: Prior to commencement of construction at the site, the Owner will **remove furnishings from existing buildings.**

- C. Critical Submittals: No structural steel submittals will be reviewed by the Designer until product data and shop drawings for the following equipment has been submitted and approved:
 - 1. Rooftop HVAC units.
 - 2. Cooling tower.

1.8 OWNER-FURNISHED PRODUCTS

- A. Owner will furnish products indicated. The Work includes providing support systems to receive Owner's equipment and making plumbing, mechanical, and electrical connections.
 - 1. Owner will arrange for and deliver Shop Drawings, Product Data, and Samples to Construction Manager.
 - 2. Owner will arrange and pay for delivery of Owner-furnished items according to Construction Manager's Construction Schedule.
 - 3. After delivery, Owner will 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.
 - 7. Construction Manager shall review Shop Drawings, Product Data, and Samples and return them to Architect noting discrepancies or anticipated problems in use of product.
 - 8. Construction Manager is responsible for receiving, unloading, and handling Owner-furnished items at Project site.
 - 9. Construction Manager is responsible for protecting Owner-furnished items from damage during storage and handling, including damage from exposure to the elements.
 - 10. If Owner-furnished items are damaged as a result of Construction Manager's operations, Construction Manager shall repair or replace them.
 - 11. Construction Manager shall install and otherwise incorporate Owner-furnished items into the Work.
- B. Note that items labeled "N.I.C." on the Drawings will be furnished and installed by the Owner under a separate contract after the completion of the Work.

1.9 CONTRACTOR USE OF PREMISES

- A. General: Construction Manager shall have full use of premises for construction operations, including use of Project site, during construction period.
 - 1. Confine operations at the site to areas permitted by laws, by-laws, permits and contract limit lines.
 - 2. Do not unreasonably encumber the site with materials or equipment.
 - 3. Coordinate with Owner and Architect work in connection with adjacent occupied buildings or areas, driveways, walks, and other facilities which would prevent access thereto or interrupt, restrict, or otherwise infringe upon use thereof.
- B. On-Site Work Hours: Work shall be generally performed inside the building during normal business working hours of **7AM – 5PM Weekdays // 7AM – 4PM Saturdays // No Work**

Sundays & Holidays. Comply with local noise ordinance. Construction Manager shall be required to seek work hour variance for requested/planned Work on-site outside of the hours above.

- C. Existing Utility Interruptions: Refer to Section 011400 - Work Restrictions.
- D. Construction Manager Parking: Parking of Construction Manager's vehicles and those of his Subcontractors will be allowed only within Limit of Work area located where shown on Drawings. Construction Manager shall be responsible for parking arrangements, regulation and control of such parking and resulting traffic. Each Subcontractor shall make arrangements with Construction Manager for required parking of his vehicles.
- E. On-Site Delivery and Storage of Construction Materials: Do not permit materials and fabricated work to be stacked on, or be transported over, floor and roof construction in such a manner as to stress any construction beyond the designed live loads. Assume full responsibility for protection and safekeeping of products stored on premises. Obtain and pay for use of additional storage or work areas needed for operations. Limit use of site to work and storage of materials for this project.
 - 1. Maintain clean, dry storage areas for construction materials and minimize their exposure to dust. Refer to Section 018119 – Indoor Air Quality Requirements and individual Division 2 through 50 Sections for additional requirements.
 - 2. Do not store foamed polystyrene, polyurethane or like materials within the building. Take proper precautionary measures regarding the Storage of such materials outside the building.
- F. Construction Manager shall be responsible for adequate site drainage during the entire construction period and shall use any appropriate temporary means that does not adversely affect construction progress or abutting property.
- G. Construction Manager shall take all necessary safety precautions and maintain an adequate level of fire protection at all times.
- H. Do not use areas outside the Limit of Work area for temporary storage or structures without specific written permission from the Architect and Owner.

1.10 PERMITS, INSPECTION AND TESTING REQUIRED BY GOVERNING AUTHORITIES

- A. If the Contract Documents, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any portion of the Work to be inspected, tested, or approved, the Construction Manager shall give the Designer and such Authority timely notice of its readiness so the Designer may observe such inspection and testing.
- B. Prior to the commencement of construction, the Construction Manager shall complete application to the appropriate Building Code enforcement authority for a Building Permit. Such Permit shall be displayed in a conspicuous location at the Project Site.
- C. The Construction Manager shall pay for Building Permit and other permits required by local authorities unless otherwise indicated.

1.11 REFERENCE STANDARDS

- A. For products specified by association or trade standards, comply with requirements of the

standard, except when more rigid requirements are specified or are required by applicable codes.

- B. The date of the standard is that in effect as of the bid date, except when a specific date is specified.
- C. Obtain copies of standards when required by Contract Documents. Maintain copy at job sit during progress of the specific work.

1.12 SPECIFICATION FORMATS AND CONVENTIONS

- A. Specification Format: The Specifications are organized into Divisions and Sections using the 50-division format and CSI/CSC's "MasterFormat" numbering system.
 - 1. Section Identification: The Specifications use Section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete because all available Section numbers are not used. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of Sections in the Contract Documents.
 - 2. Division 1: Sections in Division 1 govern the execution of the Work of all Sections in the Specifications.
- B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
 - 2. All instructions in the Specifications are addressed to the Construction Manager unless the responsibility of the Designer or Owner is clearly indicated.
 - a. Where products are listed or described in outline form, the phrase "The Construction Manager shall furnish these products" is implied.
 - b. Where installation instructions or performance criteria are listed or described in outline form, the phrase "The Construction Manager shall perform the Work in accordance with these requirements" is implied.
 - c. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
- C. Definitions:
 - 1. Indicated: The word "indicated" refers to graphic representations, notes or schedules on Drawings, Paragraphs or schedules in Specifications, and similar requirements in Contract Documents. Terms such as "shown", "noted", "scheduled", and "specified" are used to help locate a reference. No limitation on location is intended except as specifically noted.
 - 2. Directed: Terms such as "directed", "requested", "authorized", "selected", "approved", "required", and "permitted", are hereby defined as "directed by Designer", "requested by Designer", "authorized by Designer", and other like items. No implied meaning shall be interpreted to extend the Designer's responsibility into the Construction Manager's area of construction supervision.
 - 3. Approve: The term "approved" when used in conjunction with the Designer's action on

- the Construction Manager's submittals, applications, and similar requests, is limited to the duties and responsibilities of the Designer as stated in GENERAL CONDITIONS. Such approval shall not release the Construction Manager from responsibility to fulfill Contract requirements unless otherwise provided in the Contract Documents.
4. Furnish: Supply and deliver to the Project Site, ready for unloading, unpacking, assembly, installation, and similar operations.
 5. Install: Operations at Project Site, including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
 6. Provide: To furnish and install, complete and ready for intended use.
 7. Installer: The Construction Manager or entity engaged by the Construction Manager, either as an employee, subcontractor, or sub-subcontractor for performance of a particular construction activity, including installation, erection, application, and similar operations. Installers are required to be experienced in the operations they are engaged to perform.
 8. Owner: The Awarding Authority.
 9. Authority having Jurisdiction: Any State, Local, or legal authority, as defined by statute.
- D. "Or Equal", "Or Equivalent": clause:
1. Where products or materials are prescribed by manufacture name, trade name or catalogue reference, the word "or approved equal" shall be understood to follow.
 2. An item shall be considered equal or equivalent to the named item, if all of the following conditions are met:
 - a. It is at least equal in appearance, quality, durability, strength and design.
 - b. It meets or exceeds all performance requirements specified.
 - c. It performs the function of the item to an equal or superior standard as does the named item.
 3. All deviations from products specified shall be submitted as substitutions. For related procedures, refer to Section 013300 – Submittal Procedures.

1.13 MISCELLANEOUS PROVISIONS

- A. Discovery: If during the excavation or other work, articles of unusual value, or of historical or archaeological significance are encountered the ownership of such articles is retained by the Owner, and information regarding their discovery shall be immediately furnished to the Designer.
1. If the nature of the article is such that the work cannot proceed without danger of damaging same, work in that area shall be immediately discontinued until the Designer has decided the proper procedure to be followed.
 2. Any time lost thereby shall be a condition for which the time of the Contract may be extended.
 3. All costs incurred after discovery in the salvaging of such articles shall be borne by the Owner.
- B. Refer to Section 013100 – Project Management and Coordination, Article 1.4, B. for particular project supervision requirements.
- C. Product and Material Requirements: In addition to product and material requirements as specified throughout the Project Manual, preference shall be given to materials mined or manufactured in New Hampshire first and the United States of America second wherever possible.

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Dover High School & Career Technical Center
Dover, NH

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 011400
WORK RESTRICTIONS

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the Contract and General Conditions and all Sections within Division 1 – GENERAL REQUIREMENTS, which are hereby made a part of this Section of the Specifications.
- B. Examine all other Sections of the Specifications for requirements that affect work under this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 SUMMARY

- A. The Work of this Section includes, but is not limited to, requirements for the following procedures:
 - 1. Construction Manager responsibility for Architect's additional services.
 - 2. Construction Documents, Project Electronic Files and graphic reproduction of Contract Documents.
 - 3. Interpretation and modification of Contract Documents.
 - 4. Construction Manager's reports.
 - 5. Cleaning materials
 - 6. Safety and disposal requirements.
 - 7. Conduct of the Work.
 - 8. Existing Utilities.
 - 9. Conduct of construction personnel and noise control.
 - 10. Safety and disposal requirements and accident prevention.
 - 11. Welding and cutting.
 - 12. Fire watch.
 - 13. Municipal police services
 - 14. Storage of materials off-site
 - 15. Dust control.
 - 16. Cleaning during construction.
 - 17. Debris control and removal of rubbish.
 - 18. Pollution control.
 - 19. Owner's occupancy requirements
- B. Related work includes, but is not limited to, the following work under other Sections:
 - 1. Section 013200 – CONSTRUCTION PROGRESS DOCUMENTATION: Preparation and execution of construction schedule.
 - 2. Section 013100 – PROJECT MANAGEMENT COORDINATION: Procedures and responsibilities for coordinating the Work.
 - 3. Section 013300 – SUBMITTAL PROCEDURES. Submittal procedures.

4. Section 015000 – TEMPORARY FACILITIES AND CONTROLS, for additional information on temporary measures required during construction.
5. Section 017400 – CLEANING AND WASTE MANAGEMENT, for removal of non-hazardous debris including provisions for recycling and disposal.
6. Section 017700 – CLOSEOUT PROCEDURES: Procedures for completing the Work.
7. Section 017839– PROJECT RECORD DOCUMENTS: Preparation of record drawings and other documents.
8. Section 310000 – EARTHWORK, for removal of contaminated soils and liquids.

1.3 SUBMITTALS

- A. General: Refer to Section 013300– SUBMITTALS, for submittal provisions and procedures.
- B. Layout of Temporary Construction Facilities: Submit location plan showing office, trailer and storage layout.
- C. Logistics Plan:
 1. Construction Manager shall submit to the Architect, at the Pre-construction Meeting, a detailed Logistics Plan, which shall include:
 - a. Delivery Hours and Delivery Routes
 - b. Gate location, and wheel washing location.
 - c. Hours of Work
 - d. Trailer Area, and Layout of trailers
 - e. Parking locations for use of Owner and Construction Manager within the area of work
 - f. Temp fencing, erosion control, and metering locations
 - g. Location for stockpiling of soil
 - h. Location for stockpiling plowed snow
 - i. Locations for waste management containers.
 - j. Protection of existing curbs and walkways.
 - k. Lighting Plan
 - l. Traffic plan.
 - m. Police detail.
 - n. Pedestrian safety plan on site.
 2. Refer to Section 015000 – TEMPORARY FACILITIES AND CONTROLS, for specifications for temporary construction and other items to be shown on Logistics Plan.
 3. No work shall commence until the Logistics Plan has been approved.
 4. Refer to the attached Safety and Traffic Control Plan, which is hereby made part of the Contract Documents.
- D. Photographs: Progress Prints and videotapes as specified in this Section.
- E. Reports:
 1. Documentation of off-site storage facilities.
 2. With each Application for Payment, submit the following reports, compiled on a monthly basis:
 - a. Construction Manager's Reports
 - b. Proof of submission of Certified weekly payrolls to Owner.

- c. Monthly cost projections.

1.4 CONTRACTOR RESPONSIBILITY TO THE OWNER FOR ARCHITECT'S ADDITIONAL SERVICES

- A. The Contract between the Owner and the Architect contains provisions for additional services that may be required of the Architect during construction due to unforeseen conditions.

- 1. Where such additional services become necessary due to the activities of the Construction Manager, as determined by the Owner's Project Manager, costs for such services will be the responsibility of the Construction Manager, and will be deducted from the Contract Amount.

- B. Additional services for which the Construction Manager is responsible for cost to the Owner may include the following activities of the Architect:

- 1. Review of Requests for Information and Change Order Requests for work determined to be covered in the Contract Documents. Refer to related Articles in this Section.
 - 2. Continuation of construction administration beyond the dates specified for Final Completion of the Work: Refer to Section 013200 – CONSTRUCTION PROGRESS DOCUMENTATION.
 - 3. Review of re-submitted submittals and Substitution Requests that have been rejected: Refer to Section 013300 – SUBMITTAL PROCEDURES.
 - 4. Re-inspection of incomplete work: Refer to Section 017700 – CLOSEOUT PROCEDURES.
 - 5. Design services for the resolution of non-conforming work.

1.5 CONSTRUCTION DOCUMENTS

- A. All hard copies of the Contract Documents required by the Construction Manager or subcontractors for use during the construction period shall be purchased by the party requiring same. Owner's Project Manager will furnish approximate costs of such additional copies and will transmit originals to local printing companies with whom he regularly does business, but will not receive bills for such printing through his account. All negotiations for such printing shall be between Construction Manager and Printer.

- 1. Refer to provisions in this Section, for electronic copies of documents to be made available for the Construction Manager's use during construction.
 - 2. Refer to Section 017839 – PROJECT RECORD DOCUMENTS, for additional sets to be provided by the Owner to the Construction Manager for the purpose of maintaining record prints of the Work as construction proceeds.

1.6 PROJECT ELECTRONIC FILES

- A. Definitions:

- 1. Contract Documents: Printed hard copies of drawings and other documents, as defined in the General Conditions and listed in the signed copy of the Form of Agreement between Owner and Construction Manager.
 - a. In case of conflict between the Contract Documents and documents obtained through electronic means, the Contract Documents shall govern.

2. Project Electronic Files: Electronic copies of electronic documents for the Project, comprising drawings listed on Document 011401 – Electronic Release Form.
- B. General Procedures: At the Pre-Construction Meeting, the Architect will present to the Construction Manager one compact disc (CD) with Project Electronic Files, for use in the preparation of coordination and record documents for the Project.
1. Release Forms Required:
 - a. The Construction Manager shall sign a copy of Document 011401 – Electronic Release Form, to be filled out and issued by the Architect.
 - b. By signing the release form, the Construction Manager is acting on behalf of all their subcontractors for the Work of this Project.
 2. Additional copies of the compact disc with Project Electronic Files will be available from the Architect at an additional cost.
- C. Electronic File Format:
1. Editable Files: Electronic files for drawings listed on Document 011401 – Electronic Release Form will be furnished in “*.DWG” format.
 2. Printable, Non-Editable Files: Electronic files for all Drawings in the Bid Set and for Drawings issued as Addenda will be furnished in “*.PDF” format (Adobe Acrobat Reader, version 6.0).
 3. HMFH Architects, Inc. does not warrant that these electronic documents are compatible with any software or hardware other than those on which they were produced.
- D. Permitted Use of Project Electronic Files: Use of electronic files by the Construction Manager and Sub-Contractors is limited to the following activities:
1. Project Electronic Files may be used as a guide only for the preparation of Coordination Drawings and Record Drawings to be submitted as a requirement for the Project.
 2. Project Electronic Files may be used as a guide only for preparation of shop drawings. Exact copies of Contract Documents will not be accepted if submitted for these purposes, unless specifically permitted by an individual specification Section.
- E. Responsibilities of Construction Manager: Use and reproduction of Project Electronic Documents are subject to the following conditions:
1. The use of Project Electronic Files, reproduced either electronically or by other graphic reproduction methods, does not in any way alter the responsibilities of the Construction Manager for final system coordination. The Construction Manager shall incur all liability in this respect.
 2. The Construction Manager and all Subcontractors are responsible for checking the dimensions and completeness of the Project Electronic Files, and for determining any possible errors and omissions, as required by the General Conditions.
 3. The Construction Manager is responsible for updating Project Electronic Files as necessary to incorporate changes to the Work shown in Addenda and documents issued during construction.
 4. In no event shall HMFH Architects, Inc., or any other Person or Firm involved in the creation, production or distribution of the reproducible or electronic documents, be liable to the persons utilizing the documents, on account of any claim for damages. Each Person or Firm utilizing these documents agrees to release, indemnify, hold harmless and defend HMFH Architect, Inc., its officers, employees and consultants from an against all liability arising out of such firm’s use of the electronic or reproduced documents or infor-

mation referred to herein.

- F. Ownership of Documents: By transferring copies of Project Electronic Files, HMFH Architects, Inc. and the Owner do not in any way convey the copyright in the designs contained therein, nor do they convey a license to copy or use them for any purpose except as required for the construction of the Project.
- G. License for Software: By transferring copies of Project Electronic Files, HMFH Architects, Inc. does not in any way convey transfer license to use the software on which the documents were prepared. Each entity using Project Electronic Files is responsible for obtaining licenses as needed for its use of those files.

1.7 GRAPHIC REPRODUCTION OF CONTRACT DOCUMENTS

- A. Reproduction of Contract Documents issued for the Project, by graphic reproduction methods, shall be subject to the conditions outlined for reproduction of Project Electronic Files.

1.8 INTERPRETATION AND MODIFICATION OF CONSTRUCTION DOCUMENTS

- A. Refer to General and Supplementary Conditions for general information on Change Orders, Work Change Directives, Field Orders and Architect's written amendments and clarifications. The intent of this Article is to provide for additional procedures to be followed during construction.
- B. Requests for Information: Each time the Construction Manager or Subcontractor has a reasonable question on the interpretation of the Contract Documents, they shall submit in writing a Request for Information (RFI) to the Architect for response.
 - 1. The Construction Manager shall examine field conditions carefully and review the Drawings and Specifications thoroughly prior to issuing an RFI.
 - 2. The Construction Manager shall keep a log of RFI's, numbering them in the order in which they are issued.
 - 3. Each RFI shall contain a clear statement of the question, references to relevant Contract Documents and additional background information as needed to facilitate the Architect's review.
 - 4. All requests for information from Subcontractors shall be made through the Construction Manager and addressed to the Architect, and the Architect will distribute them as needed to the appropriate Consultants. A copy of each RFI shall be given to the Clerk of the Works.
 - 5. RFI's shall be issued in a timely manner to permit a thorough review and preparation of a response by the Architect and their Consultants. The Construction Manager shall identify on the RFI form whether the RFI is low, medium or highly critical and shall note the date that the RFI response is due in order not to affect the construction progress schedule.
 - 6. The Architect will prepare a written response to each RFI within 10 workdays, or sooner if the Construction Manager provides a realistic date when the response will be needed.
- C. Proposal Requests: During construction, it may become necessary or desirable to modify the Contract Drawings or Specifications in response to concealed existing conditions, changes in the Owner's program or other unforeseen circumstances.
 - 1. Where such a modification may involve a change in the Contract price or time, the Archi-

- tect will prepare a Proposal Request describing the modification under consideration, including sketches or drawings, specifications and other information to permit pricing by the Construction Manager.
2. Copies of each Proposal Request and its attachments will be distributed to the Owner, Clerk of the Works and Construction Manager.
 3. The Construction Manager shall respond in a timely manner with a Proposed Change Order detailing the estimated costs and change in Contract duration, for review by the Architect and approval by the Owner.
 4. A Proposal Request will not constitute direction to proceed with the modification unless accompanied by a Work Change Directive and an estimated price.
- D. Change Order Requests: If the Construction Manager is required to perform Work that they consider to represent a change in the cost of the Project, they may submit Change Order Requests for such work in accordance with the General Conditions and Supplementary General Conditions.
1. Each Change Order Request shall be accompanied by a document describing the modification under consideration, including sketches or drawings, specifications and other information to permit review of pricing by the Architect and Owner.
 2. Distribute copies of each Change Order Request and its attachments to the Owner, Clerk of the Works and Architect.
 3. The Architect and Owner will respond in a timely manner with a Proposed Change Order incorporating the Change Order Request if it is approved.
 4. Verbal approval of a Change Order Request will not constitute direction to proceed with the modification unless accompanied by a Change Order, or a Construction Change Directive with an estimated price.
- E. Architect Review of Construction Manager-Generated Requests for Information and Change Order Requests: The Architect will review and prepare written responses to the Construction Manager's Requests for Information and Change Order Requests that are submitted in accordance with the requirements of this section.
1. If the Construction Manager submits an excessive number of requests for information that are incomplete, or for which the information requested is available from a careful study and comparison of the Contract Documents, field conditions, other Owner-provided information, Construction Manager-prepared or other prior Project correspondence or documentation, then the Construction Manager shall be responsible to the Owner for costs for Additional Services of the Architect to review those requests for information.
 2. If the Architect determines that the Work covered by a Change Order Request is covered by the scope of the Contract Documents, the Construction Manager shall be responsible to the Owner for costs for Additional Services of the Architect to evaluate proposals and prepare Instruments of Service associated with such Change Order Request.
 3. Refer to other paragraphs in this Section for procedures required in cases where Construction Manager is responsible to the Owner for costs for Additional Services of the Architect.

1.9 CONTRACTOR'S REPORTS

- A. A daily report summarizing the work performed, weather conditions, number of workers, amount and kinds of equipment, unusual occurrences, and the like shall be submitted by the Construction Manager's Field Superintendent to the Architect, the Owner, the Clerk of the Works, each working day covering the work performed on the previous working day.

- B. Form of the daily report shall be as approved by the Architect.

PART 2 - PRODUCTS

2.1 CLEANING MATERIALS

- A. Use only those materials which will not create hazards to health or property and which will not damage surfaces.
- B. Use only those cleaning materials and methods recommended by manufacturer or surface material to be cleaned.
- C. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 - EXECUTION

3.1 CONDUCT OF WORK

- A. The Contract Site shall be as shown on the Drawings, and shall include the entire area bound by the "Contract Limit" or "Limit of Work" lines as well as all areas outside of the Limit of Work Lines when required for performance of work under this Contract.
- B. Construction Manager shall take all steps necessary to protect existing conditions to remain. Damage to existing work caused by Construction Manager's operations under this Contract shall be repaired at Construction Manager's expense.
- C. Any street, paving, curb and/or sidewalk damaged as the result of work under this Contract, whether within or outside the limits of the Work, shall be repaired and/or replaced with new matching construction by the Construction Manager at his expense and in a manner satisfactory to the Architect and authorities having jurisdiction.
- D. Protection of Curbs and Walkways: Where existing curbs or walks are to remain, or after new curbs or walks are constructed and trucking is required over them, they shall be suitably protected as shown on approved Logistics Plan.
- E. Trenching and other work outside construction limits shall be expedited to the fullest and carried out with minimum of inconvenience to normal operations of Owner and public traffic. Walks, paved or landscaped areas over which temporary driveways cross shall, upon completion of the Work, be restored to their original condition with new construction. Temporary roadways shall be bridged over trenched areas.
- F. Provide continuous, lawful, safe, adequate and convenient access to the site. Construction Manager shall construct and maintain in good, safe, usable condition temporary roads, capable of supporting emergency vehicles, and appurtenances as required, and when no longer required, remove temporary construction and restore such areas to their original condition, or as otherwise specified in the Contract Documents.

3.2 EXISTING UTILITIES

- A. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner, or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Owner not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Owner's written permission.
- B. Immediately repair any active existing utility lines (cables, conduit, ducts, and piping), damaged during the course of construction. Protect and maintain such active existing utilities in use, until relocation of same has been completed or utilities have been cut, capped, or prepared for new service connections, as applicable. Perform such repair and protection work at no additional cost to the Owner.
- C. If any existing active utility not indicated on the Drawings is unintentionally damaged, and such utility is to remain, immediately repair the damage and restore the utility to its original integrity. Reimbursement of cost for performing such repair will be made by an adjustment in the Contract Price in accordance with the General Conditions of the Contract.
- D. Any adjustment as outlined above shall be based on the assumption that the Construction Manager has performed in a prudent manner at the time such damage occurred. If extra expense is incurred in protecting and maintaining any utility line not shown on the Drawings, nor revealed by a "Dig-Safe" inspection, an adjustment in the Contract Price shall be made.
- E. The Owner will cooperate and assist the Construction Manager in locating and identifying underground utilities. Construction Manager shall cooperate and participate in "Dig Safe" programs, notifying proper authorities before proceeding.
- F. If it becomes necessary to interrupt power, water line, sewer, gas or other utilities to adjacent buildings, notify the Architect and Owner's Project Manager at least four (4) days in advance. Schedule such interruptions at such times as will minimize disruption and inconvenience to users. Construction Manager shall be responsible for notification to neighboring properties as required.

3.3 CONDUCT OF CONSTRUCTION PERSONNEL

- A. Smoking is not permitted on school property, including the construction site.
- B. Under no circumstances shall workers on site have interactions with students.
- C. Use of profanity is prohibited.

3.4 NOISE CONTROL

- A. Develop and maintain a noise-abatement program and enforce strict discipline over all personnel to keep noise to a minimum. Submit noise abatement program to Owner's Project Manager and Architect for review prior to use of noise generating equipment.
- B. Execute construction work by methods and by use of equipment that will reduce noise and which will provide minimum interference with neighborhood activities.

1. Employ construction methods and equipment that will produce the minimum amount of noise.
 2. Equip air compressors with silencers, and power equipment with mufflers.
 3. Handle vehicular traffic and scheduling to reduce noise.
- C. Do not allow radio and electronic entertainment equipment to be operated at volume that makes ordinary conversation difficult at ten (10) feet from such equipment.
- D. Do not run equipment, including idling of vehicles outside of the specified hours of work.

3.5 SAFETY AND DISPOSAL REQUIREMENTS

- A. Standards: Maintain project in accordance with State Building Code and local ordinances.
- B. Hazards Control: Store volatile wastes in covered metal containers and remove from premises. Prevent accumulation of wastes which create hazardous conditions. Provide adequate ventilation during use of volatile and noxious substances.
- C. Disposal: Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws. Do not burn or bury rubbish and waste materials on project site. Do not dispose of hazardous wastes such as solvents, mineral spirits, oil, paint, paint thinner in storm or sanitary drains. Do not dispose of wastes into streams or waterways.

3.6 ACCIDENT PREVENTION

- A. Comply with all Federal, State and municipal recommendations and requirements for safety and accident prevention, those of the Associated General Contractor of America and the American National Standards Institute (ANSI Standard A10.2). Conduct regular, frequent inspections of the site for compliance with safety regulations.
- B. Neither the Owner nor the Architect will be responsible for providing a safe working place for the Construction Manager, Subcontractors, or their employees, or any individual responsible to them for the Work.

3.7 WELDING AND CUTTING

- A. Where electric or gas welding or cutting work is done above or within ten (10) feet of combustible material or above space that may be occupied by persons, use interposed shields of incombustible material to protect against fire damage or injury due to sparks and/or hot metal.
- B. Place tanks supplying gases for gas welding or cutting at no greater distance from the work than is necessary for safety, securely fastened and maintained in an upright position where practicable. Such tanks, when stored for use, shall be remote from any combustible material and free from exposure to the direct rays of the sun or high temperatures. Storage shall be secured under lock and key, to prevent unauthorized use of gas and equipment.
- C. Maintain suitable fire extinguishing equipment near all welding and cutting operations. When operations cease for the noon hour or at the end of the day, thoroughly wet down the surroundings adjacent to welding and cutting operations. Properly protect any new materials, stored or installed, that are subject to water damage.

- D. Station a worker equipped with suitable fire extinguishing equipment near welding and cutting operations to see that sparks do not lodge in floor cracks or pass through floor to wall openings or lodge in any combustible material. Keep the worker at the source of work which offers special hazards for a minimum of thirty (30) minutes after the job is completed to make sure that smoldering fires have not been started.
- E. Place a qualified electrician in charge of installing and repairing electric and arc welding equipment.

3.8 FIRE WATCH

- A. Comply with authorities having jurisdiction for fire watch requirements during hot work operations. Hot work shall include but not be limited to welding, torch and open flame work, cutting of steel, and other similar operations. Schedule and pay for fire watch services as required by authorities having jurisdiction.

3.9 MUNICIPAL POLICE SERVICES

- A. Make all necessary arrangements with the municipal police department in advance of times when regular, off-duty, or reserve police officers will be needed for traffic control or protection due to operations performed under this Contract.
- B. Pay police officers in accordance with rates established by the municipality for such services:

3.10 STORAGE OF MATERIALS OFF SITE

- A. The Construction Manager, Subcontractors and Sub-subcontractors shall obtain prior written approval from the Owner through the Architect for permission to store materials to be incorporated in the Work, for which Progress Payments will be requested, at off-site locations. Any and all charges for storage, including insurance, shall be borne solely by the Construction Manager. Before approval, Owner will require proper proof of insurance and a letter in which is furnished:
 - 1. The names of the Construction Manager and/or Subcontractor or subordinate Subcontractor leasing the storage area.
 - 2. The location of such leased space.
 - 3. Description of the leased area: The entire premises or certain areas of a warehouse giving the number of floors or portions thereof.
 - 4. The date on which the material is first stored.
 - 5. The value of the material stored.
 - 6. Transfer of title for such materials in a form acceptable to the Owner.
- B. Requirements for storage facility at which materials will be stored off-site:
 - 1. The storage facility shall be a bonded warehouse.
 - 2. The Construction Manager shall permit access to the storage facility to the Clerk of the Works upon request.
- C. Construction Manager, Subcontractors and subordinate Subcontractors shall provide prior to the request for payment for such stored materials, adequate advanced notice, to the Architect so that the Owner or Architect can inspect, at their convenience, the materials being stored at

any location.

- D. Each sealed carton shall be marked with the Project name, the Owner's name and the Architect's name as they appear in the Agreement.
- E. A perpetual inventory shall be maintained for all materials held in storage for which payment has been requested.
- F. Payment for materials stored off site shall be at the sole discretion of the Owner. Any additional costs to the Owner resulting from storage of material off site for which payment is requested, such as, but not limited to, travel expenses and time for inspectors shall be back-charged to, and paid by, the Construction Manager.

3.11 DUST CONTROL

- A. Maintain the construction site, stockpiles, access, detour, and haul roads, staging and parking area used for the Work, free of dust which would cause a hazard or a nuisance to those at the site or adjacent sites.
- B. Provide environmentally safe and positive methods and dust control materials to minimize raising dust from construction operations, and provide positive means to prevent air-borne dust from dispersing into the atmosphere.
- C. Wet down dry materials and rubbish to lay dust and prevent blowing dust.
- D. Clean interior spaces prior to the start of finish painting and continue cleaning on an as-needed basis until painting is finished.
- E. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly-coated surfaces, including paint, coatings, sealants, caulking, adhesives.
- F. Furnish, erect, and maintain for the duration of the work period, temporary fire-retardant dust proof coverings and partitions as required to prevent the spread of dust beyond the immediate area where work is being performed.
- G. These provisions do not supersede any specific requirements for methods of construction or applicable regulations or general conditions set forth elsewhere in the Contract with regard to performance obligations of the Construction Manager.

3.12 CLEANING DURING CONSTRUCTION

- A. Execute cleaning during progress of work and at Substantial Completion, as required by General Conditions, and as herein specified. Refer to Section 017400 – Cleaning and Waste Management for more information.
- B. Maintain premises and public properties free from accumulations of waste, debris and rubbish caused by operations. At completion of work, remove waste materials, rubbish, tools, equipment, machinery, and surplus materials, and clean all exposed surfaces; leave project clean and ready for occupancy.
- C. Cleaning shall be in addition to cleaning specified under other sections and shall include all

surfaces, interior and exterior in which or to which the Construction Manager has had access.

- D. Refer to Sections of the Specifications for cleaning of specific products.
- E. Execute cleaning to ensure that the building, the site, and adjacent properties are maintained free from accumulations of waste materials and rubbish and windblown debris, resulting from construction operations.
- F. Provide on-site containers for collection of waste materials, debris and rubbish.
- G. Remove waste materials, debris and rubbish from the site periodically and dispose of at legal areas off site.
- H. Handle materials in a controlled manner with as few handling as possible. Do not drop or throw materials from heights.
- I. Schedule cleaning operations so that dust and other contaminants resulting from cleaning processes will not fall on wet newly painted surfaces, uncured caulking, sealants, adhesives, and other like items

3.13 DEBRIS CONTROL AND REMOVAL OF RUBBISH

- A. Ensure that each Subcontractor engaged in the Work bears full responsibility for cleaning up during on a daily bases and immediately upon completion of his work, and removes all rubbish, waste, tools, equipment, and appurtenances caused by and used in the execution of his work; but this shall in no way be construed to relieve the Construction Manager of primary responsibility for maintaining a clean building and site free of debris, leaving all work broom clean and in a condition satisfactory to the Architect, Project Manager, and Owner. Refer to Section 017400 – Cleaning and Waste Management for more information.
- B. Provide at least one tightly built chute serving each level which shall lead down to angle offset and sliding panel chute at a convenient loading point for trucks or dumpsters.
- C. Do not permit any material to be thrown from open floors, windows or roof of the building.
- D. Immediately after unpacking, remove all packing materials, case lumber, excelsior, wrapping and other rubbish, flammable and otherwise, from the building and premises.
- E. Initiate and maintain a specific program to prevent the accumulation of debris at the construction site, storage and parking areas, or along access roads and haul routes: Provide containers for deposit of debris and schedule periodic collection and disposal of debris. Prohibit overloading of trucks to prevent spillage on access and haul routes.
- F. Construction Manager shall make provisions for snow and ice removal, as required. In addition Construction Manager shall provide wheel-washing stations at site egress gates, as directed by the Project Manager, to maintain clean neighborhood streets.

3.14 POLLUTION CONTROL, GENERAL

- A. Provide methods, means and facilities required to prevent contamination of soil, water and atmosphere by the discharge of noxious substances from construction operations.

- B. Remediation of Spills: Provide equipment and personnel, perform emergency measures required to contain any spillages, and to remove contaminated soils or liquids. Excavate and dispose of contaminated earth off site and replace with suitable uncontaminated compacted fill and topsoil, in accordance with the requirements of Section 310000 - EARTHWORK.
- C. Take special measures to prevent harmful substances from entering public waters. Prevent disposal of wastes, effluents, chemicals, or other such substances adjacent to streams or in sanitary or storm sewers.
- D. Provide systems for control of atmospheric pollutants. Prevent toxic concentrations of chemicals. Prevent harmful dispersal of pollutants into the atmosphere.

3.15 OWNER'S OCCUPANCY REQUIREMENTS

- A. Owner Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed areas of building, before Substantial Completion dates, 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. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied before Owner occupancy.
 - 2. Obtain a Certificate of Occupancy from authorities having jurisdiction before 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 building.
 - 4. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of building.
- B. If the Project is substantially complete by the specified date for Substantial Completion, the Owner at his election may from time to time, or permanently, occupy the building or any portion thereof as the work is completed to such a degree as will, in the opinion of the Owner, permit the use of the building or other portions of the Project for the purpose for which they are intended.
- C. The Owner will, prior to any such partial occupancy, give notice to the Construction Manager thereof and such occupancy shall be predicated upon the following conditions:
 - 1. In the case of partial occupancy prior to the stipulated completion date, the Owner shall secure endorsement from the Construction Manager's insurance carrier and consent of the surety permitting occupancy of the building or use of the Project during the remaining period of construction.
 - 2. In the case of partial occupancy after the stipulated completion date, the Construction Manager shall extend all the necessary insurance coverage as stipulated until the date of Final Acceptance of the Project. Owner's use and occupancy prior to final Acceptance shall not relieve the Construction Manager of his responsibility to maintain the insurance coverage as required by the Contract Documents.
 - 3. In case of such partial occupancy, the guarantee period called for by the Contract Documents shall commence on the date of Substantial Completion of the Phase containing the guaranteed Work.
 - 4. Occupancy of the building or any portion thereof by the Owner, shall not constitute an

acceptance of the Work or of work not performed in accordance with the Contract Documents or relieve the Construction Manager of responsibility to perform any work required by the Contract but not completed at the time of occupancy.

5. If the Owner occupies the building as a result of the Construction Manager's failure to substantially complete the work by the specified date, the Construction Manager shall pay maintenance costs on the portion of the building occupied under this Agreement until Substantial Completion.
6. The Construction Manager shall be required to furnish heat, electricity and water used in the occupied portion of the building, from the time of the occupancy by the Owner until Substantial Completion of the new high school.

END OF SECTION

Attachments:

Document 011401 – Electronic Release Form

HMFH PROJECT NO. 403114
September 12, 2016

Dover High School & Career Technical Center
Dover, NH

FORM 011401
ELECTRONIC RELEASE FORM

To: [Contractor/Construction Manager]
[Street]
[Town, State]

Date: [Date documents are transmitted]

Project: Dover High School & Career Technical Center

RE: Project Electronic Files

Project Electronic Files are made available to the undersigned with the following conditions:

The undersigned agrees to accept from HMFH Architects, Inc. and its consultants the electronic files for the referenced project, as listed in the attached table, without any warranties, guarantees and/or representations of any nature whatsoever regarding the correctness, accuracy and/or completeness of any information contained therein.

The undersigned further agrees that such information shall be used as reference material only and then only for the referenced project and not for any other projects or future additions to the referenced project, without express written consent from HMFH Architects, Inc. and its consultants for each instance.

The undersigned further agrees to release, indemnify, hold harmless and defend HMFH Architects, Inc. and its consultants with respect to any claims, costs, losses, damages and/or liabilities arising out of, or relating to the use, misuse, modification, interpretation, misinterpretation and/or misrepresentation of any such information.

The undersigned further agrees to the requirements and limitations for the use of Project Electronic Files as stated in Section 011400 Work Restrictions.

Sincerely,
HMFH Architects, Inc.

Accepted and Agreed to:

(General Contractor/Construction Manager)

By: _____

Title: _____

Attachment: List of Project Electronic Files

List of Project Electronic Files

File Format	Drawing Number	Drawing Title
PDF	All drawings listed on Drawing List - Volumes 1 & 2	Entire Bid Set of Drawings
PDF	Specifications - Volumes 1 & 2	Entire Project Manual
PDF	Addenda	All Addenda Issued
DWG	Entire X Series	Existing Conditions Plan (Site Survey)
DWG	Entire Series	Civil Drawing Plans
DWG	Entire L0, L1, L2 & L3 Series	Landscape Drawing Plans
DWG	Entire A2, A3, A4 & A5 Series	Architectural Plans, Elevations, Wall Sections
DWG	Drawings EQ-1 through EQ-8	Equipment Floor Plans
DWG	Drawings FS-1 and FS-2	Food Service Equipment Plans
DWG	Entire S2, S3, S4, S5, S6 Series	Structural Plans and Details
DWG	Entire FP Series	Fire Protection Plans and Riser Diagram
DWG	Entire P Series	Plumbing Plans and Diagrams
DWG	Entire M Series	Mechanical Plans, Schedules and Diagrams
DWG	Entire E Series	Electrical Plans, Schedules and Diagrams
DWG	Entire SEC Series	Security Plans and Diagrams
DWG	Entire T1, T3 and T4 Series	Technology Plans, Schedules and Diagrams
DWG	Entire AE and AS Series	Audio Visual Systems Plans and Diagrams
DWG	Entire TL and TR Series	Theatrical System Plans and Diagrams

Additional Electronic Files for Use during Construction:

File designation	Document number	Document title
013301.PDF	Document 013301	Substitution Request Form

END OF FORM

SECTION 012200

UNIT PRICES

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the Contract and General Conditions and all Sections within Division 1 – GENERAL REQUIREMENTS, which are hereby made a part of this Section of the Specifications.
- B. Examine all other Sections of the Specifications for requirements that affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 DESCRIPTION OF WORK

- A. This Section includes administrative and procedural requirements for unit prices and estimated quantities.
- B. Related Sections include the following:
 - 1. DIVISION 02 through DIVISION 33 for procedures, materials, and execution requirements related to unit price work.

1.3 DEFINITIONS

- A. Unit Price: A unit price is an amount proposed by Bidders on the Bid Form as a price per unit of measurement for materials or services added to the Contract Sum by appropriate modification, if estimated quantities of Work required by the Contract Documents are increased. If the estimated quantities of Work required are decreased, the value of the Unit Price will be reduced as described on the BID FORM – GENERAL BIDDER CONTRACT.

1.4 PROCEDURES

- A. Each unit price includes all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.
- B. Measurement and Payment: Refer to individual Specification Sections for work that requires establishment of unit prices and estimated quantities. Methods of measurement and payment for unit prices and estimated quantities are as follows:
 - 1. For work covered by scheduled quantities, notify the Owner and Architect a minimum of 24 hours in advance of the performance of such work.
 - 2. Document such work in writing, identifying type of work, quantity and location of work. Submit documentation on Construction Manager's letterhead.
 - 3. All documentation of work covered by scheduled quantities will be subject to verification and approval by the Owner and Architect.
 - 4. In order to be considered for payment, documentation for work covered by scheduled quantities shall be submitted within one month of performance of such work. Re-

UNIT PRICES

- quests for payment of such work submitted more than one month after the work has been performed will not be accepted.
5. Only Documentation signed and verified by the Construction Manager, Trade, and the Owner's Representative will be considered valid. Documentation not signed by all these parties will be considered invalid.
- C. Owner reserves the right to reject Construction Manager's measurement of work-in-place that involves use of established unit prices and estimated quantities and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Construction Manager.
- D. Schedule of Unit Prices and Estimated Quantities:
1. A Schedule of unit prices and estimated quantities to be proposed by Bidders immediately follows this section and shall be included with the bid form.
- E. Refer to INSTRUCTIONS TO BIDDERS, and BID FORM – GENERAL BIDDER CONTRACT, for additional information regarding unit prices and estimated quantities.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

APPENDIX 012201
UNIT PRICE PROPOSAL SHEET
DOVER HIGH SCHOOL & CAREER TECHNICAL CENTER
DOVER, NH

- The following unit prices as defined in the specifications are designated for items of work on the basis of unknown quantities or quantities estimated by the Designer. These unit prices will be used to add or to deduct from the dollar amounts shown, depending on whether the actual amount is greater or less than the estimated amount. UNIT PRICES GIVEN HEREIN SHALL BE FOR ADDITIONAL WORK ONLY. DECREASED WORK SHALL BE AT THE "ADD" PRICE LESS FIFTEEN PERCENT (15%).

Unit Price Number	Specification section and Description	Unit Measure	Unit Price Dollars/Cents
1	310000 – Earthwork: Open General Excavation.	Cubic Yard	
2	310000 – Earthwork: Trench General Excavation	Cubic Yard	
3	310000 – Earthwork: Imported Gravel Fill	Cubic Yard	
4	310000 – Earthwork: Imported 3/4 inch Crushed Stone	Cubic Yard	
5	310000 – Earthwork: Imported Ordinary Fill	Cubic Yard	
6	310000 – Earthwork: Ordinary Fill (On-Site Source)	Cubic Yard	
7	310000 – Earthwork: Lean Concrete	Cubic Yard	
8	310000 – Earthwork: Off-Site Disposal of Excess Excavated Fill Material at an In-State Unlined landfill	Ton	
9	310000 – Earthwork: Off-Site Disposal of Excess Excavated Fill Material at an In-State Lined Landfill	Ton	
10	310000 – Earthwork: Off-Site Disposal of Excess Excavated Fill Material at an In-State Asphalt Batch Plant	Ton	
11	310000 – Earthwork: Removal and Off-Site Disposal of Reinforced Concrete	Ton	

12	Division 33 – Utilities: Vertical rebuild of existing sewer/drainage structure	Linear foot	
13	General Contractor/Construction Manager Shall provide moisture mitigation below resilient flooring. Refer to Section 096500 - Resilient Flooring for flooring finish. Refer to Section 090160 - Vapor Mitigation at Slabs for moisture mitigation requirements. Approximate Square Feet: 37,570.	Square Feet	
14	General Contractor/Construction Manager Shall provide moisture mitigation below resilient athletic flooring. Refer to Section 096566 - Resilient Athletic Flooring for flooring finish. Refer to Section 090160 - Vapor Mitigation at Slabs for moisture mitigation requirements. Approximate Square Feet: 3,200.	Square Feet	
17	Division 32 – Exterior Improvements: Planting Bed Soil Mix.	Cubic Yard	
18	Division 32 – Exterior Improvements: Tree 5-6" cal.	Each	
19	Division 32 – Exterior Improvements: Shrub 3-4' ht	Each	
20	Division 32 – Exterior Improvements: Herbaceous Plant #1 pot	Each	
21	Hazardous Material Remediation – See Section 022820 for list and attach herein.		
22	Section 110610: Provide unit price to upgrade dead-hung batten to fixed speed, motorized, per schedule.	Each	

23	Section 110610: Provide unit price to install variable speed motorized batten, per schedule.	Each	
24	Section 110640: Provide LED Ellipsoidal Reflector Spotlight	Each	
25	Section 110640: Provide LED PAR	Each	
26	Section 110640: Provide LED Cyclorama Light	Each	

2. The unit prices requested herein shall include their pro-rata share of all costs for the indicated items of work, including such items as overhead, superintendence, general conditions, profit, bond, labor, materials, payments to and coordination of subcontractors, equipment costs, disposal fees, and all other work incidental thereto.
3. Any unit price proposal that contains a unit price which is unduly high or low may be rejected as unbalanced, refer to Instructions to Bidders.

***THIS FORM MUST BE SUBMITTED WITH THE GENERAL BID FORM ***

NAME OF CONSTRUCTION MANAGER (PLEASE PRINT)

END OF APPENDIX

SECTION 012300

ALTERNATES

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the Contract and General Conditions and all Sections within Division 1 – GENERAL REQUIREMENTS, which are hereby made a part of this Section of the Specifications.
- B. Examine all other Sections of the Specifications for requirements that affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

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 appropriate Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

- A. Each General Bidder and each Sub-Bidder shall examine the Alternates generally defined herein and in the Drawings and Specifications and determine any modifications to his work caused by any Alternate whether or not his particular trade Section is mentioned herein.
- B. Listing of Alternates on Bid Forms:
 - 1. General Bidders shall enter a single amount in the appropriate space provided in the FORM FOR GENERAL BID, which total amount shall consist of the amount for all work to be performed by the Construction Manager and subcontractors.

1.5 COORDINATION

- A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
 - 2. The amount listed for each alternate shall include all costs related to coordination, modification and adjustments of the Work associated with that alternate.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL

- A. 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.
- B. Execute accepted alternates under the same conditions as other work of the Contract.
- C. Schedule: A Schedule of Alternates is included at the end of this Section. Specification Sections affected by alternates contain requirements for materials necessary to achieve the work described under each alternate.

3.2 SCHEDULE OF ALTERNATES

- A. Alternate #1: Provide rubber treads and risers in enclosed egress stairs.
- B. Alternate #2: Provide two additional tennis courts. Refer to drawings and specifications for requirements.
- C. Alternate #3: Provide landscape irrigation. Refer to drawings and specifications for requirements.
- D. Alternate #4: Provide track repairs. Refer to drawings and specifications for requirements.
- E. Alternate #5: Provide Marmoleum Modular tile flooring or approved equal in lieu of MCT flooring. Refer to drawings and specifications for requirements.
- F. Alternate #6: Provide integrally colored concrete at entry plazas. Refer to drawings and specifications for requirements.
- G. Alternate #7: Provide wall tile to 7'-2" height in all areas. Refer to drawings and specifications for requirements.

- H. Alternate # 8: Provide brick in lieu of CMU at the Gymnasium. Refer to drawings and specifications for requirements.
- I. Alternate # 9: Provide electronic scoreboard for softball. Refer to drawings and specifications for requirements.
- J. Alternate # 10: Provide electronic scoreboard for football. Refer to drawings and specifications for requirements.
- K. Alternate #11: Provide additional plantings around building. Refer to drawings and specifications for requirements.
- L. Alternate #12: Provide all new Double Tier and And Single Tier, in lieu of reusing existing lockers, basis of design Republic quiet lockers.
- M. Alternate #13: Provide equipment alternate per section 110610 – Stage Rigging and Curtains.
- N. Alternate # 14: Provide asphalt surface patch for track.
- O. Alternate #15: Provide alternate for 60 mil nominal PVC or 60 mil, in lieu of White EPDM, basis of design: Sarnafil – Sika Plan, other acceptable manufacturers Durolast, Carlisle, Johns Mansville

**Add A
Item
01**

**Add B
Item
019**

END OF SECTION

SECTION 012400

SCHEDULE OF VALUES

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.
- B. Examine all other Sections of the Specifications for requirements that affect work under this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 SUMMARY

- A. The Work of this Section includes requirements for the following procedures:
 - 1. Preparation and submittal of the Preliminary and Final Schedule of Values
- B. Related work includes, but is not limited to, the following work under other Sections:
 - 1. Requirements for construction schedules: Section 013200 – Construction Progress Documentation.
 - 2. General procedures for submittals: Section 013300 – Submittal Procedures.

1.3 DEFINITIONS

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

1.4 SUBMITTALS

- A. Prepare and submit the following submittals in accordance with the requirements of Section 013300 – Submittal Procedures.
- B. Schedule of Values:
 - 1. Schedule of Values shall be typewritten on 8-1/2 by 11 inch white paper.
 - 2. Submit to the Architect three (3) copies of each Schedule of Values within 7 days of receipt of Notice to Proceed.
 - 3. Provide Schedule of Values in AIA-G702 and G703 format.

- C. List of Subcontractors and Sub-subcontractors: Attached to the Preliminary Schedule of Values shall be a list of the names, addresses (and whether individual, partnership or corporation) of each Subcontractor or Sub-Subcontractor who is to perform all or any part of each subdivision. In the event any Subcontractors, or Sub-subcontractors are not known at the time said schedule is prepared, an amended or supplementary list containing the names of the Subcontractors and Sub-Subcontractors involved and indicating their division of the Work shall be furnished to the Architect as soon as the information is available. A code number for identification on requisitions shall be used to identify the Construction Manager, each of the Subcontractors and subordinate Subcontractors, and shall be shown in each requisition where any part of the Work performed by the Construction Manager, such Subcontractor, Sub-Subcontractors or material supplier is incorporated in the amount of the requisition for which payment is requested.
- D. Monthly Updates: Submit to the Owner with the Schedule of Values on a monthly basis such schedules of quantities and costs, payrolls, reports, estimates, records, and other data as the Owner may request concerning work performed or to be performed under this Contract. The Schedule of Values shall be submitted at the same time as the updated CPM Schedule showing the current status of the work, as required under Section 013200 – Construction Progress Documentation.

1.5 SCHEDULE REQUIREMENTS

- A. General: Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project CPM Schedule. Provide line items for principal subcontract amounts, where appropriate, and for portions of the work designated in this Section.
- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section. Identify each line item by Specification Number and Title, and by portion of the Work of that Section where the Work of a Section is allocated to more than one line item.
- C. The Schedule of Values shall be arranged in vertical columns identified with titles, including Names Of Items; Original Amounts, Percent Completed To Date; Previous Payments; Current Requests; and Balance Not Yet Requested. A summary of the total amount due to date and the amount of the five percent retained shall be included in the statement which shall be signed by the Construction Manager. A separate sheet shall be included with each requisition showing status of work covered by approved Change Orders. The Schedule of Values shall be revised if later found by the Architect to be inaccurate.
- D. In preparing the Schedule, each sub-division or classification of the Work shall be identified by code number referring to each individual Section (or Sub-Section where applicable) of the Specifications. The Schedule of Values shall be prepared in accordance with AIA Documents G702 and G703.
- E. Initial values will be recognized to be an accurate accounting of the value of the work. Upon request by the Architect, support values given with data that will substantiate their correctness.
- F. Identify quantities of designated materials or materials stored on which payment is expected to be made.
- G. Use monthly submissions of Schedule of Values only as basis for Construction Manager's

Application for Payment.

1.6 PREPARING SCHEDULE OF VALUES

A. General Procedures:

1. Prepare Preliminary Schedule of Values for review by Architect, Owner and Owner's Project Manager.
2. Incorporate requested modifications to produce a Final Schedule of Values, which will become the basis for documenting the progress of the Work with each Application for Payment.
3. Update Final Schedule of Values as necessary to reflect changes in the Work.

B. Itemize separate line item cost for each of the general cost items as specified in this Section.

C. Breakdown installed costs into:

1. Delivered cost of product
2. Total installation cost, with overhead and profit.
3. Construction phase.
4. Note that the Owner is exempt from Sales and Use Tax for all materials incorporated into the Work.

D. For each line item which has installed value of more than \$20,000.00 breakdown costs to list major products, components, or operations under each line.

E. Sum of costs of all items listed in schedule shall be equal to total Contract Sum.

F. Each item shown on an Application for Payment Schedule of Values shall also appear on the CPM Schedule.

1.7 LINE ITEMS FOR SCHEDULE OF VALUES

A. Work Covered in Division 1: Itemize separate line item cost for each of the following general cost items:

1. Builder's Risk Insurance
2. Performance and Payment Bonds for Construction Manager and Subcontractors.
3. Field engineering; photographic documentation.
4. Coordination; project management.
5. Coordination drawings.
6. Preparation of construction schedule and periodic updates.
 - a. If periodic updates of schedule are not performed in a timely manner, the amount shown on the Schedule of Values for this line item shall be forfeit.
7. Weather protection; temporary fence.
8. Temporary heat, water, power and lighting.

9. Temporary office facilities; temporary sanitary facilities.
 10. Construction aids, including staging, scaffolding, shoring.
 11. Project sign.
 12. Indoor air quality provisions.
 13. Construction waste management.
 14. Cutting and patching.
 15. Final cleaning.
 16. Punchlist preparation and response.
 17. Maintenance of as-built documents for architectural and site work; preparation of close-out documents.
 18. Commissioning coordination activities.
 19. Overhead.
 20. Other items of work as requested by the Architect or Owner.
- B. Work Covered in Divisions 2 through 50: Provide at least one separate line item for each Section of the Specifications. Section line items shall be further subdivided into separate line items as follows:
1. Subdivide each line item into separate line items for individual floors of the project where applicable.
 2. Identify material costs separately from labor costs.
 3. Provide separate line items for the following where applicable:
 - a. Submittals
 - b. Maintenance of as-built documents for mechanical and electrical work
 - c. Preparation of closeout documents
 - d. Operations and Maintenance Manuals;
 - e. Training
 - f. Other items of work as requested by the Architect or Owner.
 4. For mechanical and electrical work, provide the following additional separate line items where applicable:
 - a. Commissioning coordination activities other than demonstration of FPT to the Commissioning Firm
 - b. Commissioning coordination activities associated with demonstration of FPT to the Commissioning Firm
 5. For each line item which has installed value of more than \$20,000.00 break down costs to list major products, components, or operations under each line.

PART 2 - PRODUCTS [NOT USED]

PART 3 - EXECUTION [NOT USED]

END OF SECTION

SCHEDULE OF VALUES
012400 - 4

HMFH PROJECT NO. 403114
September 12, 2016

Dover High School & Career Technical Center
Dover, NH

SECTION 013100

PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.
- B. Examine all other Sections of the Specifications for requirements that affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 SUMMARY

- A. The Work of this Section includes, but is not limited to, requirements for the following procedures:
 - 1. Responsibility for coordination of the Work.
 - 2. Surveying and engineering.
 - 3. Coordination Drawings.
- B. Related work includes, but is not limited to, the following work under other Sections:
 - 1. Survey information available to bidders: Section 011100– SUMMARY OF THE WORK
 - 2. General requirements for submittals: Section 013300 – SUBMITTAL PROCEDURES.

1.3 SUBMITTALS

- A. Prepare and submit documentation in accordance with Section 013300 – SUBMITTAL PROCEDURES.
- B. Drawings:
 - 1. Survey of base plate elevations and anchor bolt locations.
 - 2. Survey of as-built conditions: Certified survey showing all as-built dimensions, locations, angles and elevations of construction, to be submitted at Substantial Completion of the Work.
 - 3. Coordination Drawings as described in this Section.
- C. Certifications required for Work described in this Section:
 - 1. Field Engineering: Submit name and address of surveyor and professional engineer to Architect.

1.4 COORDINATION

- A. General: The Construction Manager shall be responsible for the proper fitting of all work and

the coordination of the operations of all trades, Subcontractors, material installers and equipment engaged upon the Work. He shall perform or cause Subcontractors to perform all cutting, fitting, adjusting and patching necessary to make the several parts of the Work come together properly and to fit the Work to receive or be received by that of other contractors.

- B. Project Supervision: Refer to CM proposal.
- C. Coordination with Subcontractors: The Construction Manager shall be in charge of the entire Work and shall be responsible for the prompt coordination of all trades, including his own forces and his various Subcontractors, as well as the Owner's separate contractors, if they are on the job during the Construction Manager's operations, and shall become fully familiar with all work required under the Contract.
 - 1. The above notwithstanding, each Subcontractor shall assume responsibility for the correctness and adequacy of his work. Each Subcontractor shall be responsible for and pay for all damage done by his work and his workers.
 - 2. No Subcontractor shall be permitted on the site without Construction Management staff on site.
- D. Care shall be given to the proper scheduling, delivery, and installation of items to be built into rough construction which will affect the latter portions of the Work, such as anchors, pipe sleeves, inserts, conduit, pipes, lugs, clips, brackets, braces, hangers, bolts, miscellaneous metal, and similar items. These items are not necessarily specified under the trade Section under which they are to be installed. The Construction Manager shall ascertain that all are properly installed in their correct locations at the proper time, so as to prevent cutting and patching of finished work.
- E. The Construction Manager shall be fully responsible for coordination of general construction work with that of Subcontractors for PLUMBING, ELECTRICAL, HEATING AND VENTILATING and all other specialized trades. He shall investigate, together with the Subcontractors involved, the routing of pipe, ductwork, and conduit with particular attention to interference of structural members, other pipes, ducts, and conduit cuts, headroom conditions, door and window openings and swings, pipe chases, and similar features of the building which may affect installation and proper functioning of such items.
- F. Changes in design locations which may be necessary in the routing of pipes and ducts, or in the location of any mechanical, electrical or other equipment or in the location of other building elements, shall be anticipated and made prior to installation. Additional compensation will not be allowed for costs incurred as a result of the Construction Manager's failure to anticipate the necessity for such changes.
- G. There shall be no change or variation in ceiling height, wall layout, shaft, chase, furring or other dimensions shown on Drawings without the specific written approval of the Architect.
- H. The Construction Manager's responsibility for the coordination of all work under the Contract shall be complete, and shall extend to all modifications in the Work, whether or not such modifications entail a change in the Contract Price. Where the Contract Documents allow an optional material or method of performing a portion of the Work, or where the Construction Manager is ultimately allowed or directed to perform a part of the Work using a substitute material or method, the Construction Manager shall provide all other coordination and additional work that such change necessitates, without any additional cost to the Owner.

1.5 SURVEYING AND ENGINEERING, GENERAL

- A. The Construction Manager shall employ a project engineer who is a qualified land surveyor registered to practice in the State the project is located in, who shall establish and maintain grades and levels and permanent bench marks. In addition, the Construction Manager shall designate one person from within his organization, with engineering experience, who shall do the usual engineering work required, including leveling, checking, and verifying wall and partition lines, elevations, and other like items
- B. Prior to commencement of any excavation or filling work on the site, the project engineer shall check locations of all structures and other fixed items with regard to property lines and other existing conditions. The Construction Manager shall be fully responsible for reporting to the Architect discrepancies between the dimensions and/or locations indicated on the Contract Drawings and those as they actually exist on the site.
- C. After verification of all dimensions and locations, the Construction Manager shall submit to the Architect such verification in written form bearing the professional stamp of the surveyor. Failure to do so shall mean that the Construction Manager assumes responsibility for all corrective measures required at no addition to the Contract amount.
- D. The Construction Manager shall lay out the Work and shall be responsible for all lines, elevations, and measurements of the building, grading, paving and other work under the Contract. He shall exercise proper precaution to verify the dimensions shown on the Drawings before laying out the Work and will be held responsible for any error resulting from his failure to exercise such precaution.

1.6 FIELD ENGINEERING REQUIREMENTS

- A. General: Provide professional field engineering services, establish grades, lines and levels, by use of recognized engineering survey practices.
 - 1. Submit surveys and documentation as described herein.
- B. Scope of Field Engineering:
 - 1. Site features:
 - a. Existing grades, including grades immediately adjacent to existing building.
 - 2. Structural elements: For each column, a precise base plate elevation and horizontal location shall be established. After the anchor bolts have been set in the foundations and leveling plates have been set in grout, the top surface of each leveling plate shall be surveyed to determine the following locations. Submit survey data to the Architect for review and approval prior to fabrication of structural steel.
 - a. Elevation of top surface of each leveling plate.
 - b. Precise position of the center of each anchor bolt in each leveling plate.
- C. Qualifications of Surveyor or engineer: Qualified engineer or registered land surveyor, acceptable to Architect and the Owner.
 - 1. Registered professional engineer of the discipline required for the specific service on the Project, licensed in the State the project is located in.
- D. Survey Reference Points:
 - 1. Datum: Location of control datum to be used as reference point for horizontal and vertical survey measurements is shown on Drawings.
 - 2. Locate and protect control and reference points prior to starting sitework, and preserve all permanent reference points during construction.

- a. Make no changes or relocations of control points without prior written notice to Architect.
- 3. In the event that any reference point is lost or destroyed, or requires relocation due to necessary changes in grades or construction, perform the following actions without delay:
 - a. Report change to Architect immediately.
 - b. Replacement of reference point shall be performed by surveyor, as directed by Architect.
- 4. Project Survey Requirements:
 - a. Establish a minimum of two permanent benchmarks on the site, referenced to data established by survey control points.
 - b. Establish lines and levels, locate and lay out by instrumentation and other appropriate means.
 - c. Verify layouts periodically using the same means as those by which they were established.
- E. Records:
 - 1. Maintain a complete, accurate log of all control and survey work as it progresses.
 - 2. Prepare and submit a survey of existing conditions and a final survey of as-built conditions containing all relevant horizontal and vertical dimensions and reference point data.

1.7 BUILDING ENVELOPE COORDINATION DRAWINGS

- A. Provide coordination drawings illustrating details for Masonry, Air/ Vapor Barrier Systems, Waterproofing Systems, Windows, Curtainwall, Louvers, Storefront, Roofing Systems, Metal Siding Systems, Exterior Frame Systems.
- B. Building Envelope Coordination Meeting: The CM shall coordinate a pre-construction meeting on site with all of the building envelope Subcontractors, the OPM, Clerk, and Architect.
- C. CM shall coordinate and produce color coded coordination drawings of each system showing interface between each building envelope system.
- D. Coordination drawings shall include, but not be limited to:
 - 1. Foundation Conditions
 - 2. Footing Conditions
 - 3. Edge of floor slab conditions
 - 4. Roof Edge Conditions
 - 5. Roof to Wall Conditions
 - 6. Opening Conditions (i.e. Window, Curtainwall & Storefront & Vent)
 - 7. Expansion Joint Conditions
- E. Coordination drawings must be completed prior to system application on the mock-up(s).
- F. Coordination Drawings shall be reviewed and signed off by each building envelope trade.
- G. Refer to additional applicable requirements specified herein below for mechanical coordination drawings.

1.8 MECHANICAL COORDINATION DRAWINGS

- A. The Construction Manager shall be responsible for the coordination of all mechanical and

electrical work with architectural requirements including ceiling layouts. Well in advance of commencing work in any area and before materials are fabricated or work begun, he shall submit to the Architect complete Coordination Drawings in the form of colorized PDF's, submitted electronically with 1 hard copy print to the Architect, and 1 hard copy print to the Engineer, in a scale not less than $1/4" = 1'-0"$. Congested areas and sections through shafts shall be at a scale not less than $3/8" = 1'-0"$.

1. Coordination Drawings are considered Informational Submittals. Refer to Section 013300 – SUBMITTALS for requirements for preparation and submittal of Informational Submittals.
- B. Coordination Drawings shall indicate the necessary offsets for all ductwork, piping, conduit, and other items to clear the work of all other trades, and structure, and to maintain the required ceiling height, ceiling layout and partition layout.
- C. Prepare Coordination Drawings as follows: Provide PDF's and 1 hard copy print to the Architect and Engineer concurrently with each trade's additions, and with clearly marked conflicts and questions on said PDF's and prints.
1. The background for coordination drawings shall show the reflected ceiling plan.
 2. Construction Manager shall require HEATING AND VENTILATING Subcontractor to prepare original Drawings showing all ductwork, hot water and other heating lines, based on approved Sheet Metal Fabrication Drawings and related mechanical submittals.
 3. Construction Manager shall distribute them to the Architect and the Plumbing Subcontractor for the next step.
 4. Construction Manager shall then require PLUMBING Subcontractor to indicate all his equipment and plumbing lines on these.
 5. Construction Manager shall then require FIRE PROTECTION Subcontractor to indicate his equipment and piping on these.
 6. Construction Manager shall require the ELECTRICAL Subcontractor to indicate his equipment and conduit lines on the same Drawings.
 7. Construction Manager shall resolve conflicts and then submit in PDF and 1 hard copy to the Architect for review.
 8. Submit complete final set of coordination drawings for record purposes in PDF and 1 hard copy.
- D. Coordination Drawings shall bear the signature of all subcontractors involved indicating that all space conditions have been satisfactorily resolved. In addition, the Drawings shall bear the Construction Manager's stamp bearing the notation "Drawings Have Been Checked and Coordinated with all Trades". Drawings without these notations, or Drawings submitted more than 120 days after the execution of the Contract, will not be accepted or reviewed by the Architect.
- E. If any space conflicts cannot be resolved by the Construction Manager, he shall immediately notify the Architect.
- F. Coordination Drawings are for the Construction Manager's and Architect's use during construction and shall not be construed as replacing any Shop, "As-Built", or other Record Drawings required elsewhere in these Contract Documents.
- G. Architect's review of Coordination Drawings shall not relieve Construction Manager from his overall responsibility for coordination of all work performed pursuant to the Contract or from any other requirements of the Contract.
- H. Access panel coordination: Show locations and sizes of all access panels for all trades on

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September 12, 2016

Dover High School & Career Technical Center
Dover, NH

Coordination Drawings.

- I. Refer to Section 011400 – Work Restrictions for Project Electronic Files to be made available for use by the Construction Manager in the preparation of Coordination Drawings.

PART 2 - PRODUCTS [NOT USED]

PART 3 - EXECUTION [NOT USED]

END OF SECTION

SECTION 013119

PROJECT MEETINGS

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.
- B. Examine all other Sections of the Specifications for requirements that affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 SUMMARY

- A. The Work of this Section includes, but is not limited to, requirements for the following procedures:
 - 1. Organizational meetings.
 - 2. Project meetings.
 - 3. Pre-Installation conferences
 - 4. Post-construction meetings
- B. Related work includes, but is not limited to, the following work under other Sections:
 - 1. Requirements for construction schedules: Section 013200 Construction Progress Documentation.

PART 2 - PRODUCTS

2.1 ORGANIZATIONAL MEETINGS

- A. General: The Owner's Project Manager will schedule pre-construction organizational meetings, periodic Project meetings, specially called meetings throughout the progress of the Work, and post-construction meetings. Representatives of the Construction Manager shall attend all such meeting. Subcontractors shall attend only if requested by the Architect or the Owner's Project Manager.
- B. Pre-Construction Meeting: Immediately following award of Contract, the Architect will call one or more preliminary organizational meetings, during which detailed procedures will be worked out for submission and review of Shop Drawings and samples, format and extent of the Progress Schedule and Schedule of Values, format and methods for progress payment requisitions, channels of communication between Owner, the Owner's Project Manager, Architect's and Construction Manager's personnel, and other routines to be followed during construction. The Architect will then issue a directive summarizing such procedures.

2.2 PROJECT MEETINGS

- A. The Architect shall schedule and meet regularly with the Owner, the Owner's Project Manager and the Construction Manager at the site of the Work during the course of the Contract for the purpose of progress review, coordination of Shop Drawing schedules, sample submittals, and other items of work requiring such coordination. The dates of such meetings shall be as mutually agreed upon between the Owner, the Owner's Project Manager, Construction Manager and the Architect. Construction Manager shall require Subcontractors to attend such meetings if requested by the Architect.
- B. The Construction Manager shall take minutes of such meetings and shall distribute copies of the minutes to all concerned.
- C. Construction Manager's and Subcontractor's representatives attending such meetings shall include the job superintendent or other responsible party approved by the Architect. Such representatives shall be empowered to make, at these meetings, definite decisions binding upon their respective employers regarding all matters pertaining to work under this Contract.
- D. The Construction Manager shall furnish the Owner, the Owner's Project Manager and the Architect, in writing, the names, addresses, and telephone numbers of Construction Manager's and principal Subcontractors' personnel to be contacted in the event of an out-of-hours emergency at the building site. He shall also maintain a similar list readily visible from the outside of the field office.

2.3 PREINSTALLATION CONFERENCES

- A. Pre-Installation Conferences: Conduct pre-installation conferences at site prior to construction activities that require coordination.
 - 1. Schedule the conference to occur after submittals have been approved for the materials or systems.
 - 2. Installers, manufacturer's representatives, and fabricators of materials or systems affected shall be required to attend. Advise Designer of scheduled meeting dates.
 - 3. Do not allow affected work to proceed if the conference cannot be successfully concluded. Initiate actions necessary to resolve impediments to performance of the work and reconvene the conference at the earliest feasible date.
 - 4. The Construction Manager shall take minutes of such meetings & shall distribute copies of the minutes to all concerned.
- B. Work for which pre-installation conferences will be required include the following. Additional pre-installation conferences may be required by specifications in Sections 2 through 50, and by the Owner or Architect during the progress of the Work:
 - 1. Concrete work including finishes.
 - 2. Steel erection.
 - 3. Air barrier system.
 - 4. Roofing.
 - 5. Daylight dimming system.
- C. Refer to individual specifications sections for additional requirements.

2.4 POST-CONSTRUCTION MEETINGS

- A. Not less often than every three months, starting with the date of Substantial Completion and continuing for one year thereafter, representatives of the Construction Manager and the Subcontractors for FIRE PROTECTION, PLUMBING, HVAC, and ELECTRICAL Work shall meet with the Architect and Owner's Project Manager at the site in accordance with an agreed-upon schedule in order to inspect the Work and to plan correction of any deficiencies or failures discovered during this period.
- B. Representatives of the Construction Manager and Subcontractors attending such meetings shall be the same persons, or shall have the same powers and authority, as those attending job meetings prior to the date of Substantial Completion.
- C. Post-Warranty Meeting: Coordinate with Owner and attend meeting to be held with Commissioning Agent.
- D. The Construction Manager shall take minutes of such meetings & shall distribute copies of the minutes to all concerned.

END OF SECTION

SECTION 013200
CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the Contract and General Conditions and all Sections within Division 1 – GENERAL REQUIREMENTS, which are hereby made a part of this Section of the Specifications.
- B. Examine all other Sections of the Specifications for requirements that affect work under this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 SUMMARY

- A. The Work of this Section includes, but is not limited to, requirements for the following procedures:
 - 1. Time for Completion and Liquidated Damages.
 - 2. Sequencing requirements.
 - 3. Phasing requirements.
 - 4. Requirements for scheduling closeout activities.
 - 5. Critical Path Method Schedule preparation and submission.
 - 6. Photographic documentation of construction.
- B. Related work includes, but is not limited to, the following work under other Sections:
 - 1. Section 011100 – SUMMARY OF WORK: Hours of work and related scheduling criteria.
 - 2. Section 012400 – SCHEDULE OF VALUES: Allocation of portions of the Work as line items in applications for payment.
 - 3. Section 013100 – PROJECT MANAGEMENT AND COORDINATION: Construction Manager responsibility for coordinating the Work.
 - 4. Section 013119 – PROJECT MEETINGS: Scheduling construction-related meetings.
 - 5. Section 013300 – SUBMITTAL PROCEDURES: Coordination of submittal schedule with construction.
 - 6. Section 014000 – QUALITY REQUIREMENTS: Special sequencing requirements required for inspection of building components prior to concealment.
 - 7. Section 017700 – CLOSEOUT PROCEDURES: Requirements for Substantial Completion and Final Completion.

1.3 SUBMITTALS

- A. Preliminary Construction Schedule: Within 10 calendar days following receipt of the Notice to Proceed, submit a CD containing an electronic copy (PRX) and two paper copies for review by the Owner, Project Manager and the Architect. This preliminary schedule shall include the

project contract dates, milestones, long lead items, major work activities and a critical path to completion. (approximately 100 to 150 schedule activities)

1. Acceptance of the Preliminary Construction Schedule by the Owner, Project Manager and Architect shall be a prerequisite to certification of the first Application for Payment.
- B. Complete and Detailed Construction Schedule: Within 45 calendar days following receipt of the Notice to Proceed, and at least 15 calendar days prior to submitting the second Application for Payment, submit a CD containing an electronic copy(PRX) and two paper copies of the complete and detailed schedule, to show entire schedule for entire construction period.
1. Acceptance of the Complete and Detailed Construction Schedule by the Owner, Project Manager and Architect shall be a prerequisite to certification of the second Application for Payment.
- C. Monthly Schedule Update: With each monthly Application for Payment, submit a schedule update of the accepted Complete and Detailed Construction Schedule accompanied by a written narrative reporting on the progress of the Work and a CD containing an electronic copy(PRX) and two paper copies of the Monthly Schedule Update.
1. Acceptance of the Updated Schedule each month by the Owner, Project Manager and Architect shall be a prerequisite to certification of the monthly Application for Payment.
- D. Daily Construction Field Reports: Submit two copies of the current week's field reports to the Owner's Project Manager and the Architect at the end of each week. (Electronic submission is acceptable)
- E. Special Reports: Submit two copies of special reports of unusual events at the site directly to Owner's Project Manager and a copy to the Architect, on the day of the occurrence. Distribute additional copies of report to parties affected by the occurrence.
- F. Photographs:
1. Photographic documentation of construction as specified herein.
 2. Copies of prints:
 - a. Submit electronic prints of each photographic view within seven days of taking photographs.
 - b. Field Office Prints: Retain one set of prints of progress photographs in the field office at Project site, available at all times for reference. Identify photographs same as for those submitted to Architect
 3. Identification: On each print file, provide the following information:
 - a. Name of Project.
 - b. Date photograph was taken if not date stamped by camera.
 - c. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
 - d. Unique sequential identifier.
 4. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same label information as corresponding set of photographs.

1.4 TIME FOR COMPLETION AND LIQUIDATED DAMAGES

- A. It is understood and mutually agreed, by and between the Construction Manager and the Owner, that the date of commencement and the time for completion for each phase are essential conditions of this Contract, and it is further mutually understood and agreed that the Work embraced in this Contract shall be commenced by the date specified therein.
- B. The Construction Manager agrees that said Work shall be prosecuted regularly, diligently, and uninterruptedly at such rate of progress as will insure full completion thereof within the time specified. It is expressly understood and agreed, by and between the Construction Manager and the Owner, that the time for the completion of the Work in each phase described herein is a reasonable time for the completion of the same, taking into consideration the usual industrial and climatic conditions prevailing in this locality.
- C. It is further agreed that time is of the essence of each and every portion of the Contract and of the Contract Documents wherein a definite and certain length of time is fixed for the performance of any act whatsoever; and where under the Contract an additional time is allowed for the completion of any work, the new limit fixed by such extension shall be of the essence of this Contract. Provided, that the Construction Manager shall not be charged with liquidated damages for any excess cost when the delay in completion of the Work is due:
 - 1. To any preference, priority, or allocation order duly issued by the Government;
 - 2. To unforeseeable causes beyond the control and without the fault or negligence of the Construction Manager, including, but not restricted to: Acts of God, or of the public enemy; acts of the Owner; acts of another Construction Manager in the performance of a Contract with the Owner; fires, floods, epidemics, quarantine restrictions, strikes, and freight embargoes.
 - 3. To any delays of Subcontractors or suppliers occasioned by any of the clauses specified in subparagraphs 1. and 2. of this Paragraph.
- D. Provided, further, that the Construction Manager shall, within ten (10) days from the beginning of such delay, unless the Owner shall grant a further period of time prior to the date of final settlement of the Contract, notify the Owner, in writing, of the causes of the delay, who shall ascertain the facts and extent of the delay and notify the Construction Manager within a reasonable time of its decision in the matter.
- E. If the Construction Manager shall neglect, fail or refuse to substantially complete the Work within the time herein specified or any proper extension thereof granted by the Owner, the Construction Manager does hereby agree, as part of the consideration for the awarding of this Contract, to pay to the Owner the amount specified in the Agreement (or if not specified, then actual damages amount), not as a penalty but as liquidated damages for such breach of contract as herein set forth, for each and every calendar day that the Construction Manager shall be in default after the time stipulated in the Contract for completing the Work.
- F. The said amount is fixed and agreed upon by and between the Construction Manager and the Owner because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the Owner would in such event sustain, and said amount is agreed to be the amount of damages which the Owner would sustain and said amount shall be retained from time to time by the Owner from current periodic estimates. This remedy to the Owner shall be cumulative to the remedies available to the Owner under law.
- G. Work Executed after Substantial Completion: The Architect will continue to execute their administrative responsibilities for the Contract, as provided in the General Conditions, beyond the specified date of Final Completion.

1. If, due to delays on the Construction Manager's part in the completion of the Work, the Architect is required to continue in this role beyond the specified date for Final Completion, the Construction Manager shall be responsible to the Owner for costs for Additional Services of the Architect to perform additional administration duties, until the Work is complete.
2. Refer to Section 011400 – Work Restrictions, for procedures required in cases where Construction Manager is responsible to the Owner for costs for Additional Services of the Architect.

H. Liquidated Damages: Refer to INSTRUCTIONS TO BIDDERS and AIA-A101, for provisions for, and amounts of, Liquidated Damages.

1.5 PHASING

- A. The project shall be phased in accordance with the phasing plans as described on the architectural drawings and in the INSTRUCTIONS TO BIDDERS.

1.6 SEQUENCING REQUIREMENTS

- A. Exterior Envelope Construction and Inspection: Schedule the installation of materials comprising the exterior walls and roofs to minimize exposure of construction materials to damage by ultraviolet light, wind and weather. Notify the Architect prior to concealment of air barrier, to permit inspection and testing. Refer to Section 014000 – QUALITY REQUIREMENTS, and individual technical specification sections for specific requirements.
- B. Indoor Air Quality Provisions: Refer to Section 018119 – INDOOR AIR QUALITY REQUIREMENTS, for the following activities that will have an impact on scheduling:
 1. Sequencing required to minimize adsorption of airborne contaminants on new surfaces.
 2. Sequence of building flush-out with respect to completion, testing and balancing of mechanical systems. Flush-out shall be complete prior to substantial completion.
- C. Commissioning: Refer to the Owner's commissioning agent, for inspections, testing and related activities to be performed by Commissioning Agent during and after construction.

1.7 SCHEDULING REQUIREMENTS FOR CLOSEOUT

- A. General: Closeout scheduling shall be carefully coordinated with activities required for Commissioning and the approved Indoor Air Quality Management Plan. The following sequence of activities is a summary of requirements of many trades. Refer to other Division 1 Sections and Technical Sections for additional information as indicated.
 1. The Construction Manager's attention is brought to the fact that no HVAC system shall be started up before the completion of all major finishes, casework installation and final cleanup.
- B. Initial Closeout Activities:
 1. Commissioning Coordination Meeting: Schedule meeting well in advance of anticipated date for start-up of mechanical and electrical systems. At this meeting, the Commissioning Firm will distribute Pre-Functional Performance Test (PFPT) checklists, and schedul-

- ing requirements will be reviewed. Refer to Section 013119 – PROJECT MEETINGS.
2. Confirmation of Completion of Finishes, Casework and Cleaning: The Construction Manager submit a letter confirming that all major finishes have been applied, all case-work is installed and final cleanup has been completed.
- C. System Start-Up, Building Flush-out and Testing and Balancing.
1. The HVAC system shall be started up with new filters as specified in Section 230000 – Heating, Ventilating and Air Conditioning.
 2. Building Flush-Out: As part of the Indoor Air Quality Plan, the HVAC system shall be run for 28 calendar days with 100 percent fresh air. Disable carbon dioxide sensors during this time. Refer to Section 230000 – Heating, Ventilating and Air Conditioning for additional requirements for system operation. Flush-out shall be complete prior to substantial completion.
 3. Testing and Balancing: After the building flush-out is complete, replace HVAC system filters, adjust HVAC system for normal operation and conduct tests for balancing the system.
- D. Substantial Completion: When system start-up and the related activities specified above have been completed on all mechanical and electrical systems, notify the Architect that the Project is Substantially Complete. Refer to Section 017700 – PROJECT CLOSEOUT, for additional requirements for Substantial Completion.

PART 2 - PRODUCTS

2.1 CRITICAL PATH METHOD SCHEDULE (CPM) GENERAL

- A. The purpose of the Construction Schedule shall be to:
1. Assure adequate planning, scheduling and reporting during execution of the work by the Construction Manager;
 2. Assist the Construction Manager, Architect, Project Manager and Owner in monitoring the progress of the work and evaluating proposed changes to the Contract and the Construction schedule;
 3. Assist the Owner, Project Manager, Architect and the Construction Manager in the preparation and evaluation of the Construction Manager's monthly progress payments.
- B. The Construction Schedules shall employ the Critical Path Method (CPM) for the planning, scheduling and reporting of the work to be performed under the contract and shall meet the following requirements:
1. The schedule shall be produced utilizing the most current version of Primavera P3 Project Planner software system or equivalent and the data fully transferable to Primavera Project Planner.
 2. The type of schedule shall be time scaled Precedence Diagramming Method (PDM) with Finish to Start with zero (0) lag dependency relationship.
 3. Activity duration shall be in units of whole working days and shall be limited to a minimum of one (1) and a maximum of twenty (20) working days for each activity.
 4. The schedules and the corresponding completion dates shall meet the contract duration (remaining contract duration for the monthly updates) of the project. Failure by the Construction Manager to include any element of work required for performance of the Contract shall not excuse the Construction Manager from completing all work within the Con-

- tract Time. Under no circumstances, shall the Construction Manager be entitled to an equitable adjustment in the event of failing to achieve an early completion schedule.
5. The Construction Manager shall review the planned activity coding and activity ID format with the Project Manager prior to the development of the Detailed Construction Schedule. At a minimum, the Project Manager will require the following coding: Area, Location/Phase/Shift, Work Type/Trade, CSI Code, and a separate code for each subcontractor.
 6. Proposed durations assigned to each activity shall be the Construction Manager's best estimate of time required to complete the activity considering the scope and resources planned for the activity, utilizing the appropriate workday calendar.
 7. Seasonal weather conditions shall be considered and included in the planning and scheduling of all work influenced by high or low ambient temperatures and/or precipitation to ensure completion of all work within the Contract time. Seasonal weather conditions shall be determined by an assessment of average historical climatic conditions based upon the preceding ten (10) year records published for the locality by the National Ocean and Atmospheric Administration (NOAA).
 8. The OPM's acceptance of the Construction Schedule shall not relieve the Construction Manager of responsibility for timing, planning and scheduling of the Work, nor impose any duty on the Architect or Owner with respect to the timing, planning or scheduling of the Work.

2.2 PRELIMINARY CONSTRUCTION SCHEDULE

- A. Within 10 calendar days following receipt of Notice to Proceed, prepare and submit for review prints and CD of the Preliminary Construction CPM Schedule covering the first 90 days of construction. The schedule shall be neatly organized and plotted, time-scaled from left to right on standard size sheets. The Preliminary Construction Schedule shall cover the following phases and/or activities:
 1. Proposed mobilization, procurement and planned construction within the first 90 days after Notice To Proceed.
 2. Include a summary bar for major areas of the remainder of the Work and a cash requirement prediction based on indicated activities.
- B. The Preliminary Schedule shall be incorporated into the Complete and Detailed Schedule including all revisions directed by the Owner, Project Manager and Architect.

2.3 COMPLETE AND DETAILED CONSTRUCTION SCHEDULE

- A. Prepare and submit a comprehensive, fully developed Complete and Detailed CPM Construction Schedule within 45 days after Notice to Proceed and at least 15 days prior to the second Monthly application.
 1. The Complete and Detailed schedule shall incorporate the accepted Preliminary Construction Schedule with the Owner/Project Manager/Architect's comments
 2. Schedule shall be neatly organized and plotted time scaled from left to right on Project standard size sheets with suitable notation relating the interface points among sheets.
 3. The Construction Manager's Schedule shall consist of, but not be limited to, the following:
 - a. Proposed procurement, submittal preparation, submittal review, fabrication & delivery, construction, testing, commissioning, and permitting activities.
 - b. Proposed durations for activities.

- c. Proposed sequencing of activities (predecessors & successors).
- d. Milestone events as required by the Contract Documents and Division 1 of the Specifications.
- 4. The following shall be depicted on the Schedule for each activity:
 - a. Concise description of the work represented by the activity (maximum forty-eight (48) characters). The work related to each activity shall be limited to one work trade and one area. All descriptions shall include area designations.
 - b. In developing the Schedule, the Construction Manager shall be responsible for assuring that subcontractor and supplier work at all tiers, as well as its own work, is included in the Schedule.
 - c. The Schedule as developed shall show the sequence and interdependence of activities required for complete performance of the work. The Construction Manager shall be responsible for assuring that all work sequences are logical and the Schedule shows a coordinated plan of the work.
 - d. Each activity shall have only one responsible party and will be coded accordingly.
 - e. Labor Resources will be included and tracked for all 'construction' activities in the "Complete and Detailed Construction Schedule". Each activity should contain adequate detail to determine and track the labor resources needed to complete the work as scheduled. Labor resources may be input as "Crews or partial crews" by trade to simplify the development of the schedule. If crew loading is used, typical crew sizes must be included for each trade in the baseline schedule narrative. This will allow for the reasonable assessment of labor resources necessary to complete the work as sequenced and scheduled.
 - f. For specific work activities where "Key Equipment" is required, such as crane(s) during steel erection, man-lifts or other critical equipment that is critical to phasing or sequencing of the work, the corresponding work activities in the schedule will be appropriately coded to allow for reasonable assessment and tracking of the adequacy of the planned "key equipment" and its movement through the project. (lifts may be a little too much)
- 5. For the purposes of utilizing schedule targets, activity id's shall not be modified.
- 6. The schedule shall employ retained logic.
- 7. Any float suppression techniques identified shall be corrected by the Construction Manager.
- 8. The Construction Manager shall utilize logic, durations, and appropriate calendar assignment to forecast dates, not activity constraints.

2.4 MONTHLY SCHEDULE UPDATE REPORTS

- A. Monthly Schedule Update Report: Evaluate the status of the work as of the 25th of each month to show actual progress and to identify problem areas. Update the Complete and Detailed Construction schedule and print a schedule summary. Include approved Change Orders and Construction Change Directives within the updated schedule
- B. The Construction Manager shall furnish sufficient forces, offices, facilities and equipment at no additional cost to the Owner, and shall work such hours as necessary, within any local restrictions or agreements incorporated into the Contract, to ensure the prosecution of the work in accordance with the current monthly Project Schedule Update. Should the monthly update show that the Construction Manager is fourteen (14) or more work days behind schedule, the Construction Manager shall prepare a Recovery Schedule at no additional cost to the Owner explaining and displaying how the Construction Manager intends to reschedule the work in order to regain compliance with the contract. The provision of this paragraph may include the Construction Manager increasing the hours of work, the number of shifts, overtime operations and/or the amount of construction plant and equipment or working on Saturdays, Sundays

and holidays, within agreed working hours or variance granted, provided the Construction Manager gives reasonable notice to the Owner.

2.5 RECOVERY SCHEDULE

- A. When directed by the Project Manager/Architect, the Construction Manager shall develop a Recovery Schedule with a detailed narrative for all the remaining work based on the last accepted Monthly Schedule Update. The Recovery Schedule shall represent the Construction Managers current work sequence plan and shall forecast completion of the remaining work within remaining contract durations. The Recovery Schedule narrative shall enumerate the Construction Manager's work plan including increases to crew sizes and/or extended shifts to complete work with in remaining contract durations. The Recovery Schedule shall conform to requirements set forth in Paragraph 1.04 (Complete and Detailed Construction Schedule).
- B. The Construction Manager shall be responsible to develop mitigation measures for all delays, regardless of the responsibility for the delays, and to identify all time and cost impacts to the work associated with those mitigation measures. Whenever it is possible for the Construction Manager to mitigate delay without added cost, the Construction Manager shall do so. The Construction Manager shall mitigate all delays as efficiently and economically as possible, with the objective of minimizing both the time and cost impact of the delay, regardless of the responsibility of the delay.
- C. Unless circumstances otherwise require, the Construction Manager shall not pursue mitigation action for which it expects the Owner/Architect to be liable, prior to notifying the Owner/Architect and receiving Owner/Architect authorization to proceed with the mitigation action. Any action taken by the Construction Manager prior to receiving approval from the Owner/Architect shall be at the Construction Manager's risk.

2.6 DAILY CONSTRUCTION REPORTS

- A. Prepare a daily construction report, recording events at the site. Report the following information, as applicable.
 - 1. List of subcontractors at the site, and approximate count of personnel.
 - 2. High and low temperatures, general weather conditions (when exterior work is in progress)
 - 3. Meetings and significant decisions.
 - 4. Accidents, unusual events, and emergency procedures.
 - 5. Stoppages, delays, shortages, losses.
 - 6. Meter readings and similar recordings.
 - 7. Services connected, disconnected.
 - 8. Orders and requests of governing authorities.
 - 9. Change Orders received, implemented.
 - 10. Equipment or system tests and start-ups.
 - 11. Partial Completions, occupancies.
 - 12. Substantial Completions authorized.
 - 13. Copies of weight tickets collected for construction debris removal indicating percentage recycled by weight.
- B. At the end of each week, compile the daily reports for the preceding week. Have the Construction Manager's Superintendent sign the daily reports and prepare a brief outline of the Work anticipated for the coming work week. Submit 1 copy to the Owner/Owner's Project

Manager and place 1 copy in the Project Record Documents file.

2.7 2 WEEK LOOK-AHEAD

- A. Provide a bar chart type, 2 week look-ahead schedule to review with the Owner's Project Manager and Architect during progress meetings.

2.8 CONSTRUCTION PHOTOGRAPHS

- A. Digital Images: Provide images in JPG format, produced by a digital camera with minimum sensor size of 8 megapixels, and at an image resolution of not less than 3200 by 2400 pixels.
- B. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.
 - 1. Maintain key plan with each set of construction photographs that identifies each photographic location.
- C. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
 - 1. Date and Time: Include date and time in file name for each image.
 - 2. Field Office Images: Maintain one set of images accessible in the field office at Project site, available at all times for reference. Identify images in the same manner as those submitted to Architect and Owner.
- D. Preconstruction Photographs: Before starting construction, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect.
 - 1. Flag construction limits before taking construction photographs.
 - 2. Take 20 photographs to show existing conditions adjacent to property before starting the Work.
 - 3. Take 20 photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
 - 4. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.
- E. Periodic Construction Photographs: Take 20 photographs weekly, with timing each month adjusted to coincide with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.
- F. Final Completion Construction Photographs: Take 20 color photographs after date of Substantial Completion for submission as project record documents. Architect and Owner will inform photographer of desired vantage points.

PART 3 - EXECUTION

3.1 SCHEDULING THE WORK

- A. The Construction Manager shall perform the Work in accordance with the approved CPM Schedule.
 - 1. If during the progress of the job the Construction Manager misses a start date of an activity on the critical path, the Construction Manager shall, within five (5) calendar days, advise the Architect in writing of action proposed to bring the Work up to schedule, and shall submit a revised CPM Schedule indicating such action, together with a typed list of such revisions.
 - 2. If the Construction Manager fails to submit a revised schedule within the specified time or if the Architect is not convinced of the efficacy of the measures proposed, the Owner may, at its option, require the Construction Manager to accelerate the progress of the Work, without additional cost to the Owner, by increasing the work force or the hours of work, or by other reasonable means approved by the Architect.

END OF SECTION

SECTION 013300
SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the Contract and General Conditions and all Sections within Division 1 – GENERAL REQUIREMENTS, which are hereby made a part of this Section of the Specifications.
- B. Examine all other Sections of the Specifications for requirements that affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 SUMMARY

- A. The Work of this Section includes, but is not limited to, requirements for the following procedures:
 - 1. Submittal schedule
 - 2. Product data
 - 3. Shop drawings
 - 4. Samples
 - 5. Colors and finishes
 - 6. Calculations
 - 7. Informational submittals
 - 8. Action on submittals.
 - 9. Substitution requests.
- B. Related work includes, but is not limited to, the following work under other Sections:
 - 1. Availability and restrictions for use of electronic copies of Contract Document: Section 011400 – Work Restrictions.
 - 2. Specific requirements for submittal of construction schedules: Section 013200 Construction Progress Documentation.
 - 3. Specific requirements for submittal of schedule of values: Section 012400 – Schedule of Values.
 - 4. Requirements for submittal of coordination drawings: Section 013100 – Project Management and Coordination.
 - 5. Submittal of final record drawings and other documents: Section 017839 – Project Record Documents.
 - 6. Submittal of product and procedural documentation: 018119-Indoor Air Quality Requirements

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Architect's responsive action. Action submittals include product data, shop drawings and samples.
- B. Informational Submittals: Written information that does not require Architect's responsive action. Submittals of this kind may be required by the Architect to confirm the Construction Manager's compliance with submittal requirements. Submittals may be rejected for not complying with requirements. Informational submittals include calculations and other informational submittals described in this Section.
- C. Substitutions: Changes in products, materials, equipment and methods of construction from those required by the Contract Documents, as proposed by the Construction Manager and not considered "or equal".
- D. Or equal: Construction Manager proposed products, materials, and equipment that comply with specified material and performance requirements, but are not one of the named manufacturer's, suppliers, and distributors. Equal products, materials, and equipment shall identically match the physical appearance of specified items.

1.4 SUBMITTALS

- A. Submittal Schedule:
 - 1. Within 45 days after signing the Agreement, to be submitted with the CPM Schedule, prepare and submit for the Architect's approval a schedule of Shop Drawings, Product Data and Samples required to be submitted for the Work.
 - a. The schedule shall indicate by trade the date by which final approval of each item must be obtained, and shall be revised as required by conditions of work, subject to the Architect's approval.
 - b. The schedule shall be derived from the Construction Manager's CPM Schedule, but shall be submitted as a separate document, in addition to being part of the CPM line items.
 - 2. The Architect's review, including Consultant's review period, will not exceed 21 calendar days from the date on which the Architect receives the submission or the date that is provided on the Construction Manager's submittal schedule, whichever is the latest. Construction Manager shall strictly adhere to the established dates set forth by the Schedule of Submittals specified above in paragraph 2.01 A. On a weekly basis, the Construction Manager is responsible for identifying, in writing, priority submissions to assist the Architect in facilitating an efficient review process that is in accordance with the Construction Manager's CPM schedule.
 - 3. Each submittal shall be made no later than 60 calendar days prior to the time that the CPM shows requirement for incorporation of the item into the Work, or earlier under the following conditions:
 - a. As required to furnish and deliver to the site the specific item or items required, with sufficient time to allow proper examination and review of such submittals.
 - b. If the item in question is to be incorporated in the work prior to the expiration of 60 calendar days from the time of execution of the Contract, the aforesaid written notice shall be submitted to the Architect immediately following the execution of the Contract.
 - c. Substitutions/ Or Equal: Each request for a substitution shall be made no later than

90 calendar days prior to the time for incorporation of the item into the Work.

4. No item, material, article, system or piece of equipment requiring approval of the Architect shall be ordered or installed until such approval has been obtained.
- B. Product List for Color Selection: To facilitate the preparation of the color schedule, the Construction Manager shall, along with the CPM, submit within forty-five (45) calendar days following signing the Agreement, unless otherwise extended by the Architect, a list of the names of the manufacturers whose products he proposes to use.
 1. List products for which color, finish, pattern, texture, or other related information is a consideration, including, but not limited to the following:
 - a. Exterior materials: Face brick; exterior concrete masonry units; factory-finished metal siding; factory finish for doors, windows and louvers.
 - b. Casework finishes: Solid and veneer wood with transparent finish; plastic laminate.
 - c. Interior finishes: Ceramic tile, acoustical ceiling tile, resilient flooring, carpet, paint.
 - d. Specialties available in a choice of colors: Toilet partitions; lockers; operable panel finishes.
 - e. Other items for which the above properties affect the design.
 2. Products listed shall be as specified, unless substitution has been approved.
- C. Substitution and Or Equal Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 1. Substitution and Or Equal Request Form: Use facsimile of form provided at end of Section.
 2. Documentation: Show compliance with requirements for substitutions listed on the Substitution / Or Equal Request form, and additional requirements as may be requested by the Architect or as otherwise applicable. Submit specified product or system and clearly demonstrate in a side-by-side comparison the similarities and differences between the specified and proposed Substitution or Or Equal product or system. Absent this documentation, the request will not be reviewed by the Architect and be sent back rejected.
- D. Product Data, Shop Drawings, Samples, Schedules and other Submittals: Refer to individual Specification Sections for submittals required.
- E. Confirmation of contract between Construction Manager and printing company for reproduction of shop drawings as specified in this Section.

PART 2 - PRODUCTS

2.1 SUBMITTAL PREPARATION, GENERAL

- A. Preparation of Submittals: To receive consideration by the Architect, each submittal shall be accompanied with the Submittal Transmittal Form at the end of this section.
 1. Submittal packages shall contain all required information in accordance with the submittal requirements of each specification section. Incomplete submittals will be returned without review.
- B. Each submittal cover sheet shall contain a clear space approximately 80 square inches for

stamps and Architect's comments. Each drawing shall contain a similar space as an additional border on the right or bottom.

C. Distribution:

1. CM shall electronically deliver submittals to the Architect and its consultants, OPM, Clerk, and CxA (when applicable) in a format acceptable to the Architect.
2. Simultaneously, CM shall deliver 1 hard copy print to the Architect and its consultants and one hard copy print to the clerk.
3. Architect and consultants will review submittals, and the Architect will post reviewed submittals on web-based file transfer service specified herein.
4. CM is responsible for distribution to all trades.
5. CM to deliver 1 hard copy of "Reviewed" and "Approved and Furnish as Corrected" submittals to Clerk.
6. Drawings submitted directly from Subcontractors, manufacturers or vendors, or directly to the Architect's consultants, will be returned to the Construction Manager without action.

D. Web-Based Construction Administration Database:

1. For the entire Construction Period Construction Manager shall provide, manage and maintain a High-Band Width Electronic File Transfer Service that is accessible via the Internet by a Web Browser such as Internet Explorer or Mozilla Fire Fox. The Construction Manager shall process submittals electronically, through one of the three following web-based construction administration database services:
 - a. Prolog Converge.
 - b. Submittal Exchange.
 - c. Newforma.
 - d. Or equal.
2. The Construction Manager shall provide licensed seats/access to, and training on said database, for all of the Architect's Consultant's and OPM's CA Team Members, to facilitate electronic transmittal of all of Construction Documentation including, but not limited to Project submittals, RFI's and Change Order Requests, Architect Directives, Sketches, Meeting Minutes, and Architect Field Reports.
3. All of the Project documentation compiled in this CA database, shall be made completely accessible to the Architect & Owner, for the entire duration of the Project, and then be submitted (in PDF form) to, and become the property of the Owner, similar to all other Closeout documentation related to this Project.

2.2 PRODUCT DATA

A. Manufacturers' Product Literature: For standard manufactured items, submit manufacturer's catalog sheets with illustrated cuts of the items to be furnished.

1. Include scale details, sizes, dimensions, performance characteristics, capacities and other pertinent information.
2. Each submittal of product data shall be accompanied by an appropriate transmittal form with specific reference to the applicable paragraph in the Specifications.
3. Indicate clearly on such printed matter which of several items is being submitted for approval.

B. If catalog cuts of standard manufactured items show different types, options, finishes, performance requirements, or other variations, those features that the Construction Manager proposes to furnish shall be clearly circled or otherwise indicated, and all irrelevant diagrams, notes, or other information deleted or canceled.

1. If any variations from the catalog description are proposed or required, such variations shall be clearly noted on the cut by the Construction Manager.
2. Wiring diagrams shall be produced to address specific project requirements. Catalog cuts of wiring diagrams will not be acceptable.

2.3 SHOP DRAWINGS

- A. The Construction Manager shall prepare shop drawings showing such features as required by the Technical Specifications Sections, to demonstrate an understanding of the particular conditions unique to this Project.
 1. Prepare shop drawings at a scale of at least twice the scale of contract drawings showing the same work.
 2. Reproduction of Contract Documents in any form will not be accepted for use as Shop Drawings, unless specifically allowed in writing by the Architect for a particular portion of the Work.
 3. Refer to Section 011400 –WORK RESTRICTIONS for permissible use of electronic documents for the purpose of preparation of shop drawings. Use of Project Electronic Files for shop drawing preparation will be subject to the requirements specified in that Section.
- B. Shop Drawings related to various units comprising a proposed assembly shall be submitted simultaneously so that such units may be checked individually and as an assembly.
- C. Each drawing shall have a clear space approximately 80 square inches as an additional border on the right or bottom for stamps and Architect's comments.
- D. Shop Drawings shall clearly indicate all details, sectional views, arrangements, working and erection dimensions, kinds and quality of materials and their finishes, and other information necessary for proper checking and for fabrication and installation of the items, and shall include all information required for making connections to other work and/or adjacent materials.
- E. If any information on previously submitted Shop Drawings, aside from notations made by the Architect is revised in any way, such revision shall be circled or otherwise graphically brought to the Architect's attention. If approved Drawings are subsequently revised, they shall be re-submitted to the Architect with all revisions clearly marked for the Architect's attention. Whenever drawings are revised, the latest revisions shall be circled or otherwise indicated to distinguish them clearly from all previous revisions (and from the information on the original drawing).

2.4 SAMPLES

- A. Submit samples as required under the various Sections of the Specifications. Each sample shall be accompanied by a transmittal and cover sheet as required for all submittals.
- B. Before submitting samples, consult with Architect to determine whether samples are to be submitted to Architect's office, field, or other location.
- C. Samples shall be submitted in triplicate, with a forth sample to be submitted to the Clerk for owner review, unless otherwise specified or directed by the Architect.
- D. Samples may be submitted to Architect directly from manufacturers, vendors, suppliers, Sub-

contractors, or others, but a separate transmittal letter shall be submitted through the Construction Manager in each such case.

- E. Approved samples of major or expensive items or assemblies, if in good condition and meeting all requirements of the Contract, may be properly marked for identification and used in the Work, provided that all shipping and handling charges are paid by the Construction Manager.
- F. Each sample shall have a label indicating the material represented, its place of origin, and the names of the producer, the Architect, the Construction Manager, the Subcontractor and the building or Work for which the material is intended. Samples shall be marked to indicate the Drawing numbers or Specification Paragraph requiring the materials represented.
- G. Approval of samples for color, texture, and other aesthetic qualities shall not be construed as approval of other characteristics.
- H. Approved samples, unless specifically stated by the Construction Manager as slated for incorporation in the Work, will be kept on file (and accessible for inspection) by the Architect until Final Acceptance of the Project. Any sample not reclaimed by the Construction Manager within thirty (30) days after Substantial Completion of the Project will be considered unclaimed material, and may be disposed of by the Architect.

2.5 COLORS AND FINISHES

- A. The Architect will prepare a master color schedule indicating the required color, finish, pattern, material, texture, and other pertinent information in connection with interior and exterior finishes.
- B. Color chips shall be submitted for all items having color unless otherwise directed or approved by the Architect. Upon the expiration of such 45-day period, the Architect will proceed with color selection and preparation of final color schedule.
- C. The Architect will select the colors and finishes of a manufacturer within the framework of the Specifications, for each item where the Construction Manager fails to submit the name of a specific manufacturer within the allotted time, and the Construction Manager shall provide such materials without additional compensation.

2.6 CALCULATIONS

- A. Calculations Based on Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Construction Manager by the Contract Documents, submit calculations demonstrating that products and systems comply with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit three copies of a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Construction Manager to be designed or certified by a design professional.
 - 1. Indicate that products and systems comply with performance and design criteria in the

Contract Documents.

2. Include list of codes, loads, and other factors used in performing these services

2.7 INFORMATIONAL SUBMITTALS

- A. General: Informational submittals comprise written information that does not require Architect's responsive action.
- B. Informational submittals required for the Work include, but are not limited to, the following:
 1. Storm Water Pollution Prevention Plan Documentation, as specified in Section 011400 – WORK RESTRICTIONS
 2. Calculations for Construction Manager-engineered work, as specified in particular specification sections in Divisions 2 through 50.
 3. Research/evaluation reports and test data as specified in particular specification sections in Divisions 2 through 50.
 4. Certifications and other qualification data, as specified in particular specification sections in Divisions 2 through 50.
 5. Maintenance data, as specified in particular specification sections in Divisions 2 through 50.
 6. Confirmation of contract with printing company as specified in this Section.

2.8 SUBMITTAL REQUIREMENTS FOR COMMISSIONING

- A. Submittals:
 1. Submit digital copy of applicable submittals for equipment to be commissioned to Commissioning Authority (CxA).
 2. CxA will review and approve submittals applicable to systems being commissioned for compliance with commissioning needs, concurrent with Architect's and Construction Manager's review.
 3. Provide copy of the Design Team's review comments to the CxA.
 4. Repeat this process for any resubmissions.
- B. Data for Commissioning: The following information shall be included in all submittals of commissioned equipment and systems.
 1. Detailed manufacturer's installation and start-up procedures.
 2. Operating, troubleshooting, and maintenance procedures.
 3. Fan and pump curves.
 4. Full warranty information, with responsibilities of Owner to keep warranty in force clearly defined.
 5. Installation and checkout materials actually shipped inside equipment and actual field checkout sheet forms to be used by factory or field technicians.
- C. CxA will request specific information needed about each piece of commissioned equipment or system. Information requested includes, but is not limited to:
 1. Full details of Owner-contracted tests, if any.
 2. Full factory testing reports, if any.
- D. CxA may request additional documentation necessary for commissioning process. Requests

by CxA may precede, be concurrent with, or follow normal submittals.

- E. Construction Manager's responsibility for deviations in submittals from requirements of Contract Documents is not relieved by CxA's review.

PART 3 - EXECUTION

3.1 CONTRACTOR ACTION ON SUBMITTALS

- A. Should the Architect in checking shop drawings or other submittals make changes which the Construction Manager deems will increase the Contract Price, the Construction Manager shall so inform the Architect and OPM in writing within fourteen (14) calendar days following receipt of the checked submittals and prior to starting fabrication of the item or items. Failing this, the Construction Manager shall be deemed to have waived all claims for extra compensation for the work involved.
- B. Notes or other information on submittals that are contrary to provisions of the Contract Documents shall be deemed to be addressed to the applicable Construction Manager, Subcontractor, material supplier or other parties involved, and shall have no force or effect with respect to this Contract, even though the Shop Drawing or Sample involved is approved by the Architect. In particular the terms "By Others", "N.I.C." or words of similar meaning and import on submissions shall not be deemed to imply that the referenced items are to be omitted from this Contract.
- C. The Construction Manager shall obtain and distribute copies of approved Shop Drawings and other Submittals to his subcontractors and material suppliers needing such information, at no additional cost to the Owner.
- D. The Construction Manager shall keep on the site, in good order, a complete up-to-date set of all approved Shop Drawings and other Submittals.
- E. Construction Manager shall assume full liability for delay attributed to insufficient time for delivery and/or installation of material or performance of the Work when approval of pertinent Shop Drawings is withheld due to failure of the Construction Manager to submit, revise, or re-submit Shop Drawings in adequate time to allow the Architect reasonable time, not to exceed twenty-one (21) calendar days for normal checking and processing of each submission and resubmission. The Architect will not be limited to twenty-one (21) calendar days when the Submittal Schedule has not been submitted or is not current.

3.2 ARCHITECT ACTION ON SUBMITTALS

- A. Product Data and Shop Drawings: After reviewing product data submittals, the Architect will mark each submittal with one of the following responses
 - 1. The Architect will annotate all submittals digitally, applying a stamp including the following information: "Reviewed as required by the Construction Contract Documents and approved, but only for conformance to the design concept of the Work, and subject to further limitations and requirements contained in the Contract Documents."
 - 2. "Rejected". A digital copy of Rejected submittals will be uploaded into the CA Database. Rejected submittals shall be resubmitted in the same manner until approval is obtained.
 - 3. The stamp will also contain notes indicating possible actions, namely; "rejected"; "revise"

- and resubmit"; and "furnish as corrected". Architect will check one of the actions.
4. Corrections or comments made on the submittals during this review shall not relieve Construction Manager from compliance with requirements of the Contract Drawings and Specifications. This check is only for review of general conformance with the design concept of and general conformance with the information given in the Contract Documents. The Construction Manager is responsible for confirming and correlating all quantities and dimensions; selecting fabrication processes and techniques of construction; coordinating his work with that of all other trades; and performing his work in a safe and satisfactory manner.
 5. For all Submittals, the Construction Manager will have prints made from the annotated digital submittals at the Construction Manager's expense. Such prints shall be used for record purposes and for comparison with subsequent resubmissions. One will be retained by the Architect, one furnished to the applicable consultants. Such procedures shall be followed until the Shop Drawing is marked "Furnish as Corrected", or "Reviewed as required by the Construction Contract Documents and approved, but only for conformance to the design concept of the work, and subject to further limitations and requirements contained in the Contract Documents."
 6. Submittals marked "Furnish as Corrected" shall be treated in the same manner as Drawings marked "Reviewed as required by the Construction Contract Documents...and requirements contained in the Contract Documents." The Architect's comments shall be considered part of the original Drawings. Should the Construction Manager disagree with such comments, he shall so notify the Architect in writing within fourteen (14) days after receipt of such Drawings and before commencing work on the items in question. Failing this, the Construction Manager shall be deemed to have accepted full responsibility for implementing such comments at no additional cost to the Owner.
 7. For documents with the comment "Reviewed as required by the Construction Contract Documents..." or "Furnish as Corrected", the Construction Manager will have made at the Construction Manager's expense, four (4) prints of the corrected original for the Architect's and Owner's use.
- B. Informational Submittals: Architect will review each informational submittal and will review it for general compliance with submittal requirements
1. Architect will process and digitally distribute each informational submittal as for other submittals.
 2. Compliant informational submittals will be marked "Reviewed" and a stamped digital copy will be distributed to Owner's Project Manager, Clerk of the Works and Construction Manager.
 3. Informational submittals that do not comply with submittal requirements specified herein and in the section whose work they cover will be returned "rejected". Re-submittal will be required.
- C. Repeated Re-submittals: The Architect will review the initial submittal for each product, and one re-submittal if revisions are required.
1. If the first re-submittal is rejected or requires further revision, the Construction Manager shall be responsible to the Owner for costs for Additional Services of the Architect to perform review of an extensive number of repeated submittals, until a submittal for that product is accepted by the Architect with no need for further revision.
 2. Refer to Section 011400 –WORK RESTRICTIONS, for procedures required in cases where Construction Manager is responsible to the Owner for costs for Additional Services of the Architect.

3.3 SUBSTITUTIONS/ OR EQUALS

- A. Conditions: Architect will consider Construction Manager'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:
1. Substitution is requested by completing a copy of Form 013301 – SUBSTITUTION / OR EQUAL REQUEST FORM, attached to the end of this Section.
 2. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 3. Requested substitution/ or equal does not require extensive revisions to the Contract Documents.
 4. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 5. Substitution request is fully documented and properly submitted.
 6. Requested substitution will not adversely affect Construction Manager's Construction Schedule.
 7. Requested substitution has received necessary approvals of authorities having jurisdiction.
 8. Requested substitution is compatible with other portions of the Work.
 9. Requested substitution has been coordinated with other portions of the Work.
 10. Requested substitution provides specified warranty.
 11. 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.
 12. Any additional cost, or any loss or damage arising from the substitution of any material or any method for those originally specified shall be borne by the contractor, notwithstanding approval or acceptance of such substitution by the Owner or Architect.
- B. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within 7 calendar days of receipt of a request for substitution. Architect will notify Construction Manager of acceptance or rejection of proposed substitution within 21 calendar days of receipt of request, or 7 calendar days of receipt of additional information or documentation, whichever is later.
1. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.
- C. Review of Substitution / Or Equal Requests: The Architect will review Substitution Requests that are submitted in accordance with the requirements of this section, and are shown to be of benefit to the Project.
1. If a request for substitution is incomplete, the Construction Manager shall be responsible to the Owner for costs for Additional Services of the Architect to perform additional review, until the substitution has been either accepted with no need for further revision, or rejected.
 2. If a request for substitution is shown to be of benefit to the Construction Manager only and not to the Project, the Construction Manager shall be responsible to the Owner for costs for Additional Services of the Architect to perform review, redesign or coordination due to such substitution.
 3. Refer to Section 011400 –WORK RESTRICTIONS, for procedures required in cases

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where Construction Manager is responsible to the Owner for costs for Additional Services of the Architect.

D. Form of Acceptance of Substitution: Change Order

END OF SECTION

Attachment:

Form 013301 – SUBSTITUTION REQUEST FORM

Form 013302 – SUBMITTAL TRANSMITTAL FORM

FORM 013301

SUBSTITUTION / OR EQUAL REQUEST FORM

Project: DOVER HIGH SCHOOL & CAREER TECHNICAL CENTER

To: HMFH Architects, Inc.
130 Bishop Allen Drive
Cambridge, MA 02139

We hereby submit for your consideration the following product as a substitution for the item specified for the above referenced project:

Drawing Number: _____ Drawing Title: _____

Specification Section: _____ Section Title: _____

Paragraph: _____ Specified Item: _____

Proposed Substitution / **Or Equal**: _____

Attach complete information on changes to Drawings and Specifications, including related work on other Drawings and under other Sections of the Specifications necessary for the proper installation of the proposed substitution, including proper coordination and finishing.

Submit with request complete Product Data, samples and other data necessary to substantiate that the proposed item is equal to or exceeds the specified item in all respects. Include a comparison chart showing material features and properties of the specified item and the proposed substitute, paying particular attention to requirements specifically mentioned in the Specifications or shown on the Drawings, and guarantee/warranty information. Clearly mark manufacturer's literature to indicate equality in performance. In the case of operating equipment or systems, provide information as to servicing and maintenance requirements, and anticipated service life in the indicated application.

Fill in the blanks below (attach additional sheets as necessary):

A. Does the substitute affect dimensions shown on the Drawings: Yes ☐ No ☐
(if yes, clearly indicate changes on enclosures)

B. Will the undersigned pay for changes to the building design, including architectural/engineering detailing costs caused by the requested substitution: Yes ☐ No ☐
(if no, please explain)

C. What effect does the substitution have on other Contracts or other trades? _____

D. What effect does the substitution have on construction schedule? _____

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E. Manufacturer's warranties of the specified and proposed items are: Same ☐ Different ☐

Explain: _____

F. Itemized comparison of specified item with proposed substitute is attached.

G. This substitution will amount to a credit or extra cost to the Owner of: _____

_____ Dollars

(\$_____).

H. Does the substitution reduce or alter sustainable attributes (pre-consumer recycled content, post consumer recycled content, indoor air quality certification)? Yes No

Explain:

Notes:

Submission of this form by the Construction Manager will not require the Owner to accept the proposed substitution unless the substituted product or system is acceptable to the Architect.

The Owner's acceptance of any substitution will not change the Contract Price, unless the Owner, Construction Manager and any other required parties execute a Change Order in accordance with the terms and provisions of the Contract Documents.

Refer to Section 013300 – SUBMITTAL PROCEDURES, for additional requirements for the submittal and processing of substitution requests.

Submitted By: _____
(signature)

Title: _____

Firm: _____

END OF FORM



Submittal Review Transmittal

Submittal No.:

(GC Insert Submittal number)

Project:	Hanover High School	Contract For:	New Construction
Prepared By:	(GC Insert General Contractor's Project Manager & Company Name)	To:	HMFH Architect, Inc. 130 Bishop Allen Drive Cambridge, MA 02139
Subcontractor :	(GC Insert Subcontractor's contact & Company Name)	Contractor's Reference Date from Submittal Schedule:	(GC Insert date)
Specification Reference:	(GC Insert Section & paragraph number)	Date Due back to Contractor from Submittal Schedule:	(GC Insert date)
Submittal Type:	(GC Select -Product Data, Certification, Test Report, Shop Drawing or Sample)	Date Received by HMFH:	(To be filled in by Archtiect)
Submittal Title:	(GC-Insert Submittal Name)	Date Returned to Contractor:	(To be filled in by Archtiect)

General Contractor's Review Comments

(GC Provide GC's stamp and any applicable comments or notations in this box)

Architect's Review Comments

(Architect will provide stamp and comments in this box)

SECTION 01 35 43
ENVIRONMENTAL PROCEDURES

PART 1 – GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.
- B. Examine all other Sections of the Specifications for requirements that affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 RELATED WORK UNDER OTHER SECTIONS

- A. Asbestos Remediation.

1.3 HAZARDOUS MATERIALS PROCEDURE

- A. Asbestos:
 - 1. Asbestos Materials Exist On-Site: There are accessible and inaccessible asbestos containing materials (ACM) in the existing building. ACM affected by the demolition project are included under this contract. The Demolition Contractor shall refer to items 6, 7, 8 and 9 below for proper procedures regarding removal and disposal of damproofing, flashing and transite pipes. The Demolition Contractor shall formally notify each subcontractor that there are ACM existing in the building. Hidden ACM may only be found during demolition and renovation. Refer to items 2 and 3 below.
 - 2. Unknown and inaccessible ACM: During demolition, it is possible that previously unknown asbestos materials may be discovered in currently concealed locations.
 - 3. Notification: If the Demolition Contractor or other trades discover or encounter any ACM during the performance of the work, the Demolition Contractor or other trades shall immediately:
 - a. Stop work, notify the C.M at Risk Contractor and Clerk of the Works about the presence of suspect ACM and request instructions for proper action, and
 - b. Take whatever steps and measures are necessary to reduce, control or eliminate the risk of exposure of workers and the public to the ACM.
 - c. Every effort will be made to obtain the 10-day DEP waivers to remove hidden or unforeseen ACM by the asbestos contractor. The Demolition Contractor or other trades shall allow sufficient time for the removal of the ACM at no additional charges to the owner for delays and should waivers are denied.
 - 4. Responsible Person On-Site: The C.M at Risk Contractor shall designate one of its senior on-site employees to be in charge of coordination between the HAZ MAT Consultant, Architect, the Demolition Contractor, and all subcontractors with respect to hazardous materials issues.
 - 5. Responsibility for Hazardous Material Discovery: It is the sole responsibility of the Demolition Contractor, C.M at Risk Contractor and Sub-Contractors to undertake whatever measures, methods or procedures are necessary, required or otherwise appropriate to safeguard the health and safety of all workers and members of the public

with respect to identification and discovery of previously unknown hazardous materials during the work of the Project.

6. Foundation and building flashing (including under window systems, door systems and walls) were assumed to exist throughout the building and assumed to contain asbestos. It is the Demolition Contractor's responsibility to properly expose, remove and dispose at no additional cost to the Owner in accordance with all federal and state regulations. The Demolition Contractor is solely responsible for means and methods and techniques used to properly remove and dispose of the ACM and shall comply with all federal, state and OSHA regulations. The Demolition Contractor shall include in his bid the disposal of 100 ton of the ACM. UEC on-site project monitor will record on a daily basis all quantities removed. The Demolition Contractor will be required to do the same. At the completion of the Demolition project, should quantities of ACM removed were found to be less/more than 100 ton, the Demolition Contractor will be required to issue a credit to the owner based on the unit price to be provided by the contractor. The unit price includes all applicable costs. It is also the Demolition Contractor's responsibility to comply with DES.
7. Dampproofing, including but not limited to paper, glue, glue daubs on Styrofoam (Coated Walls) and structural columns and beams were assumed to contain asbestos and assumed to exist throughout the building including foundation walls below grade. The ACM was assumed to be sandwiched between the outside walls. The Demolition Contractor shall excavate around the foundation walls and shall separate/segregate ACM coated walls/columns and beams from non-ACM walls and to perform the removal work at no additional cost to the Owner in accordance with all federal and state regulations. The Demolition Contractor is solely responsible for means and methods and techniques used to properly remove and dispose of the ACM and shall comply with all federal, state and OSHA regulations. The Demolition Contractor shall include in his bid the disposal of 2,500 ton of ACM coated walls/columns and beams. UEC on-site project monitor will record on a daily basis all quantities removed. The Demolition Contractor will be required to do the same. At the completion of the Demolition project, should quantities of ACM coated walls/columns and beams removed were found to be less/more than 2,500 ton, the Demolition Contractor will be required to issue a credit to the owner based on the unit prices to be provided by the contractor. The unit price includes all applicable costs including but not limited to site preparation, demolition, segregation, transportation and disposal. It is also the Demolition Contractor's responsibility to comply with DES. Certain interior walls (previously exterior due to additions) might be coated with ACM and shall be properly removed and disposed. Refer to item 9 below.
8. Quantities for materials included above in items 6 and 7 are in an addition to the scope required to demolish/dispose of the building per the demolition sections and only to be used for additions and deduction. Credit shall be given to the owner for all quantities listed above multiplying by the credit prices should less ACM was found. The Demolition Contractor shall carry all costs related to demolition and disposal in his bid as non-ACM and all scope and quantities listed above in items 6 and 7. The Demolition Contractor shall own the cost for any loss of salvage values of the columns and beams at no additional cost to the owner should ACM was found.
9. Transite and ACM insulated pipes were assumed to exist underground. The Site or Demolition Contractor shall excavate around the pipes to expose the pipes at no additional cost to the owner for removal by the asbestos contractor.
10. Indemnification: To the fullest extent permitted by law, the Demolition Contractor, C.M at Risk Contractor and Sub-Contractors shall indemnify and hold harmless the Owner and the Architect and their agents and employees from and against all claims, damages, losses and expenses including, but not limited to, attorneys' fees arising out of or relating to the performance of the Work, including the discovery or identification of any hazardous materials, provided that any such claim, damage, loss or expense if attributable to bodily injury, sickness, disease or death, or to damage to or destruction of tangible property (other than the Work itself) including the loose of use resulting therefrom; and is caused in whole or in part by any negligent act or omission of the Demolition Contractor, C.M at Risk Contractor and Sub-Contractors, anyone directly or indirectly employed by any of

them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder.

B. Lead:

1. The Demolition Contractor, C.M at Risk Contractor and Sub-Contractors shall be made aware that Lead Based Paint exists on painted surfaces throughout the building including structural columns and beams.
2. All the work of this Contract shall conform to the standard set by all applicable Federal, State and Local laws, regulations, ordinance and guidelines in such from in which they exist at the time of the work on the Contract and as may be required by subsequent regulations.
3. The Demolition Contractor, C.M at Risk Contractor and Sub-Contractors are solely responsible for means and methods, and techniques used for demolition and lead control. The Demolition Contractor shall collect and control lead contaminated debris and to properly remove and dispose of lead contaminated soil around each building due to demolition activities.
4. The Demolition Contractor shall at his own cost and expense comply with all laws, ordinance, rules and regulations of Federal, State, Regional and Local authorities during demolition, prepping, sanding, cutting, burning, scraping, painting over, grinding and regarding handling, storing and disposing of lead and lead contaminated waste material.
5. The Demolition Contractor shall submit to the Architect prior to commencing of work the following:
 - a. Written respiratory and notification program
 - b. Written lead compliance program in accordance with OSHA regulations including:
 1. Training requirement certifications.
 2. Supervisor qualifications.
 3. Written compliance program specific to this project
 4. Respirators fit test records.
 5. Medical surveillance certificates.
6. The EPA requires demolition debris with lead to be tested in accordance with the Toxicity Characteristic Leaching Procedure (TCLP) to determine the potential for significant amounts of lead to leach out of the waste. If the results are below the 5.0 ppm, the waste may be disposed of in a conventional landfill for demolition debris. If, however, the TCLP results are above the limit, the waste must be disposed of in a DES approved, hazardous waste landfill. The Demolition Contractor shall at own cost and expense perform all required testing of waste by the TCLP. The Demolition Contractor must submit to the Owner copy of tests performed and all waste shipment records prior to disposing of debris. The Owner reserves the right to have own TCLP samples collected to verify results. All disposal costs shall be at the Demolition Contractor's responsibility.
8. The following references are cited as current applicable publications. This project is subject to compliance with the all regulations including but not limited to:
 - c. U. S. Department of Labor, Occupational Safety and Health Administration Title 29 CFR 1910.1025 and 29 CFR Part 1926.62.
 - d. U. S Department of Environmental Protection, Resources Conservation and Recovery Act.
 - e. State of New Hampshire regulations and standards.
9. All above regulations are applicable to this project. Where there is a conflict between this section and the applicable regulations, the more stringent requirement shall prevail.

C. Other Hazardous Materials:

1. The Demolition Contractor shall be made aware that other hazardous materials are found inside/outside the building. The Demolition Contractor shall be responsible for quantifying, removal and proper disposal of all hazardous materials in/out the building, including but not limited to batteries and related electrolytic material, PCB's, mercury and Freon inside air conditioners, switches, exit signs, thermostats and other items.

D. PCB's:

1. The Demolition Contractor, C.M at Risk Contractor, Sub-Contractors and Asbestos Contractor shall be made aware that building materials (Material) including but not limited to painted surfaces, glue, roofing, coatings and other building materials are likely to contain >1 ppm of Polychlorinated Biphenyls PCB's. Caulking was found to contain >1ppm but <50 ppm of PCB's.
2. Due to the difficulty associated with exhaustive testing of all surfaces, glue, and coatings within the building, the Owner has elected to direct the Demolition Contractor, C.M at Risk Contractor, Sub-Contractors and Asbestos Contractor to assume that these surfaces do, in fact, contain PCB's and to take all necessary steps for their compliant removal and disposal.
3. All of the work of this Contract shall conform to the standard set by all applicable Federal, State and Local laws, regulations, ordinance and guidelines.
4. The Demolition Contractor, C.M at Risk Contractor, Sub-Contractors and Asbestos Contractor are solely responsible for means and methods, and techniques used for demolition and control. The Demolition Contractor, C.M at Risk Contractor, Sub-Contractors and Asbestos Contractor shall collect and control PCB's contaminated debris and soil.
5. The Demolition Contractor, C.M at Risk Contractor, Sub-Contractors and Asbestos Contractor shall at its own cost and expense comply with all laws, ordinance, rules and regulations of Federal, State, Regional and Local authorities during prepping, sanding, cutting, burning, scraping, painting over, grinding and regarding handling, storing and disposing of contaminated waste material and during demolition of the building.

E. Silica Dust:

1. The Demolition Contractor and Asbestos Contractor shall be made aware that buildings materials (Material) may contain Silica.
2. Due to the difficulty associated with exhaustive testing, the Owner has elected to direct the Demolition Contractor and Asbestos Contractor to assume that Silica was found.
3. The Demolition Contractor and Asbestos Contractor shall review and comply with most recent US Department of Labor Final Rule and shall take extra precautions to protect workers and other personnel on site.

PART 2 – (PRODUCTS) Not Used

PART 3 – (EXCUTION) Not Used

END OF SECTION

SECTION 014000

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.
- B. Examine all other Sections of the Specifications for requirements that affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for
 - 1. Quality assurance
 - 2. 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-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Construction Manager's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Construction Manager to provide quality-assurance and -control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
 - 4. A pre-construction "kickoff" meeting regarding testing requirements shall be scheduled and shall be attended by: the GC or CM and all applicable Trade/Sub Construction Managers, the Testing Agency, the Architect, OPM/Clerk of the Works, Structural Engineer, Geotechnical Engineer.

1.3 DEFINITIONS

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

execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.

- 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 establish the standard by which the Work will be judged.
- D. Laboratory Mockups: Full-size, physical assemblies that are constructed at testing facility to verify performance characteristics.
- E. 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.
- F. 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.
- G. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.
- H. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- I. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- J. Installer/Applicator/Erector: Construction Manager or another entity engaged by Construction Manager as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.
- K. 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.

1.4 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 Architect for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the

minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect 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. Testing and Inspection Log: Submit updated copy of log each month with the Application for Payment.
- 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 reinspecting.
- 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 are 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, according to ASTM E 329; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
 - 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
 - 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
 - 1. Construction Manager responsibilities include the following:
 - a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
 - d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
 - e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
 - f. When testing is complete, remove test specimens, assemblies, mockups, and laboratory mockups; do not reuse products on Project.
 - 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Construction Manager. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- J. 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 ma-

terials indicated for the completed Work:

1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
 2. Coordinate the work of multiple subcontractors as needed to build complete mockups of multi-component systems.
 3. Notify Architect seven days in advance of dates and times when mockups will be constructed.
 4. Demonstrate the proposed range of aesthetic effects and workmanship.
 5. Perform field tests on mock-up panels to show compliance with requirements as specified in individual sections. At a minimum, perform air leakage and water infiltration testing.
 6. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
 - a. Allow seven days for initial review and each re-review of each mockup.
 7. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 8. Demolish and remove mockups when directed, unless otherwise indicated.
- K. Laboratory Mockups: Comply with requirements of preconstruction testing and those specified in individual Sections in Divisions 2 through 50.

1.7 QUALITY CONTROL – OWNER RESPONSIBILITIES

- A. General: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
1. Testing, inspections and commissioning performed by the Owner or the Owner's agents in no way reduce the responsibility of the Construction Manager to meet performance requirements, descriptive criteria and all other requirements of the specifications, nor do these activities on the part of the Owner relieve the Construction Manager from performing Quality Assurance and Quality Control measures specified.
- B. Tests and Inspections: The Owner reserves the right to employ consultants and testing agencies to test the performance of the Work and to inspect the Work for conformance with the Contract Documents.
1. Notice for Testing: The Construction Manager shall give the Owner a minimum 24-hour notice when installations that require testing are ready for testing or inspection.
 - a. Earlier notice shall be given where specified in a given technical section of the Specifications.
 - b. If the Owner's testing agency arrives at the site to test the performance of the work, and determines that the installation is not ready for testing or inspections, then the Construction Manager shall be responsible for the costs of the testing agency's site visit
 2. Availability of Test Results: The results of such tests and inspections will be made available to the Architect and Construction Manager.
 3. Correction of Work:
 - a. Where results demonstrate deficiencies in the Work, the Construction Manager shall take all actions necessary to correct the Work in a timely manner at their own expense.
 - b. When the Construction Manager considers the Work to be corrected, further tests

and inspections will be performed by the Owner's consultants and testing agencies at the Construction Manager's expense.

- C. Owner will furnish Construction Manager with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
- D. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Construction Manager, and the Contract Sum will be adjusted by Change Order.

1.8 QUALITY CONTROL – CONTRACTOR RESPONSIBILITIES

- A. Tests and inspections not explicitly assigned to Owner are Construction Manager's responsibility. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Construction Manager by authorities having jurisdiction, whether specified or not.
 - 1. Where services are indicated as Construction Manager's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Construction Manager shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 - 2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 - 3. Where quality-control services are indicated as Construction Manager's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 - 4. Testing and inspecting requested by Construction Manager and not required by the Contract Documents are Construction Manager's responsibility.
 - 5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- B. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 1 Section "Submittal Procedures."
- C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Construction Manager's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- D. Testing Agency Responsibilities: Cooperate with Architect and Construction Manager in performance of duties. Provide qualified personnel to perform required tests and inspections.
 - 1. Notify Architect and Construction Manager promptly of irregularities or deficiencies observed in the Work during performance of its services.
 - 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
 - 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 - 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Construction Manager.
 - 5. Do not release, revoke, alter, or increase the Contract Document requirements or ap-

- prove or accept any portion of the Work.
6. Do not perform any duties of Construction Manager.
- E. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.
 5. Delivery of samples to testing agencies.
 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 7. Security and protection for samples and for testing and inspecting equipment at Project site.
- F. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting. Schedule times for tests, inspections, obtaining samples, and similar activities.
- G. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Submit schedule within 30 days of date established for the Notice to Proceed.
1. Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

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 Architect.
 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 Architect'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 Section 017329 – 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

SECTION 015000
TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the Contract and General conditions and all Sections within Division 1 – GENERAL REQUIREMENTS, which are hereby made a part of this Section of the Specifications.
- B. Examine all other Sections of the Specifications for requirements that affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 SUMMARY

- A. The Work of this Section includes, but is not limited to, requirements for the following:
 - 1. Temporary facilities and services.
 - 2. Temporary water.
 - 3. Weather protection
 - 4. Temporary heating and ventilating
 - 5. Temporary humidity control.
 - 6. Temporary electricity and lighting
 - 7. Temporary telephone
 - 8. Temporary sanitary facilities
 - 9. Temporary fire protection
 - 10. Temporary stairs and ladders
 - 11. Temporary hoists and chutes
 - 12. Staging and scaffolding
 - 13. Temporary use of elevators
 - 14. Temporary enclosures
 - 15. Protection of work, property and the public
 - 16. Security of the work
 - 17. Rodent control.
 - 18. Water control
 - 19. Snow and ice control
 - 20. Construction fence
 - 21. Project signs

1.3 SUBMITTALS

- A. General: Refer to Section 013300 – SUBMITTAL PROCEDURES, for submittal provisions and procedures.
- B. Informational Submittals: Submit the following plans for temporary protection and facilities as specified in this Section:

1. Weather protection plan
2. Temporary humidity control procedures
3. Temporary heating plan
4. Temporary fire protection plan.

1.4 TEMPORARY FACILITIES AND SERVICES

- A. Construction Manager shall be responsible for arranging and providing temporary facilities and general services at the site as specified herein and as otherwise required for proper and expeditious prosecution of work. Except as otherwise specified, the Construction Manager shall pay costs for all temporary facilities and general services until Final Acceptance of the Work and shall remove same at completion of the Work.
 1. Provide for relocating the construction trailer in accordance with phasing schedule.
- B. All such services and facilities shall comply with applicable Federal, State and local regulations.
- C. Construction Manager shall make all connections to existing services and sources of supply, shall provide all necessary installations, labor, materials, and equipment, in a manner subject to the approval of the Architect and the Owner, shall remove temporary installations and conditions when no longer required, and shall restore the services and sources of supply to proper operating condition as approved by the Architect.
- D. Discontinuance of any temporary service prior to the completion of any portions of the Work shall not render the Owner liable for any additional cost resulting therefrom.
- E. Should a change in location of any temporary equipment be necessary in order for the Work to progress properly, Construction Manager shall remove and relocate such equipment as required without additional cost to the Owner.

1.5 TEMPORARY WATER

- A. Furnish potable water for construction purposes for trades at a point within 10 feet of building being constructed. Make arrangements and pay charges for water service installation, maintenance, and removal thereof, and pay costs of water for all trades.
- B. After installation, permanent water supply and distribution system may be used as source of water for construction purposes, provided that the Construction Manager pays applicable municipal water costs and assumes responsibility for damage to water distribution system and pays costs of restoration of system where so damaged.
- C. Temporary pipe lines and connections from the permanent service line, either outside or within the building, necessary for the use of the Construction Manager and his Subcontractors shall be installed, protected and maintained at the expense of the Construction Manager.
- D. In addition to temporary lines and connections, the Construction Manager, if required by the Owner, shall at the Construction Manager's expense install a temporary meter in a frostproof box in such location and in such manner as may be approved by the Architect.
- E. Provide an adequate supply of drinking water from approved sources of acceptable quality, satisfactorily cooled, for Construction Manager's employees and those of his Subcontractors. Where required, furnish drinking water in suitable containers and provide single-service cups

for use of employees. Drinking water dispensers shall be conveniently located in building where work is in progress.

- F. At completion of construction work, temporary water service equipment and piping shall be removed by Construction Manager.

1.6 WEATHER PROTECTION

- A. It is the intent of these Specifications to require the Construction Manager to provide temporary enclosures and heat to permit construction work to be carried on during the months of October through April and in compliance with New Hampshire General Laws. These Specifications are not to be construed as requiring enclosures or heat for operations that are economically infeasible to protect in the judgment of the Architect. Included in this category, without limitation, are such items as site work, excavation, pile driving, steel erection, erection of certain exterior wall panels, roofing, and similar operations.
- B. "Weather Protection" shall mean the temporary protection of that work adversely affected by moisture, wind and cold, by covering, enclosing and/or heating. This protection shall provide adequate working areas during the months of November through March as determined by the Architect and consistent with the approved construction schedule to permit the continuous progress of all work necessary to maintain an orderly and efficient sequence of construction operations. The Construction Manager shall furnish and install all "weather protection" material and be responsible for all costs, including heating required to maintain temperature of 40 degrees F. at the working surface. This provision does not supersede any specific requirements for methods of construction, curing of materials or to performance obligations of the Construction Manager.
- C. Within 30 calendar days after award of Contract, the Construction Manager shall submit in writing to the Architect for approval, three (3) copies of his proposed methods for weather protection.
- D. Installation of weather protection shall comply with all safety regulations including provisions for adequate ventilation and fire protection.
- E. Determination of extent of work to be performed during winter months shall be by the Construction Manager, with Owner's approval provided that work shall proceed at such a rate as to insure Substantial Completion on or before the stipulated date in accordance with the Progress Schedule.
- F. Be responsible for providing protection against damage to materials and work installed in freezing weather by providing special heat and coverings to prevent damage by the elements, in a manner approved by the Architect. Protect the ground surfaces under footings, under pipelines, under masonry, under concrete and other work subject to damage, against freezing or ice formation. If low temperature makes it impossible to continue operations safely in spite of cold weather precautions, cease work, and so notify the Architect.

1.7 TEMPORARY HEATING AND VENTILATING

- A. Within thirty (30) calendar days after commencement of work under this Contract, the Construction Manager shall submit in writing to the Architect for approval, three (3) copies of his method and time schedule for heating during construction, which shall concur with his general Progress Schedule.

- B. Temporary weather-tight enclosures and temporary heating shall be provided by the Construction Manager as required during construction to make the building weather-tight and to protect work from freezing and frost damage. All costs of closing in buildings, and all costs of temporary heat shall be paid for by the Construction Manager until Substantial Completion.
- C. Construction Manager shall provide for temporary heating and shall pay fuel costs for heating directly to the utility company. Construction Manager may not tie into the Owner's permanent heating and ventilating system. In areas of building where work is being conducted, temperature shall be continuously maintained as specified in Sections of Specifications but not less than 50 degrees F. nor more than 75 degrees F.
- D. Furnish and install one accurate recording Fahrenheit thermometer at a place designated by the Owner, located as directed by the Owner in order to determine that the specified temperatures are being maintained.
- E. When work has progressed sufficiently for installation of glazing, Construction Manager may, if approved by Architect, use glazed windows in place of temporary enclosures. Permanent windows shall be protected against damage from mortar, cement, plaster, and other like items, and from damage by other trades; and upon completion of work shall be thoroughly cleaned, damaged component parts including glass shall be satisfactorily repaired or replaced, and windows left in perfect condition, prior to Substantial Completion.
- F. Where building systems are inoperable, temporary heating shall be by smokeless portable unit heaters, steam generators or forced warm air heaters (UL, Factory Mutual, Fire Marshall approved), located outside building or vented to the outside. Construction Manager shall pay for fuel, maintenance and attendance required in connection with temporary heat. Surfaces, interior or exterior, damaged by use of these space heaters shall be replaced by new materials or be refinished to the satisfaction of the Architect without additional cost to the Owner. Use of oil burning "salamanders" is forbidden and nonvented open flame heaters will not be permitted inside after the building is closed in. Do not use propane-fueled heaters inside building or near stockpiles of combustible materials.
- G. When new heating system, or suitable portion thereof, is in operating condition, such system may not be used for temporary heating.
- H. Use of permanent air handling facilities for construction heating purposes will not be permitted.
- I. Make periodic inspections of the equipment and controls to insure proper operation of the system, as conditions require, and report any failings. Installation and operation of weather protection and heating devices shall comply with all safety regulations including provisions for adequate ventilation and fire protection.
- J. Upon conclusion of temporary heating period, Construction Manager shall remove temporary piping, temporary radiators, other equipment and pay costs in connection with repairing damaged caused by installation or removal of temporary heating equipment and shall thoroughly clean and recondition those parts of permanent heating system used for temporary service.
- K. Provide adequate ventilation as required to keep temperature of building within 10 degrees of ambient outdoor temperature when such ambient temperature exceeds 70 degrees F., and to prevent accumulation of excess moisture in building. Refer to Section for Indoor Air Quality Control, for additional requirements for ventilation during construction

1.8 TEMPORARY HUMIDITY CONTROL

- A. Humidity Control of Enclosed Building: The contractor shall install the following equipment to monitor and regulate relative humidity as required for the installation of all interior products. Humidity control equipment shall include, but not be limited to, the following:
 - 1. Hygrometer: Provide one device to measure temperature and relative humidity in each construction area.
 - 2. Dehumidifier, as required to maintain humidity of enclosed areas below 70%:
 - 3. Fans: As required to eliminate significant variation in humidity levels within enclosed spaces.
- B. Schedule for Humidity Control: Relative humidity shall be maintained within the limits set by manufacturers of all interior materials and equipment. Refer to individual specification sections in Divisions 6, 9, 10, 11 and 12 for additional environmental requirements. No interior construction product shall be installed or applied prior to enclosure of building and installation of temporary humidity control measures.
- C. Within 30 calendar days after award of Contract, the Construction Manager shall submit in writing to the Architect for approval, three (3) copies of his proposed methods for humidity control.

1.9 TEMPORARY ELECTRICITY AND LIGHTING

- A. Make arrangements as required with local electric company for temporary electric service, pay expenses in connection with installation, operation, and removal thereof, and pay cost of energy consumed by all trades until Substantial Completion of the building. Construction Manager shall make payments for electrical service directly to the electric company.
- B. Take care not to overload equipment and lines. Provide and relocate temporary electric meters as required.
- C. Power: Provide power distribution as required throughout new structure 120/208 volt, 3 phase, 60 cycle AC. Termination of power distribution shall be at one location in each major section of building, approximately at center. Termination shall be provided complete with circuit breakers, disconnect switches and other electrical devices as required to protect power supply system. Submit plan showing electrical distribution locations for Architect's approval.
- D. Lighting: Temporary lighting system shall be furnished, installed and maintained by Construction Manager as required to satisfy minimum requirements of safety and security. Temporary lighting system shall afford general illumination in building areas and supply not less than one (1) watt per square foot of floor area for illumination in areas of building where work is being performed. Provide adequate outdoor lighting to illuminate staging, stockpiles, trenches, projections, office trailers and other like items, to the satisfaction of the Architect, and general illumination throughout adequate for watchmen and emergency personnel.
- E. Safety: All temporary equipment and wiring for power and lighting shall be furnished and installed in conformity with the National Electrical Code and in accordance with local ordinances and requirements of the municipal power authority. All temporary wiring and accessories shall be maintained in a safe manner and utilized so as not to constitute hazard to persons or property and shall be removed after they have served their purposes.
- F. When permanent electrical power and lighting systems are in operating condition, they may

be used for temporary power and lighting for construction purposes, provided that Construction Manager obtains written approval of Architect and Owner. If permanent lighting fixtures are used in temporary light, provide new lamps for fixtures used for temporary light before Substantial Completion of the Work. In addition, provide the following:

1. Replace lamps that burn-out.
 2. Replace lamps that get damaged.
 3. Limit hours of use of the lights as acceptable to Architect.
 4. Clean light fixtures during final cleaning. Lighting protective plastic wrap shall remain on light fixtures to the extent possible, until final cleaning.
- G. At completion of construction work, or at such time as Construction Manager makes use of permanent electrical installation, temporary wiring, lighting and other temporary electrical equipment and devices shall be removed by Construction Manager.

1.10 TEMPORARY TELEPHONE AND HIGH SPEED INTERNET

- A. Arrange with local telephone company to provide direct line telephone service at each construction site. Provide:
1. One direct line instrument in Field Office for the Construction Manager with electronic answering machine.
 2. Two direct line instruments in Field Office of the Clerk of the Works/OPM equipped with electronic answering machine; plus one direct line for facsimile machine in office. Turn over keys to Clerk of the Works, OPM and Architect.
 3. High Speed internet access, 6.0 Mbps minimum downstream speed, modem to accept the appropriate service provided, and wireless router via DSL, Broadband, Cable, or equal with unlimited internet access to the Field offices of the Construction Manager and Clerk of the Works/OPM.
 4. Other instruments at the option of the Construction Manager, or as required by regulations.
 5. Each Subcontractor shall make his own arrangements for telephone service.
- B. Pay for installation and removal of temporary telephones and facsimile lines and for all calls and fixed charges in connection therewith; including unlimited long-distance calling.
- C. Temporary telephone services shall be maintained until Final Completion of the Work.

1.11 TEMPORARY SANITARY FACILITIES

- A. Construction Manager shall provide an adequate number of toilet facilities with chemical type toilets and temporary lighting rented from and serviced by an approved company, as necessary for all persons engaged on the Work. Provide separate facilities for male and female workers.
- B. Toilets shall be erected in location approved by the Architect, shall be maintained by the Construction Manager in a clean and orderly condition in compliance with all local and State health requirements, and shall be removed at Substantial Completion of the Work.
- C. Permanent toilet facilities shall not be used by the Construction Manager, Subcontractors or any persons engaged by them during the course of work under this Contract.

1.12 TEMPORARY FIRE PROTECTION

- A. Provide and maintain adequate temporary fire protection in the form of barrels of water with buckets, fire bucket tanks, fire extinguishers, or other effective means of extinguishing fire, ready for instant use, distributed around the Project and in and about temporary inflammable structures during construction of the Work.
- B. Within 30 calendar days after award of Contract, the Construction Manager shall submit in writing to the Architect, three (3) copies of his proposed methods for fire protection that have been reviewed and approved by the local Fire Department. Post a copy of the approved fire protection plan in the Field Office for reference.
- C. Gasoline and other flammable liquids shall be stored in and dispensed from UL listed safety containers in conformance with National Board of Fire Underwriter's recommendations. Storage shall not be within building.
- D. Make arrangements for periodic inspection by local fire protection authorities and insurance underwriter's inspectors. Cooperate with said authorities and promptly carry out their recommendations.
- E. Tarpaulins used during construction work shall be made of material that is resistant to fire, water, and weather. Tarpaulins shall have UL approval and comply with FS-CCC-D-746.
- F. Torch-cutting and welding operations performed by Subcontractors shall have approval of Construction Manager before such work is started and chemical extinguisher shall be available within sight and not over ten (10) feet from location where such work is in progress.
- G. Do not light fires in or about premises.

1.13 TEMPORARY STAIRS AND LADDERS

- A. Each trade shall provide its own ladders where such ladders do not exceed a height of eight feet. Where ladders over eight feet, or stairs, steps or ramps of any height are required, the Construction Manager shall provide the entire installation, including the first eight feet.
- B. All such apparatus, equipment and construction shall meet all requirements of Federal, State and local laws applicable thereto.
- C. Temporary ladders, ramps, runways, stairs, and similar items required for proper execution of Construction Manager's work and that of the Subcontractors shall be properly maintained. Use of such facilities by other contractors, subcontractors and trades shall be permitted as required by construction schedule.

1.14 TEMPORARY HOISTS AND CHUTES

- A. Each trade shall provide its own hoists, including associated rigging, conveyance apparatus and chutes.
- B. Construction, maintenance and operation of material hoists shall conform to applicable requirements of the "Standard Safety Code for Building Construction", ANSI; to AGC "Manual" requirements and to State and local regulations.

- C. Temporary chutes, derricks, and similar items required for proper execution of Construction Manager's work and that of his Subcontractors shall be properly maintained. Use of such facilities by other contractors, subcontractors and trades shall be permitted as required by construction schedule. Hoists and chutes shall be so constructed as to prevent damage, staining and marring of permanent work.
- D. No materials, rubbish or debris, shall be permitted to drop free, but shall be removed by the use of material hoist and/or fully enclosed rubbish chute.
- E. Provide openings in slabs, roofs, walls and partitions, where required, for moving in large pieces of equipment. Close and restore openings and finish them after equipment is in place. Structural modification, if required, shall be subject to prior written approval by the Architect.

1.15 STAGING AND SCAFFOLDING

- A. Responsibility for Staging:
 - 1. Each trade shall provide staging and scaffolding required for its work.
 - 2. The Construction Manager shall coordinate the use of staging and scaffolding as required to permit trades to perform the Work in a timely manner.
- B. Construction Requirements for Staging: The Construction Manager is responsible for safety of staging and scaffolding, including but not limited to the following requirements:
 - 1. Staging shall be of approved design, erected and removed by experienced stage builders, and shall comply with all applicable OSHA standards.
 - 2. Provide accident prevention devices required by State and local laws.

1.16 TEMPORARY USE OF ELEVATORS

- A. Make arrangements with Elevator Subcontractor for temporary use of elevators, if required, during construction period, and for normal use by all trades and Subcontractors.
- B. Make arrangements for provision of temporary cab enclosures, cars, car switches, gate contacts, power, signaling devices, temporary hoistway openings, protection of permanent hoistway entrances and other installed finished work, and pay for all such other items as are necessary to permit temporary operation in accordance with local, State and national codes.
- C. Arrange with Elevator Subcontractor for all necessary maintenance of elevators during period of temporary operation and for restoration of elevators to their original, perfect condition with guarantees as specified. All costs in connection with temporary operation of elevators shall be paid by the Construction Manager.
- D. Do not abuse, overload or otherwise damage elevators in temporary use for construction purposes.
- E. Elevator will be made available to the Owner for use during installation of FF&E, IT and Owner materials at no cost to the Owner.

1.17 TEMPORARY ENCLOSURES

- A. Provide temporary weathertight enclosure of exterior walls as necessary to provide acceptable working conditions, provide weather protection for interior materials, allow for effective

temporary heating, and to prevent entry of unauthorized persons.

- B. Provide temporary exterior doors with self-closing hardware and padlocks. Permanent door enclosures shall not be used as temporary enclosures. Other enclosures shall be removable as necessary for work and for handling of materials.
- C. Refer to Section INDOOR AIR QUALITY CONTROL, for requirements for temporary interior partitions to enclose portions of the work where required for protection of indoor air quality.
 - 1. Provide sound attenuation batts and insulated, weather stripped doors in temp partitions to reduce sound transmission between occupied and unoccupied areas.
- D. Relocate temporary enclosures as required by progress of construction, by operations of the building, or work requirements, and to accommodate legitimate requirements of Owner and Subcontractors employed at the site.
- E. Completely remove temporary materials, equipment and services when enclosure needs can be met by use of permanent construction and at completion of the Project.

1.18 PROTECTION OF WORK, PROPERTY AND THE PUBLIC

- A. Furnish, erect, and maintain, until such time as removal is approved by the Architect, temporary fencing and barricades to extent recommended by OSHA and as otherwise required for the protection of life and property during operations under the Contract.
- B. Construct barricades and protective facilities in accordance with local and State regulations. Furnish and install all signs, lights, reflectors, and all such protection facilities as may be required.
- C. Construction Manager shall save the Owner harmless from all claims arising from the use of public streets, sidewalks, and adjoining premises for construction purposes.
- D. Keep all access roads and walks clear of debris, materials, construction plant and equipment during building operation. Repair streets, drives, curbs, sidewalks, fences, poles and the like where disturbed in building operation and leave them in as good condition after completion of the Work as before operations started.
- E. Protect all planting, landscaping, trees and site improvements to remain.
- F. The Construction Manager shall be responsible for the maintenance of construction barriers and traffic barriers in order to maintain traffic around the Work with the maximum of safety and practical convenience to such traffic during the life of the Contract, and whether or not work has been suspended temporarily. He shall take all precautions for preventing injuries to persons or damage to property on or about the Work.
- G. Work shall be carried on and barriers erected in such a manner as to provide safe passage at all times for public travel and with least obstruction to traffic. The Construction Manager shall provide and maintain at his own expense in a safe and passable condition such temporary bypasses created by the barriers as may be necessary to accommodate both pedestrian and vehicular traffic.
- H. Whenever gale or high winds are forecast, take proper measurements to secure all loose material, equipment or other items that could blow about and be damaged or cause damage to

other work. No such loose items shall be left unsecured at end of working day. Particular attention shall be taken with scaffolding and items placed or stored on roofs or within the structure prior to being enclosed.

- I. Remove all snow and ice which may impede work, damage the finishes or materials, be detrimental to workers, or impede trucking, delivery, or moving of materials at the job site, or prevent adequate drainage of the site or adjoining areas.
- J. Be responsible for all breakage of glass from the time construction operations commence in each portion of the Project until each portion of the Project is occupied by the Owner. Unless glass has been broken by the Owner or his representatives, or by other separate prime contractors, the cost of glass replacement shall be borne by Construction Manager.

1.19 SECURITY OF THE WORK

- A. The Construction Manager shall be responsible for providing any and all security precautions necessary to insure adequate protection of his and the Owner's interests.
- B. Take all required measures to protect the Work at all times against fire, storm, theft, vandalism and other losses.
- C. The Construction Manager shall be wholly responsible for patrolling and protecting the work under construction and the materials stored on the site; and shall reimburse the Owner for any losses, damage or injury not compensated by insurance, except those directly caused by the Owner, his agents or his employees.
- D. The Construction Manager shall rebuild, repair, restore and make good all damage to any portion of the Work occasioned by any of the above causes before completion and written acceptance of the completed Work, and shall bear the expense thereof. No extension of time will be allowed in such cases.
- E. Should the Construction Manager fail to take prompt action whenever conditions make it necessary, the Owner may make emergency repairs or cause the same to be made, with the stipulation that the costs for such repairs shall be charged against the Construction Manager and deducted from monies due to him.

1.20 RODENT CONTROL

- A. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents and to perform extermination and control procedures at regular intervals so Project will be free of rodents and their residues at Substantial Completion.
 - 1. Obtain extended warranty for Owner.
 - 2. Perform control operations lawfully, using environmentally safe materials.
 - 3. The Construction Manager's attention is brought to the fact that the building will be occupied by children. Every effort shall be made to avoid applications of materials that will in any way compromise their health.

1.21 WATER CONTROL

- A. Take over responsibility for site drainage in work areas upon entering the premises and main-

tain such drainage during the life of this Contract in a manner approved by the Architect and so as not to adversely affect adjacent areas or abutting property.

- B. During the progress of the Work, provide and maintain all required pumps, suction and discharge lines, and power in sufficient number and capacity to keep all excavations, pits, trenches, foundations, and the entire property area free from accumulation of water from any source whatsoever, at all times, and under any and all circumstances and contingencies that may arise.

1.22 SNOW AND ICE CONTROL

- A. De-icing Materials:
 - 1. General: Comply with state and local regulations.
- B. Snow Storage:
 - 1. General: Comply with state and local regulations.

PART 2 - PRODUCTS

2.1 CONSTRUCTION FENCE

- A. Furnish, install, maintain, and pay for temporary fencing and other protection required for the safety of the Work and of stored materials and equipment. Provide temporary construction fence as required for public safety and protection around entire construction area at the Limit of Work line, at each site as shown on Drawings. Fence shall be installed in a manner that will not impact wetlands.
- B. Construction fence shall be six (6) feet high and of chain link construction with 6 gauge wire at the top and the bottom of the fencing material, erected in a substantial manner, straight, plumb and true.
- C. Gates shall be built into fence at such approved locations as are necessary, well cross-braced and hung on heavy strap hinges with proper post and hook for double gates. Provide heavy hasps and padlocks for each gate. Provide keys to Owner to facilitate emergency access by Owner's Security Forces and local Police and Fire Department.
- D. All fencing shall be in accordance with local ordinances and shall be removed at such time before Final Acceptance as the Architect directs. Restore site to acceptable condition after removing fence.
- E. Vehicular access to the site, and parking for Construction Manager's employees' vehicles shall be restricted to the specific areas designated by the Owner.

2.2 PROJECT SIGNS

- A. Provide in a location designated by the Architect one (1) sign, 4 feet by 8 feet in size, with three 4-inch by 4-inch post supports. Sign shall be fabricated from 3/4 inch thick medium density overlaid exterior plywood, edged continuously with 3/4 inch square pine banding. Apply one coat of exterior primer and two coats of exterior gloss enamel to all surfaces of

sign and supports.

- B. Sign shall be professionally produced and shall indicate: (1) the name of the Project, (2) the name of the Owner, (3) the name of the Construction Manager, (4) names and addresses of the Architect and Consulting Engineers. Graphic images and lettering, including type size, style and colors, will be provided by the Architect prior to beginning of construction. Architect will provide layout in electronic disc format or printed copy for sign production.
- C. Provide directional signs as required to properly control construction traffic at each site.
- D. No other signs or advertisements will be allowed on building or premises.
- E. Erect where required for DEP File No. in accordance with Wetland Regulations and the Order of Conditions where applicable.

PART 3 - EXECUTION (NOT USED))

END OF SECTION

SECTION 01 56 39

TEMPORARY TREE AND PLANT MATERIAL PROTECTION

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.
- B. Examine all other Sections of the Specifications for requirements that affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 SUMMARY

- A. The Work of this Section includes, but is not limited to, the following:
 - 1. Installation of temporary tree protection fencing at existing trees and shrubs to remain.
 - 2. Protection of existing improvements to remain.
 - 3. Post construction clean-up.

1.3 RELATED WORK

- A. Related work includes, but is not limited to, the following work covered in other sections:
 - 1. SECTION 02 41 19 – SELECTIVE DEMOLITION
 - 2. SECTION 31 20 00 – EARTH MOVING
 - 3. SECTION 31 13 00 - SELECTIVE TREE AND PLANT MATERIAL REMOVAL

1.4 REFERENCES

- A. Comply with applicable requirements of:
 - 1. State of New Hampshire, Standard Specification for Roads and Bridge Construction, Department of Transportation, latest edition.
 - 2. City of Dover, of the State of New Hampshire, and of other authorities having jurisdiction. Provide labor, materials, equipment and services to comply with requirements.
 - 3. ASTM: American Society for Testing and Materials.
 - 4. AASHTO: American Association of State Highway and Transportation Officials.
 - 5. AAN: American Association of Nurserymen.
 - 6. ISA: International Society of Arboriculture.
 - 7. ANSI: American National Standards Institute.

TEMPORARY TREE AND PLANT MATERIAL PROTECTION

1.5 SUBMITTALS

- A. Prepare and submit in accordance with SECTION 01 33 00 – SUBMITTAL PROCEDURES.

1.6 QUALITY ASSURANCE

- A. Temporary tree and plant material protection shall be performed by a certified landscape contractor with a minimum of five years of related work experience and under full time supervision of a qualified supervisor.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver and store all products in unopened original manufacturer's packaging. Store all materials in strict accordance with manufacturer's instructions and recommendations. Protect materials from all damage. Conform to provisions of SECTION 01 60 00, PRODUCT REQUIREMENTS.

1.8 WARRANTY

- A. In addition to the guarantee/warranty requirements of the Contract and General Requirements, the Contractor shall obtain in the name of the Owner the standard manufacturer's guarantee of all materials furnished under this Section where such guarantees are offered in the manufacturer's published product data. These guarantees are in addition to, and not in lieu of, other liabilities which the Contractor may have by law or other provisions of the Contract Documents.

1.9 PROJECT CONDITIONS

- A. General: The Contractor shall visit and accept the site as he/ she finds it, and shall inform him/herself of the character and the type of plant material items to be protected. The Contractor shall walk the site with the Owner's Representative prior to commencing work to determine the full scope of plant materials to be removed and plant materials to remain.
- B. Damage or loss to site improvements shall be at the risk of the Contractor from and after the date of Contract execution, and no such damage or loss shall relieve the Contractor from any obligation under the Contract.
- C. Traffic: Adjacent building areas, site areas and streets will continue to be used throughout the construction process. Contractor shall use extreme care to protect the safety and welfare of pedestrians and occupants of these areas. Submit pedestrian access plan prior to beginning work.
- D. Conduct operations and removal of debris to ensure minimum interference with the normal use of streets, public ways, and other adjacent facilities. Do not close or obstruct adjacent buildings, loading docks, traffic ways, corridors, streets, walks or other used facilities without the written permission of the Owner and authorities having jurisdiction.
- E. Protection: Existing buildings and traffic ways adjacent to the work site will be occupied during construction operations. Ensure the safe passage of vehicles and persons in and around the work areas during and after demolition. Prevent injury to persons and damage to property. Immediately repair damaged property to its condition before being damaged.
- F. Protection of Existing Landscaping to Remain: Prior to beginning any work of the Contract on site, take effective action to protect all existing landscaping indicated to remain. Refer to requirements specified herein.

- G. Dust and Noise Control: Take effective measures to prevent windblown dust and to control noise to avoid creating a nuisance. Obtain Owner's Representative and Owner's approval of means, methods and techniques used to control dust and noise. Chemicals deleterious to plant growth may not be used on sub-grades of areas that will be sodded, seeded, or planted. Avoid creating ice hazards in freezing weather.
- H. Utilities: Maintain all utilities except those requiring removal or relocation. Keep utilities in service and protect from damage. Do not interrupt utilities serving used areas without first obtaining permission from the utility company and the Owner. Provide temporary services as required and review interim utility service plan with the Owner and Owner's Representative prior to interruption of service.

1.10 LOCATION OF UTILITIES

- A. The Contractor must verify the location of all utilities in the limit of work before starting work, including but not limited to gas, electric, telephone, storm drainage, sanitary drainage, fiber optic, telecommunication, cable, and water services.

1.11 EXAMINATION OF SITE AND DOCUMENTS

- A. The Contractor shall carefully study the Contract Documents and shall fully inform him/herself of existing conditions of the site before submitting his/ her bid and before starting work. The Contractor shall at once report to the Owner's Representative any errors, inconsistencies or omissions he/ she may discover. The Contractor shall be fully liable to the Owner for any damage resulting from such errors, inconsistencies or omissions in the Contract Documents.
- B. The Contractor shall be fully responsible for carrying out all site work required to fully and properly execute the work of the Contract, regardless of the conditions encountered in actual work. Plans, surveys, measurements and dimensions under which the work is performed are believed to be correct to the best of the Owner's knowledge, but the Contractor shall have examined them for him/herself during the bidding period, as no allowance will be made for any errors or inaccuracies that may be found therein.
- C. On all Project Drawings, figures take precedence over measurements by scale. The Owner's Representative shall decide on questions that may arise regarding the meaning and intent of the Project Drawings and Project Specifications. If any Project Drawings or figures that are necessary for a clear understanding of the Work are omitted, or if any error appears in either Project Drawings or Specifications, or if discrepancies are found between the Project Drawings and Project Specifications, it shall be the duty of the Contractor to notify the Owner's Representative of such omissions, errors or discrepancies, and in no case proceed in uncertainty. If any mistakes arise in consequence of such neglect on the part of the Contractor to notify the Architect, the Contractor must correct the work at his/ her own expense.
- D. The Contractor shall perform no portion of the Work at any time without the Contract Documents or, where required, Product Data, Samples, or other Submittals for such portion of the Work. No claim for extra compensation or extension of time will be allowed on account of actual conditions inconsistent with those assumed, except those conditions described in SECTION 00 72 00 – GENERAL CONDITIONS.

1.12 EXISTING UTILITIES

- A. The Contractor shall locate and mark underground utilities to remain in service before beginning work. Markings shall remain throughout the length of the project.
- B. Protect all existing utilities to remain during operations. In work on or around the utilities, follow all rules and regulations of the respective utility. Do not interrupt existing utilities except as

authorized by authorities having jurisdiction. Provide not less than 72 hours written notice to Owner if shut down of utility service is required.

- C. Active utilities shall be adequately protected from damage and removed only as indicated on Drawings or as directed by the Owner's Representative. Where active utilities are encountered but not shown on the Drawings, the Contractor shall notify the Owner's Representative immediately in writing. The Contractor shall protect and maintain these utilities until written instructions are received from the Owner's Representative.
- D. Inactive and abandoned utilities and drains encountered in tree and plant material protection operations shall be reported to the Owner's Representative immediately.

1.13 PROTECTION

- A. All local rules and regulations governing the works shall be observed by the Contractor in executing all work under this section.
- B. All work shall be executed in a manner to prevent any damage to existing buildings, streets, pavings, vegetation designated to remain, service utility lines, structures, existing improvements, adjoining property and existing improvements on adjoining property. Protect from damage all utilities that are to remain.
- C. Items to remain and existing improvements that are damaged shall be restored to their original condition that is acceptable to the Owner's Representative and parties having jurisdiction. Restoration work shall be at no cost to the Owner and parties having jurisdiction.
- D. All work shall be executed using all precautions necessary to assure safety.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Provide all materials, equipment, and supplies as required to completely perform the work specified herein and as shown on the Drawings.

2.2 PROTECTION OF DRAINAGE

- A. Refer to SECTION 02 41 19 – SELECTIVE DEMOLITION.

2.3 PROTECTIVE FENCES

- A. Protective fences shall mean construction fences and tree protection fences.
- B. Protective fences shall be chain link fence components including posts, rails, fabric, and miscellaneous accessories. Dimensions and layout shall be as shown on the Drawings. All fence components shall be galvanized. Fence components may be used (second hand) if in good shape.
- C. Contractor shall obtain Owner's approval of all fence components before obtaining fence system.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Inspect all parts of the area to which EXISTING PLANT MATERIAL DEMOLITION AND PROTECTION is to be installed and the conditions under which the work must be performed. Report in writing to the Contractor, with a copy to the Owner's Representative, any conditions which might adversely affect the installation. Do not proceed with the installation until defects have been corrected and conditions are satisfactory.

3.2 PROTECTION OF EXISTING PLANTS TO REMAIN

- A. The contractor and all subcontractors and employees working on site shall be aware of the following information:
 - 1. Most of a tree's roots are located in the upper few inches of topsoil. For this reason, trees are vulnerable to immediate and long-term damage. Immediate damage to roots is caused by grading, use of vehicles and tools, and excess pedestrian traffic above the roots. Long-term damage is caused by the compaction of the soil above the roots by use of vehicles, storage of materials, and excess pedestrian traffic.
 - 2. Protection of a tree therefore includes the protection of the roots of the tree as well as its trunk, branches, and leaves. Roots are best protected by fencing off as large an area as possible around each tree, so that no driving, parking, walking, or storage of materials takes place where it may cause damage.
 - 3. The roots of a tree often extend far into the surrounding landscape, including areas well beyond the outer perimeter of the tree's canopy. For this reason, operations should be confined to the smallest possible area.
 - 4. As a practical minimum, however, every effort is made to protect the area beneath the canopy of the tree, also known as the area inside the "drip line." This area is sometimes referred to as the "root zone."
 - 5. Soil is most vulnerable to compaction, and roots to damage, when the soil is wet.
- B. Review all fence limits with the Owner's Representative before erecting fences or beginning work.
- C. Erect the tree protection fence before selective demolition, selective tree and plant material removal and pruning or any other construction activity commences. Keep tree protection fence in place until removal is approved by the Owner's Representative.
- D. Minor adjustments to the fence layout, which are not represented on the Drawings, might be required to facilitate the work. Minor adjustments shall be made at no additional cost to the project.
- E. Erect the protective fence so that it is securely in place and resistant to ordinary seasonal climatic forces, adjacent pedestrian movement, and work operations.
- F. The Contractor shall periodically inspect, repair and maintain protective fences during the course of construction operations. During periods of construction stoppages, including but not limited to delays and over-wintering, the Contractor shall periodically inspect, repair and maintain protective fences.

- G. The Owner and Owner's Representative reserve the right to require the Contractor to provide additional or more secure tree protection devices if it is determined that the existing trees are not being properly protected by the Contractor or if the vegetation is threatened with damage through the Contractor's operations.
- H. Temporary access within plant protection areas is permitted to perform construction operations as described on the Drawings. All work within tree protection areas shall be performed by hand or with small equipment that will not damage or threaten damage to trees. All tree protection fencing shall be restored at the end of each day's operation.
- I. If the Owner's Representative determines at any time that trees are not being protected to the standards herein, he may order construction activity to stop immediately and to remain stopped until the non-compliant condition or practice is corrected. The Contractor shall comply with this provision at no additional cost to the Owner. This provision in no way affects the Contractor's obligation to complete the work of this contract by the date specified.
- J. Protect existing trees and other vegetation to remain in place. Do not burn, cut, break, skin, or bruise trunk, roots, or branches. Do not stockpile construction materials and/or excavated materials within drip line of the tree. Do not fasten ropes, cables, or guys to any existing trees unless specifically authorized by the Owner's Representative.
- K. The parking of vehicles, driving of vehicles, storage of materials, removal of soils, and stockpiling of soils within the drip line of trees, including trees located on adjacent properties which overhang the site, is expressly prohibited except as approved by the Owner's Representative, for work directly related to grading revisions as indicated on the drawings.
- L. Utilities: Route utilities away from existing trees even if shown otherwise. Review re-routing with Owner's Representative and Civil Engineer. Do not proceed without written direction. Minimize the cutting of tree roots, and when cutting is unavoidable, cut cleanly with a power saw and not an excavating machine. If cutting is required, comply with "Protection of Tree" specifications included in this Section.
- M. Water trees and other vegetation to remain within limits of contract work as required to maintain their health during course of construction operations.
- N. Do not permit water to stand around the base of plants within the drip line during construction operations except during that period of inundating flooding which would, in its natural course, cover the base of trees. The Contractor shall provide temporary drainage where required to avoid ponding during construction operations and after the flood waters have receded below the elevation at the base of each inundated tree.
- O. Provide protection for roots over 1-1/2" diameter cut during construction operations. Roots that are encountered during the course of construction which require cutting shall be cleanly cut with a hand or power saw; cutting of roots with machinery is expressly prohibited. When roots that must be cut are encountered, all work shall cease until roots have been properly cut. Temporarily cover exposed roots with wet burlap to prevent roots from drying out; cover with earth as soon as possible.
- P. Fertilizing: After pruning operations are completed, fertilize trees to increase vigor with a complete, slow release nitrogen, phosphorus, potassium (1:1:1 or 2:1:1) liquid injected fertilizer. Where liquid injected fertilizer is not practical, and when approved by Owner's Representative, drill holes 6" to 10" deep and place granular fertilizer at frequent spacing.
- Q. If the Arborist determines that the damaged tree cannot be repaired and restored to full-growth status, the Contractor shall replace the damaged tree(s) and pay liquidated damages as noted below.

1. The Contractor shall purchase a new tree to replace the damaged tree. The size of the tree replacement shall equal ½" caliper for every 1" DBH of the damaged tree, the new tree shall be based on nursery measurements. The species and source of the replacement tree shall be determined by the Owner's Representative.
2. In addition to providing a new tree replacement, the Contractor shall pay the Owner \$250.00 for every caliper inch of the damaged tree (the size of the damaged tree shall be as shown on the Drawings).
3. An example of the conditions stated above: A 20" DBH tree was damaged and determined to need replacement. To remedy this situation, the Contractor would purchase and install a 10" caliper tree and pay the Owner \$5,000.
4. The total cost of tree replacement, including the cost of the Arborist, shall be borne by the Contractor.

3.3 PROTECTION OF EXISTING IMPROVEMENTS

- A. The Contractor shall provide protections necessary to prevent damage to existing improvements indicated to remain in place and newly constructed improvements on Owner's property.
- B. The Contractor shall protect existing improvements on adjoining properties from any damage.
- C. The Contractor shall restore damaged improvements to their original condition, as acceptable to the Owner's Representative and parties having jurisdiction, at no cost to the Owner and parties having jurisdiction.

3.4 PATCHING AND REPAIRS

- A. Promptly patch and repair holes and damaged surfaces caused to adjacent construction.
- B. Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
- C. Restore exposed finishes of patched areas and extend finish restoration into adjoining construction to remain in a manner that eliminates evidence of patching and refinishing.
- D. Patch and repair surfaces in the new areas where demolished surfaces extend one finished area into another. Provide a flush and even surface of uniform color and appearance.
 1. Closely match texture and finish of existing adjacent surface.
 2. Patch with durable seams that are as invisible as possible. Comply with specified tolerances.
 3. Inspect and test patched areas to demonstrate integrity of the installation, where feasible.
 4. Also refer to SECTION 01 73 29 – CUTTING AND PATCHING.

3.5 DISPOSAL OF WASTE MATERIAL

- A. Burning will not be permitted on the Owner's property.
- B. The Contractor shall remove waste materials, unsuitable and excess materials from the Owner's property and legally dispose of off-site.

- C. The Contractor shall submit the dumpsite owner's name and location of dumpsite to the Owner for approval prior to waste removal from project site.

3.6 POST CONSTRUCTION CLEAN-UP

- A. The Contractor shall completely remove all signs of stockpiles of excess or waste materials, or any other vestiges of construction. Disturbed areas shall be graded and filled with approved soil to a depth of 5" lower than the original contour or new contour as shown on the Drawings. The top layer of soil over the entire area shall be loam 6" thick. The entire area shall be seeded with a lawn seed mix approved by the Owner's Representative.

END OF SECTION

SECTION 017329
CUTTING AND PATCHING

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the Contract and General Conditions and all Sections within Division 1 – GENERAL REQUIREMENTS, which are hereby made a part of this Section of the Specifications.
- B. Examine all other Sections of the Specifications for additional requirements that affect this Section whether or not specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 SUMMARY

- A. This Section covers procedural requirements for cutting and patching, including but not limited to the following:
 - 1. Standard requirements for all cutting and patching to be done on the Project, whether by the Construction Manager, or other subcontractors.
- B. Refer to the following Sections for related work:
 - 1. Section 015000 – TEMPORARY FACILITIES AND CONTROLS, for temporary protection, shoring and construction aids.
 - 2. Section 017400 – CLEANING AND WASTE MANAGEMENT, for disposal of demolished materials.
 - 3. Divisions 2 through 12 Sections, for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
 - 4. Section 033000 – CAST-IN-PLACE CONCRETE, for cutting, patching and repair of concrete.
 - 5. Section 042000 – UNIT MASONRY, for cutting and patching of masonry for the work of all trades, unless otherwise provided herein.
 - 6. Section 042000 – UNIT MASONRY, for installation of lintels where required for all penetrations through new masonry.
 - 7. Section 055000 – METAL FABRICATIONS, for furnishing of lintels where required for all penetrations through new masonry.
 - 8. Section 078400 – FIRESTOPPING, for patching fire-rated construction.
 - 9. Division 9 – FINISHES, for all patching of new construction, except for masonry and concrete.
 - 10. Section 092900 – GYPSUM BOARD, for cutting and patching gypsum wallboard construction.
 - 11. Section 099000 – PAINTING AND COATING, for final preparation of new and patched surfaces as required for application of paint, and for paints and coatings applied to patched surfaces..
 - 12. Division 21,22,23 – MECHANICAL and Division 26 – ELECTRICAL, for coring and drilling for all items to be installed by mechanical and electrical trades, except as otherwise indicated.

13. Division 21,22,23 – MECHANICAL and Division 26 – ELECTRICAL, for items to be installed by mechanical and electrical trades, except as otherwise indicated.

1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other Work.
- B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.
- C. Coring: Any new penetration cut through existing or new construction using core drill and measuring no more than 6 inches in diameter, or 6 inches by 6 inches. Larger cores are considered under cutting.

1.4 RESPONSIBILITY FOR CUTTING AND PATCHING

- A. General: All cutting and patching shall conform to the requirements of this Section, whether or not the work is to be done by the Construction Manager, or Subcontractor.
 - 1. Patching shall be performed so as to maintain the integrity of acoustical rating of adjacent construction.
 - 2. Refer to Section 078400 – FIRESTOPPING, for requirements for maintaining the integrity of fire-rated construction at penetrations.
- B. Coordination: The Construction Manager shall be responsible for the following:
 - 1. Obtain locations and dimensions of penetrations required through walls and floors from trades requiring penetrations.
 - 2. Coordinate those penetrations with the requirements of other trades.
 - 3. Forward locations and dimensions of requested penetrations to the trades responsible for performing the cutting and patching work.
- C. Modifications with Structural Implications:
 - 1. Non-masonry construction: Provide new penetrations and other work where modification to existing structural elements is shown on the Drawings.
 - 2. Masonry construction: Coordinate the work of Subcontractors as required where modification to existing load-bearing masonry is shown on the Drawings.
 - 3. Do not perform any work that will alter existing structural elements unless it is shown on the Drawings or proposed alterations have been approved in writing by the Architect.
 - 4. Structural elements include, but are not limited to, the following: Steel beams and columns, structural masonry walls, reinforced concrete slabs.
- D. Coring: All coring shall be performed by the trade requiring the new penetration.
- E. New Penetrations in Masonry Construction:
 - 1. Exposed masonry and all masonry bearing walls: All cutting and patching shall be performed under Section 042000 – UNIT MASONRY, with lintels furnished under Section 055000 – METAL FABRICATIONS where required.
 - 2. Concealed portions of non-bearing masonry walls:
 - a. Small penetrations where no lintel will be required shall be provided under Section 042000 – UNIT MASONRY.
 - b. Larger penetrations requiring a lintel shall be provided under Section 042000 – UNIT MASONRY, with lintels furnished under Section 055000 – METAL

FABRICATIONS.

3. Structural criteria for new openings in masonry walls: Bring the following conditions to the attention of the Structural Engineer for determination of whether a lintel or other reinforcement will be required.
 - a. Non-load-bearing masonry walls: Any opening wider than one block or 16 inches.
 - b. Load-bearing masonry walls: Any opening wider than 6 inches.
- F. New Penetrations in Non-Masonry Construction:
1. Exposed locations: Cutting and patching shall be provided by the trade(s) responsible for surrounding construction.
 2. Concealed locations: Cutting and patching shall be provided by the trade(s) responsible for surrounding construction.
 3. Locations at roof: Cutting and patching of roof deck and substrate shall be coordinated with the work of Section 075300 – EPDM ROOFING.

1.5 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio. Structural elements include but are not limited to the following:
1. Reinforced concrete columns and beams. Coring of concrete foundation walls and slabs will be permitted where shown on drawings or required for mechanical and electrical work.
 2. Reinforced masonry bearing walls.
 3. Steel columns, beams, joists and connections.
- B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operating elements include but are not limited to the following:
1. Primary operational systems and equipment.
 2. Air or smoke barriers.
 3. Partitions and other construction required to provide acoustical separation.
 4. Fire-suppression systems.
 5. Mechanical systems piping and ducts.
 6. Control systems.
 7. Communication systems.
 8. Conveying systems.
 9. Electrical wiring systems.
- C. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Miscellaneous elements include but are not limited to the following:
1. Water, moisture, or vapor barriers.
 2. Membranes and flashings.
 3. Exterior curtain-wall construction.
 4. Equipment supports.
 5. Piping, ductwork, vessels, and equipment.
 6. Noise- and vibration-control elements and systems.
- D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior

or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

1.6 WARRANTY

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

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations. Refer to Section 015000 – Temporary Facilities and Controls for additional requirements.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

3.3 PERFORMANCE

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

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
 2. Cutting of openings in roofs shall be delayed as long as feasible, and preferably until the Roofing Subcontractor is at the site and can provide permanent roof covering immediately. Otherwise, protect roof openings so made in a weathertight manner until permanent roof is installed. Protect existing roofing to remain. Do not damage or alter in-place roofing and flashing to remain when doing work under this Section. Refer to Section 015000 – TEMPORARY FACILITIES AND CONTROLS, for additional requirements for protection from the weather.
- B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces, in such a manner as to ensure a minimal difference between the cut area and new materials when patched..
 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 4. Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
 5. Mechanical and Electrical Services: Use extreme care when cutting through construction containing concealed mechanical and electrical lines. Coordinate cutting and patching work with the following work to be performed under Division 230000 and 260000 Sections.
 - a. Cut off pipe or conduit in walls or partitions to be removed.
 - b. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 6. Proceed with patching after construction operations requiring cutting are complete.
- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 3. Restore damaged pipe covering to its original condition.
 4. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface con-

- taining the patch. Provide additional coats until patch blends with adjacent surfaces.
5. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 6. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

3.4 DEBRIS REMOVAL AND CLEANING

- A. Dispose of all materials under Section 017400 – CLEANING AND WASTE MANAGEMENT.
- B. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION

SECTION 017400
CLEANING AND WASTE MANAGEMENT

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the Contract and General Conditions and all Sections within Division 1 – GENERAL REQUIREMENTS, which are hereby made a part of this Section of the Specifications.
- B. Examine all other Sections of the Specifications for requirements that affect work under this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for the following waste handling operations for the Work of the Construction Manager and all Subcontractors:
 - 1. Salvaging nonhazardous construction and demolition waste.
 - 2. Recycling nonhazardous construction and demolition waste.
 - 3. Disposing of nonhazardous construction and demolition waste.
- B. Related Sections include the following:
 - 1. Section 015000 – TEMPORARY FACILITIES AND CONTROLS, for environmental-protection measures during construction.
 - 2. Section 042000 – UNIT MASONRY, for disposal requirements for masonry waste.

1.3 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- 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

tion into the Work.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Develop waste management plan that results in end-of-Project rates for salvage/recycling of minimum 90 percent by weight of total non-hazardous Construction and Demolition waste generated by the Work, not including land-clearing and associated debris.

1.5 SUBMITTALS

- A. Waste Management Plan: Submit 3 copies of plan within 7 days of date established for the Notice to Proceed.
- B. Waste Management Progress Reports: Concurrent with each Application for Payment, submit three copies of report. Include separate reports for demolition and construction 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.
- C. Final Waste Management Report: Before request for Substantial Completion, submit three copies of a summary of all weight tickets collected for demolition and construction debris removal. The summary shall include the following information, by line item:
 - 1. Type of debris
 - 2. Date(s) of load disposal
 - 3. Name of facility to which debris was taken
 - 4. Ticket number(s)
 - 5. Number of loads, yards and total pounds for each type of debris
 - 6. Number of pounds recycled or salvaged for each type of debris
 - 7. Percentage of material recycled or salvaged for each type of debris
 - 8. Total quantity of waste in tons (tonnes)
 - 9. Total quantity of waste salvaged, both estimated and actual in tons (tonnes)
 - 10. Total quantity of waste recycled, both estimated and actual in tons (tonnes)
 - 11. Total quantity of waste recovered (salvaged plus recycled) in tons (tonnes)
 - 12. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.

Note: For material that is removed from the site and does not generate a waste ticket, provide an estimate of the weight and volume of materials removed.

- D. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
- E. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
- F. 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.

- G. 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.
- H. Qualification Data: For Waste Management Coordinator and refrigerant recovery technician.
- I. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.6 QUALITY ASSURANCE

- A. Waste Management Coordinator Qualifications: 5 years minimum experience.
- B. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.
- C. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
- D. Waste Management Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:
 - 1. Review and discuss waste management plan including responsibilities of Waste Management Coordinator.
 - 2. Review requirements for documenting quantities of each type of waste and its disposition.
 - 3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
 - 4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
 - 5. Review waste management requirements for each trade.

1.7 WASTE MANAGEMENT PLAN

- A. General: Develop plan consisting of waste identification, waste management plan, and cost/revenue analysis. Include separate sections in plan for demolition and construction waste. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.
- B. Waste Identification: Indicate anticipated types and quantities of demolition site-clearing and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.
- C. Waste Management Plan: Construction Manager will develop a Waste Management Plan that details the following:
 - 1. The 90% diversion percentage goal.
 - 2. Deconstruction, salvage, and recycling/reuse strategies and processes, e.g., scheduling

- of different stages of deconstruction to best remove recyclable or salvageable materials intact.
3. Methods of on-site communication directing the contractors and subcontractors regarding what, when, how and where to recycle.
 4. Documents needed to show waste diversion - e.g., weight tickets for all wastes removed from the site, including recycled and salvaged materials. If items are removed, and no weight tickets are generated, document the materials and date, estimate the weight and volume of the materials, and add them into the overall total for waste and/or salvaged/recycled material removed from the site.
 5. A method for collecting all recycling and waste data and organizing it for an audit of the recycling rates on the project.
 6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location on Project site where materials separation will be located.
 7. List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
 - a. 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.
 - b. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
 - c. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
 - d. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
 - e. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
- D. Cost/Revenue Analysis: Indicate total cost of waste disposal as if there was no waste management plan and net additional cost or net savings resulting from implementing waste management plan. Include the following:
1. Total quantity of waste.
 2. Estimated cost of disposal (cost per unit). Include hauling and tipping fees and cost of collection containers 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 hauling and tipping fees by donating materials.
 7. Savings in hauling 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.
- E. Forms: Prepare waste management plan on forms acceptable to the Architect.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

- A. General: Implement waste management plan as approved by Architect. 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 Division 1 Section "Temporary Facilities and Controls" for operation, termination, and removal requirements.
- B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan. Coordinator shall be present at Project site full time for duration of Project.
- C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.
 - 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, recycled, reused, donated, and sold.
 - 2. Comply with Division 1 Section "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.
- E. Weight Tickets: Construction Manager shall collect weight tickets for all wastes removed from the site, including recycled and salvaged materials. If items are removed, and no weight tickets are generated, document the materials and date, estimate the weight and volume of the materials, and add them into the overall total for waste and/or salvaged/recycled material removed from the site.
- F. Final Summary: At Substantial Completion, Construction Manager shall provide a summary of all weight tickets collected for demolition and construction debris removal. The summary shall include the following information, by line item:
 - 1. Date of load disposal
 - 2. Name of facility to which debris was taken
 - 3. Ticket number
 - 4. Type of debris
 - 5. Number of loads, yards and total pounds for each line item
 - 6. Number of pounds recycled for each line item
 - 7. Percentage of material recycled for each line item
 - 8. Totals for each figure listed above.

3.2 SALVAGING DEMOLITION WASTE

- A. Salvaged Items for Reuse in the Work:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 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:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 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.

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 Construction Manager.
- C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical.
 - 1. Provide appropriately marked containers or bins for controlling recyclable waste until they are 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 off Owner's property and transport to recycling receiver or processor.

3.4 RECYCLING DEMOLITION WASTE

- A. Asphaltic Concrete Paving for Fill: If approved by geotechnical engineer, grind asphalt to maximum 1-1/2-inch (38-mm) size.
 - 1. Crush asphaltic concrete paving and screen to comply with requirements in Division 2 Section "Earthwork" for use as general fill.
- B. Asphaltic Concrete Paving for Off-Site Disposal: Break up and transport paving to asphalt-recycling facility.

- C. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
 - 1. Pulverize concrete to maximum 1-1/2-inch (38-mm) size.
 - 2. Crush concrete and screen to comply with requirements in Division 2 Section "Earthwork" for use as satisfactory soil for fill or subbase.
- D. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.
 - 1. Pulverize masonry to maximum 1-1/2-inch (38-mm) size.
 - a. Crush masonry and screen to comply with requirements in Division 31 Section "Earthwork" for use as general fill.
 - b. Crush masonry and screen to comply with requirements in Division 32 Section "Exterior Plants" for use as mineral mulch.
 - 2. Clean and stack undamaged, whole masonry units on wood pallets.
- E. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type 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. Site-Clearing Wastes: Chip brush, branches, and trees on-site.
 - 1. Comply with requirements in Division 32 Section "Exterior Plants" for use of chipped organic waste as organic mulch.
- C. Wood Materials:
 - 1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
 - 2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
 - a. Comply with requirements in Division 32 Section "Exterior Plants" for use of clean sawdust as organic mulch.
- D. Gypsum Board: Stack large clean pieces on wood pallets 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 Division 2 Section "Exterior Plants" for use of clean ground gypsum board as inorganic soil amendment.

3.6 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
 - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.

2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.
- C. Disposal: Transport waste materials off Owner's property and legally dispose of them.

END OF SECTION

SECTION 017700

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.
- B. Examine all other Sections of the Specifications for requirements that affect work under this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 SUMMARY

- A. The Work of this Section includes, but is not limited to, requirements for the following procedures:
 - 1. Final cleaning
 - 2. Temporary and trial usage
 - 3. Warranties and bonds
 - 4. Closeout requirements
 - 5. Inspection and Submittals for Substantial Completion
 - 6. Monetized Punch List Inspections
 - 7. Final Inspection and Submittals
 - 8. Final application and certificate for payment
 - 9. Post-construction inspection
- B. Related Work includes, but is not limited to, the following Work under other Sections:
 - 1. Procedures related to Architect's additional services if required to complete closeout of Project: Section 011400 – WORK RESTRICTIONS
 - 2. Construction schedule requirements: Section 013200 – CONSTRUCTION PROGRESS DOCUMENTATION.
 - 3. Verification of performance of mechanical and electrical systems: OWNER COMMISSIONING.
 - 4. Temporary facilities to be removed at the end of the Project: Section 015000 – TEMPORARY FACILITIES AND CONTROLS.
 - 5. Documents to be submitted as part of Closeout Requirements: Section 017839 – PROJECT RECORD DOCUMENTS

1.3 SUBMITTALS

- A. Warranties and Bonds: As specified herein.

- B. Punch Lists: As specified herein.
- C. Submittals for Substantial Completion: As specified herein.
- D. Final Submittals: As specified herein.

PART 2 - PRODUCTS

2.1 CLEANING MATERIALS

- A. Refer to Section 011400 WORK RESTRICTIONS for cleaning materials.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. Before final inspection, thoroughly clean the entire exterior and interior areas of the building where construction work has been performed, the immediate surrounding areas, and corridors, stairs, halls, storage areas, temporary offices, and toilets.
 - 1. Allow adequate time in Construction Schedule to perform thorough final cleaning of entire Project for each phase.
- B. Refer to Section 011400 WORK RESTRICTIONS for general requirements for cleaning and for cleaning products, and refer to individual specification sections for cleaning requirements for particular products.
- C. Employ professional cleaners for final cleaning operations.
- D. Remove all construction facilities, debris, and rubbish from the Owner's property and legally dispose of same beyond site limits.
- E. Broom clean exterior paved surfaces, and rake clean other surfaces of the grounds.
- F. Sweep, dust, wash, and polish all finished surfaces. This includes cleaning of the Work of all finished trades where needed, whether or not cleaning for such trades is included in their respective Sections.
- G. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from exposed interior and exterior surfaces.
- H. Leave pipe and duct spaces, chases, and furred spaces thoroughly clean.
- I. Wash and polish all new glass on both sides, such Work shall be performed by a contractor specializing in a window cleaning work.
- J. Clean all ceilings, wall surfaces, floors, window and door frames, hardware, metal work, glass, glazing, enameled metals, and the like.
- K. Repair, patch and touchup marred surfaces to specified finish, to match adjacent surfaces.

- L. Each Subcontractor for mechanical and electrical work, including Plumbing, HVAC, Fire Protection, and Electrical Work shall clean materials and equipment for which they are responsible, leaving the Work in a finished and clean state.
- M. For each mechanical unit that has been in operation during construction, Construction Manager shall clean permanent filters and replace disposable filters with new filters as specified for that mechanical unit, and shall also clean ducts, blowers and coils associated with that unit.
- N. Prior to final completion, Construction Manager shall conduct an inspection of sight-exposed interior and exterior surfaces and all work areas, to verify that the entire Work is clean.
- O. Owner will assume responsibility for cleaning as of time designated on Certificate of Substantial Completion for Owner's acceptance of Work or portion thereof.
- P. Include stripping, sealing, and waxing per Owner's requirements. Refer to technical specifications for additional requirements.

3.2 TEMPORARY AND TRIAL USAGE

- A. Temporary or trial usage by Owner of any mechanical device, machinery, apparatus, equipment, or any Work or materials supplied under the Contract before final completion and written acceptance by the Architect shall not be construed as evidence of acceptance as same.
- B. The Owner reserves the privilege of such temporary or trial usage for such reasonable time as required to properly test such item. Claims for damages due to injury to or breaking of any parts of such Work, when the determined cause is weakness or inaccuracy of structural parts, defective material or workmanship, will not be allowed.
- C. If the Owner so requests, place an approved person or persons to instruct and assist in such trial usage and bear the costs therefor. Trials shall be made under the Architect's supervision.

3.3 WARRANTIES AND BONDS

- A. Compile specified warranties and bonds, review to verify compliance with Contract Documents, and submit to Architect for review and subsequent transmittal, if approved, to the Owner.
- B. Assemble two original signed copies of warranties, bonds and service and maintenance contracts executed by Officers of each of the respective manufacturers, suppliers and subcontractors.
- C. Neatly type Table of Contents in orderly sequence. Provide complete information for each item:
 - 1. Product or work item identification.
 - 2. Manufacturing or supplying firm, with name of principal, address and telephone number.
 - 3. Scope of work and of warranty provided.
 - 4. Date of beginning of warranty, bond or service and maintenance contract. Commence upon date of Substantial Completion for each phase.
 - 5. Duration of warranty, bond or service maintenance contract. (In no case less than one

- (1) year).
 - 6. Information for Owner's personnel:
 - a. Proper procedure in case of failure.
 - b. Instances which might affect validity of warranty or bond.
 - 7. Construction Manager, name of responsible principal, address and telephone number.
- D. Form of Submittals: Prepare in duplicate packets and in the following format:
- 1. Size: 8-1/2" x 11". Punch sheets for 3-ring binder. Z-Fold larger sheets to fit into binders.
 - 2. Cover: Identify each packet with types or printed title "WARRANTIES AND BONDS". List Title of Project, Date and Name of Construction Manager.
 - 3. Binders: Commercial quality, three-"D"-ring, with durable and cleanable plastic covers.
- E. Time of Submittals:
- 1. For equipment or component parts of equipment put into service during progress of construction, submit documents within ten (10) days after inspection and acceptance. Otherwise, make submittals before Date of Substantial Completion.
 - 2. For items of Work where acceptance is delayed materially beyond the Date of Substantial Completion, provide updated submittal within ten days after acceptance, listing the date of acceptance as the start of the warranty period.
- F. Submittals Required: Submit warranties, bond, service and maintenance contracts as specified in the respective Sections of the Specifications.

3.4 CLOSEOUT REQUIREMENTS

- A. Punch List For Each Phase: When the Construction Manager submits a complete list of items to be completed or corrected in accordance with subparagraph 9.8.2 of the GENERAL CONDITIONS and the Architect receives the list, the Architect will make an inspection to determine whether the Work or designated portion is substantially complete, for each phase. The Construction Manager shall submit a schedule indicating when each item will be completed.
- B. If the Architect determines that the Construction Manager's list is not complete, the Architect will notify the Construction Manager. The Construction Manager shall provide a complete list before the Architect will complete his inspection.
- C. If the Architect's inspection discloses any item whether or not included on the Construction Manager's list, which is not in accordance with the requirements of the Contract Documents, the Architect will add the item to the list and will issue a punch list of items to be completed or corrected before final payment will be made. Such punch list shall not be construed as all-inclusive of the work which the Construction Manager will be required to perform before final payment.
- D. Substantial Completion for Each Phase: Architect will prepare and issue a Certificate of Substantial Completion, AIA G704, complete with signatures of Owner and Construction Manager, accompanied by list of items to be completed or corrected, as verified and amended by the Architect. Architect will not issue certificates of Substantial Completion until the items listed below in Articles 3.05 and 3.06 have been completed and submitted.

3.5 INSPECTION FOR SUBSTANTIAL COMPLETION

- A. In preparation for Substantial Completion, the Construction Manager shall submit written certification that:
 - 1. Contract Documents have been reviewed.
 - 2. Work has been inspected for compliance with Contract Documents.
 - 3. Work has been completed in accordance with Contract Documents.
 - 4. Equipment and systems have been tested in presence of Owner's Representative and are operational.
 - 5. Work is completed, and ready for inspection.
- B. Architect will begin inspection within seven (7) days after receipt of above referenced Construction Manager's Certification.
- C. Should the Architect consider the Work is substantially complete in accordance with requirements of Contract Documents, the Architect will request Construction Manager to make Project Closeout submittals.
- D. Should the Architect consider that the Work is not substantially complete:
 - 1. The Architect will notify Construction Manager, in writing, stating reasons.
 - 2. Construction Manager shall take immediate steps to remedy the stated deficiencies, and send second written notice to the Architect certifying that the Work is complete.

3.6 SUBMITTALS FOR SUBSTANTIAL COMPLETION

- A. Construction Manager shall submit the following items at Substantial Completion:
 - 1. Operating and Maintenance Data.
 - 2. Schedule for training and instruction on new mechanical and electrical systems.
 - 3. Guarantees and Warranties.
 - 4. Keys and keying schedule.
 - 5. Spare Parts and Maintenance Materials.
 - 6. Roofing Guarantee and Flashing Endorsement.
 - 7. Evidence of Compliance with requirements of governing authorities.
 - 8. Punch list with schedule.
 - 9. Final Record Documents.
 - 10. Flush-out documentation including ATC hourly trending reports.
- B. Evidence of compliance with authorities' requirements shall include:
 - 1. Certificates of compliance for flame and smoke, and fire rating.
 - 2. Certificates of Inspection:
 - a. Mechanical
 - b. Electrical
 - 3. Certificate of Occupancy
- C. Submit Certificate of Insurance for products and completed operations.
- D. Instructions: Instruct Owner's personnel in the operation of all systems, mechanical, electrical and other equipment.

3.7 MONETIZED PUNCHLIST INSPECTIONS

- A. Within 30 days of Substantial Completion, the Architect will produce a Monetized Punch List that assigns a monetary value to each item remaining incomplete or incorrect.
- B. The Construction Manager may request two inspections by the Architect after receipt of the Monetized Punch List, for the purpose of documenting progress toward completion of items on the List.
 - 1. If the Architect is required to inspect the Work more than three times prior to establishment of Final Completion, the Construction Manager shall be responsible to the Owner for costs for Additional Services of the Architect to perform additional inspections, until the Work is considered Finally Complete.
 - 2. Refer to Section 011400 WORK RESTRICTIONS, for procedures required in cases where Construction Manager is responsible for costs for Additional Services of the Architect.

3.8 FINAL INSPECTION

- A. The Construction Manager shall complete or correct all remaining items on the Monetized Punch List in accordance with the time limits stated in the General Conditions.
- B. Certification of Final Completion: When the Construction Manager considers that all of the items on the Monetized Punch List have been completed or corrected, the Construction Manager shall submit written certification that the items on the Monetized Punch List have been completed and corrected. This certification shall include a copy of the Monetized Punch List with the following information added:
 - 1. Indicate beside each item the date when the item was completed or corrected and,
 - 2. In the case of items completed by subcontractors or sub-subcontractors, the name of the Subcontractor or Sub-subcontractor.
- C. The Architect will begin inspection within seven (7) days after receipt of such certification, to determine whether items on the Punch List have been completed.
 - 1. Should the Architect determine that the Work is not complete after receipt of the certification of Final Completion, the Construction Manager shall be responsible to the Owner for costs for Additional Services of the Architect to perform additional inspections, until all items on the Punch List are completed.
 - 2. Refer to Section 011400 WORK RESTRICTIONS, for procedures required in cases where Construction Manager is responsible for costs for Additional Services of the Architect.

3.9 FINAL SUBMITTALS

- A. Construction Manager's Affidavit of Payment of Debts and Claims, AIA G706.
- B. Construction Manager's Affidavit of Release of Liens, AIA G706A, with:
 - 1. Consent of Surety to Final Payment: AIA G707.
 - 2. Construction Manager's release or waiver of liens.
 - 3. Separate releases or waivers of liens for subcontractors, suppliers and others with lien

rights against property of Owner, together with list of those parties.

- C. All submittals shall be duly executed before delivery to the Architect.

3.10 FINAL APPLICATION AND CERTIFICATE FOR PAYMENT

- A. Construction Manager shall submit final application for payment in accordance with requirements of the GENERAL CONDITIONS.
- B. Architect will issue final certificate in accordance with provisions of Conditions of the Contract.
- C. Prior to issuance of the Certificate for Final Payment by the Architect, all requirements contained in this Paragraph entitled "Closeout Requirements" and other requirements of the Conditions of the Contract shall be executed, received and approved by the Architect.

3.11 POST-CONSTRUCTION INSPECTION

- A. 10 months after Date of Substantial Completion, the Owner's Project Manager will make visual inspection of Work in company with Owner and Construction Manager to determine whether correction of Work is required, in accordance with provisions of GENERAL CONDITIONS AND SUPPLEMENTARY GENERAL CONDITIONS.
- B. For guarantees beyond one year, the Owner's Project Manager will make inspection at request of Owner after notification to Construction Manager.
- C. Owner's Project Manager will promptly notify Construction Manager in writing of any observed deficiencies.

END OF SECTION

SECTION 017839
PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the Contract and General Conditions and all Sections within Division 1 – GENERAL REQUIREMENTS, which are hereby made a part of this Section of the Specifications.
- B. Examine all other Sections of the Specifications for requirements that affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 SUMMARY

- A. The Work of this Section includes, but is not limited to, requirements for the following procedures:
 - 1. Record prints
 - 2. Final record drawings
 - 3. Operations and maintenance submittals and instructions.
 - 4. School Dude product and equipment database information.
- B. Related work includes, but is not limited to, the following work under other Sections:
 - 1. Availability and restriction for use of project electronic files: Section 011400 Work Restrictions.
 - 2. Photographic documentation of construction: Section 011400 Work Restrictions.
 - 3. Availability of electronic files for preparation of record documents: Section 011400 Work Restrictions.
 - 4. Surveying and field engineering: Section 013100 Project Management and Coordination.
 - 5. General requirements for submittals: Section 013300 Submittal Procedures.
 - 6. Other submittals required at the completion of the Work: Section 017700 Closeout Procedures.

1.3 DEFINITIONS

- A. Record Prints are full sets of black-line of Contract Drawings, kept at the Project Site and marked regularly to record as-built conditions as specified herein.
- B. Final Record Drawings: Electronic files in DWG format prepared from completed and approved Record Prints.
- C. Final Record Coordination Drawings: Electronic files in DWG format prepared from updated prints of approved coordination drawings, to record as-built conditions.

1.4 SUBMITTALS

- A. Record Prints: Periodic submittal of prints of Drawings marked to indicate Work completed and changes in the Work, as specified in this Section:
 - 1. Record Prints
 - 2. Coordination Drawing Record Prints
- B. Final Record Drawings: Reproducible drawings, as specified in this Section:
 - 1. Final Record Drawings
 - 2. Final Record Coordination Drawings
- C. Operations and Maintenance Submittals:
 - 1. Maintenance Manuals
 - 2. Schedule of Training and Instruction for mechanical and electrical systems.
- D. School Dude product and database information.

PART 2 - PRODUCTS

2.1 RECORD DOCUMENTS, GENERAL

- A. The Construction Manager shall maintain Record Prints of site plans, landscape drawings, architectural drawings, and structural drawings.
- B. Subcontractors shall maintain Record Prints of the Work of the following Sections:
 - 1. Section 210000 - Fire Protection.
 - 2. Section 220000 – Plumbing.
 - 3. Section 230000 – Heating, Ventilating, and Air Conditioning.
 - 4. Section 260000 – Electrical Work.

2.2 RECORD PRINTS

- A. During the progress of the Work, the Construction Manager shall keep on file at all times two (2) complete and separate sets of black line prints of the entire set of Contract Drawings. Each set shall be updated daily to record the following information:
 - 1. Status of Work: One set shall be used to indicate the progress of the Work installed by coloring in the various pipelines, ducts, and apparatus as erected.
 - 2. Revisions: The second set shall be accurately and promptly updated with colored inks, daily as the Work progresses, to accurately record all revisions to the Work, including, but not limited to, the following:
 - a. Fire Protection, Plumbing, Heating and Ventilating, and Electrical Work, whenever Work was installed other than as shown on the Contract Drawings or described in the Specifications
 - b. Locations, elevations, sizes, and other like items of all concealed and buried utilities, ducts, and services, including exterior utility and storm drainage lines.

- c. The Construction Manager shall be responsible for assuring that the various revisions are delineated by the specific trades involved.
- 3. Both sets shall be kept available at all times for use and inspection by the Architect and the Owner.
- 4. Schedule monthly meetings to review the progress of record prints with the Architect. The progress set must be approved by the Architect in order to be included in the monthly pay application.
- B. Refer to Section 011400 Work Restrictions for Project Electronic Files to be made available for use by the Construction Manager in the preparation of Final Record Drawings.
- C. Transfer all information from the updated Record Prints to the electronic files at least once every three months.
 - 1. Submit three prints of each updated drawing to the Architect at least three times during construction: when the work is approximately 1/4, 1/2, and 3/4 complete.
 - 2. When roughing in for any particular area is completed, it shall be shown on the Record Prints and a copy submitted for Architect's review.

2.3 FINAL RECORD DRAWINGS

- A. Before completion of the Work, and when directed by the Architect, the Construction Manager and all indicated subcontractors shall perform the following:
 - 1. Transcribe all previously recorded information from Record Prints onto the electronic files.
 - 2. Make all final changes and corrections to the electronic files for the Final Record Drawings.
 - 3. Signatures Required: The Construction Manager or Sub-Contractor shall sign each drawing for which they are responsible, as certification that the work was installed as shown.
 - 4. Deliver signed, completed Final Record Drawings to Architect.
- B. Acceptance by the Architect of the completed Final Record Drawings shall be a prerequisite for Substantial Completion.
- C. Shop Drawings will not be acceptable as Final Record Drawings for the Project.
- D. The Architect shall be the sole judge of the acceptability of Final Record Drawings.
- E. Special Requirements for Final Record Drawings of Site Work:
 - 1. Record Drawings for exterior utilities and other items below grade shall include accurate locations of the following:
 - a. The points where such items enter the building and property lines.
 - b. All turns, offsets, and other changes in direction below grade.
 - c. All valves and other appurtenances.
 - 2. Indicate locations of these items using dimensions to adjacent permanent benchmarks or structures as approved by the Architect. Reliance on scale only to locate any temporary or concealed construction will not be acceptable.

3. Final Record Drawings for work below grade shall be submitted immediately upon completion of utility line installation and prior to concealment of the work
4. Refer to Division 31/32/33 Sections for additional requirements for Final Record Drawings of site work.

2.4 RECORD COORDINATION DRAWINGS

- A. Record progress of the Work and modifications and corrections on a set of prints of approved coordination drawings. Follow procedures as for Record Prints.
- B. Final Record Coordination Drawings shall be prepared using information from approved record copies of coordination drawings as for Final Record Drawings.

2.5 MAINTENANCE MANUALS

- A. Upon Substantial Completion of the Work, submit maintenance schedules, maintenance manuals, and all approved Shop Drawings, presenting full details for care and maintenance of visible surfaces and all equipment furnished and installed under the Contract.
- B. Maintenance manuals shall consist of manufacturer's catalog cuts with descriptive information, lubricating and maintenance instructions, parts lists, usage instructions, names, addresses and telephone numbers where replacement parts and service can be quickly obtained, and all other information required for the Owner to use, maintain, and service the items properly.
- C. Upon Architect's approval of drafts, submit two (2) corrected copies properly bound in a logical and well arranged order, with index, to the Architect for transmittal to the Owner.

2.6 SCHOOL DUDE DATABASE SUBMITTALS

- A. Upon Substantial Completion of the Work, submit information according to Template Guide included at the end of this section.
- B. Upon Architects approval, submit hard and digital copy to Owner.

PART 3 - EXECUTION

3.1 TRAINING AND INSTRUCTIONS

- A. The Construction Manager shall arrange for instruction for the Owner's employees, to insure proper operation of the equipment furnished.
 1. It is the intent of this paragraph to require the Construction Manager and the applicable Subcontractors to furnish as much detailed instruction as is necessary to educate the Owner's on-site personnel in the proper use of the equipment.
 2. This instruction shall be provided by a qualified trainer who is also a manufacturer's certified technician with expertise with the specific system or equipment for which training is required. In some cases, this may require more than one visit to the Project by those responsible for the instruction.

3. The Construction Manager and, in particular, the Plumbing, Heating and Ventilating, and Electrical Subcontractors shall not assume that the Owner's employees possess special expertise or have had any previous experience whatsoever in the operation and maintenance of sophisticated mechanical and electrical equipment.
 4. Submit the schedule and draft agenda for instructional sessions to the Owner. Do not proceed with instruction until Owner has approved schedule.
 5. Refer to specific technical sections for additional requirements specific to particular equipment and systems.
- B. For major items of mechanical and electrical equipment, instructions and demonstrations shall be performed during the initial start-up period and, if necessary, during one or more return visits as may be required.
- C. Videotape: Instruction sessions and demonstrations shall be video-recorded by professional videographers in DVD format, using tripods, broadcast-quality video cameras and proper lighting. Close-ups of items being demonstrated shall be included. Sound recording shall be clear and perfectly intelligible. Video shall be edited as required to provide a permanent reference. Each session and demonstration shall be included, except where waived by the Architect, and all DVDs shall be properly labeled as to date, subject, and presenter. Provide two (2) copies of each DVD.

END OF SECTION

Classification	Type
Electrical	Dimmer System
Electrical	Emergency Generator
Electrical	Lighting
Electrical	Magnetic Starters
Electrical	Switch Gear/Disconnect
Electrical	Switches/Receptacles
Flooring Equipment	Burnisher
Flooring Equipment	Floor Scrubber
HVAC	Air Handling Unit
HVAC	Boilers
HVAC	Chillers
HVAC	Cooling Towers
HVAC	Fan Coils/Fans
HVAC	Heat Pumps
HVAC	Heating Systems
HVAC	Package Refrigeration
HVAC	Roof Top Unit
HVAC	Transformers
Inspections	Asbestos
Licenses	Vehicles
Plumbing	Backflow Preventer
Plumbing	Disposal/Lift Systems
Plumbing	Domestic Water
Plumbing	Fixture/Valves
Plumbing	Gas System
Plumbing	Septic System
Plumbing	Water Heater
Roofing	Drainage
Roofing	Flashing/Roof Jacks
Roofing	Flat Roof System
Roofing	General Roof System
Roofing	Penetrations
Roofing	Tile/Wood/Shingle
Special Equipment	Bleacher Seating
Special Equipment	Bleacher Seating
Special Equipment	Doors & Windows
Special Equipment	Elevators/Lifts
Special Equipment	Kilns/Foundry
Special Equipment	Kitchen Equipment
Special Equipment	Lockers
Special Systems	Emergency Lighting
Special Systems	Energy Management

Special Systems	Fire Alarm System
Special Systems	Intercom/PA System
Special Systems	Intrusion Alarm
Special Systems	Network System
Special Systems	Sprinkler System
Special Systems	Stage Lighting
Surfaces	Asphalt
Surfaces	Block/Brick/Concrete
Surfaces	Carpet
Surfaces	Ceiling Tile
Surfaces	Ceramic Tile
Surfaces	Drywall/Wall Coverings
Surfaces	VCT Tile
Surfaces	Wood

Template Guide for input of information. “THIS IS FOR THE EQUIPMENT TAB”

Column A	<u>ITEM NUMBER</u>	N/A
Column B	<u>CLASSIFICATION</u>	N/A
Column C	<u>TYPE</u>	N/A
Column D	<u>CLASSIFICATION>TYPE</u> : click in the field and select from the drop down	
Column E	<u>DESCRIPTION</u> : type in description of the unit (Its name) i.e.: RTU-1 or AHU-1	
Column F	<u>MANUFACTURER</u> : click in the field and select from the drop down, if the manufacturer is not there go to the manufacturer tab and type it in, then it will populate to the equipment tab.	
Column G	<u>SUPPLIER</u> : if the Supplier is not there go to the Supplier tab and type it in, then it will populate to the equipment tab.	
Column H	<u>DATE PURCHASED</u> :	N/A
Column I	<u>ORIGINAL COST</u> :	N/A
Column J	<u>LOCATION</u> : click in the field and select from the drop down	
Column K	<u>BUILDING</u> :	N/A
Column L	<u>AREA</u> : click in the field and select from the drop down	
Column M	<u>AREA NUMBER</u> : type in the actual location of the piece of equipment here, (Roof, etc...)	
Column N	<u>TAG NUMBER</u> :	N/A
Column O	<u>MODEL NUMBER</u> : type in the model #	
Column P	<u>SERIAL NUMBER</u> : type in the serial #	
Column Q	<u>OUT OF SERVICE - BEGIN</u>	N/A
Column R	<u>OUT OF SERVICE – END</u>	N/A
Column S	<u>DATE PLACED</u>	N/A
Column T	<u>DATE REMOVED</u>	N/A
Column U	<u>WARRANTY EXPIRES</u> : type in the date	
Column V	<u>LIFE EXPECTANCY UNIT</u> : type in years	
Column W	<u>LIFE EXPECTANCY</u> : type in the number of years (25)	
Column X	<u>NOTES</u> : Type in this information as applicable, Voltage, Amps, Phase, Belts, Filters, Panel #, and breaker #	
Column Y	<u>INCLUDE NOTES</u> : click YES for notes	

SECTION 018119
INDOOR AIR QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the Contract and General Conditions and all Sections within Division 1 – GENERAL REQUIREMENTS, which are hereby made a part of this Section of the Specifications.
- B. Examine all other Sections of the Specifications for requirements that affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 SUMMARY

- A. The Work of this Section includes, but is not limited to, requirements for the following procedures:
 - 1. General procedures for maintaining indoor air quality.
 - 2. Selection of products.
 - 3. Mixing of two-component products.
 - 4. Work procedures.
 - 5. Flushout procedures.
 - 6. Integrated pest management.
- B. Related work includes, but is not limited to, the following work under other Sections:
 - 1. Scheduling requirements for building flush-out: Section 013200 – Construction Progress Documentation
 - 2. Separate line item for IAQ Control measures in Schedule of Values: Section 012400 – Schedule of Values.
 - 3. Submittal procedures: Section 013300 – Submittal Procedures.
 - 4. Weatherproof enclosures and cleaning materials: Section 015000 - Temporary Facilities and Controls.
 - 5. Sealing of air intakes during roofing installation: Section 075300 – EPDM Roofing.
 - 6. Temporary and permanent filters and other provisions for air handling systems: Division 23 – MECHANICAL.

1.3 INTENT

- A. It is the intent of the Owner to maintain a healthful environment for the present and future occupants of the building. Therefore, the Construction Manager shall conduct the Work in such a way as to avoid creating indoor air quality problems. Required procedures include:
 - 1. Limiting use of products that may contribute to poor indoor air quality.
 - 2. Maintaining work procedures which contain and alleviate dusts and odors and air-borne contaminants.
 - 3. Protection of materials from moisture.

- B. The Construction Manager's attention is directed to the provisions throughout the Contract Documents intended to maintain indoor air quality during construction and after completion of the Project. These provisions will be strictly enforced. The Construction Manager shall notify and require each subcontractor, sub-subcontractor and materials vendor to comply with such provisions.
- C. Pest Control Impact on IAQ: With the intent of eliminating or minimizing the use of chemical pesticides, which can become airborne contaminants, the Construction Manager shall implement an Integrated Pest Management Plan (IPM).
 - 1. Key aspects of pest control for this Project include:
 - a. Construction areas shall be kept clean to minimize residue that will serve as nutrients or harborage for insects and rodents.
 - b. No discarded food shall remain on the construction site overnight.
 - c. Application of chemical pesticides shall be considered a last resort after other methods have failed, and shall be performed by licensed pest control professionals.
 - d. Control of insects shall be performed using traps containing baits and gels.
 - e. Control of rodents shall be performed using mechanical traps.
 - f. Plant growth will be controlled by hand weeding wherever practical and the use of herbicides will be strictly limited, in accordance with the requirements of landscape Sections.
 - 2. The Construction Manager shall develop and implement IPM goals and procedures with respect to the control of pests during construction.
 - 3. Refer to specific technical Sections for pest control products and procedures to be incorporated into the Work in compliance with the Owner's IPM.

1.4 DEFINITIONS

- A. "IAQ": Indoor Air Quality.
- B. "MSDS": Material Safety Data Sheet.
- C. "REL": Reference Established Limit, a highest permissible concentration of a given airborne compound.
- D. "VOC": Volatile Organic Compound.
- E. "Work Area": The portions of the building or site given over to the Construction Manager for the construction of new Work required by the Contract Documents.

1.5 REFERENCE STANDARDS

- A. This Project has been designed to meet the following requirements and regulations. Where different criteria for a given component of the Work are not in agreement, the Construction Manager shall be required to meet the most restrictive criterion, unless otherwise indicated in the Contract Documents.
 - 1. American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc. (ASHRAE), 1999: ASHRAE Standard 62-1999, Ventilation for acceptable Indoor Air Quality.
 - 2. American Society for the Testing and Materials (ASTM):
 - a. ASTM D5116-97, Guide for Small Scale Environmental Chamber Determination of Organic Emissions from Indoor Materials/Products.
 - 3. Occupational and Safety and Health Administration (OSHA): Relevant standards on in-

- door air quality, including the following:
 - a. 29 CFR 1926.59, Hazard Communication
 - b. 29 CFR 1910.95, Occupational Noise Exposure
 - c. 29 CFR 1910.146, Permit Required Confined Spaces
 - d. 29 CFR 1910.1000, Air Contaminants
 - e. 29 CFR 1910.1200, Hazard Communication.
- 4. Sheet Metal and Air Conditioning National Association (SMACNA): "Duct Cleanliness for New Construction Guidelines." Follow these guidelines to Advanced levels of cleanliness. Of specific importance are the following:
 - a. Ductwork shall be sealed when transported to the construction site.
 - b. Store ductwork in clean, dry conditions and keep sealed while it is stored.
 - c. Wipe down internal surfaces of ductwork immediately prior to installation to remove dust.
 - d. Seal open ends on completed ductwork and overnight work-in-progress.
 - e. During installation, protect ductwork waiting to be installed with surface wrapping.

1.6 PERFORMANCE REQUIREMENTS

- A. VOC Emissions: Products have been selected for this Project with respect to their emissions of Volatile Organic Compounds, in order to limit concentrations of VOC's in occupied spaces to levels below the Reference Established Limits established by the State of California.
 - 1. Maximum allowable concentrations of VOC's include the following:
 - a. Total VOC's (TVOC): |
 - b. Formaldehyde: 3 $\mu\text{g}/\text{m}^3$
 - c. Naphthalene: 9 $\mu\text{g}/\text{m}^3$
 - d. Styrene: 300 $\mu\text{g}/\text{m}^3$
 - e. Isocyanurates: |
 - f. Diesel Exhaust: 5 $\mu\text{g}/\text{m}^3$
 - 2. Substitutions for any specified VOC-containing product specified will be considered with the condition that acceptable VOC-emission data are available for the proposed product, or the Construction Manager arranges to have that product tested for VOC emissions by an independent laboratory.
- B. Airborne Dust: Dust partitions, site dust control measures and other construction practices shall be maintained to prevent airborne dust from leaving the site or accumulating in the building interior.
- C. Moisture: Weather protection, scheduling of the Work, restoration drying techniques using dessicant drying, dehumidification and other construction practices shall be used to maintain the schedule and to prevent construction materials from reaching moisture levels that will support the growth of mold, bacteria and other biological contaminants.
 - 1. Maximum Equivalent Moisture Content (EMC) of substrates installed wet or wetted during the construction process such as concrete, and concrete block shall be measured before application of mold-sensitive finishes. Installation of the following products shall not proceed until the relative humidity in the substrate does not exceed 70 percent relative Humidity (RH) as measured using ASTM F 2170, or in accordance with the manufacturer's written limitations, whichever is lower:
 - a. Non-preservative-treated wood products
 - b. Gypsum wallboard
 - c. Carpet
 - d. Acoustical ceiling tile

- e. Fabric-covered acoustical panels and tackboards
 - f. Fixed upholstered seating
2. Wood-based finish products such as flooring, architectural woodwork, casework and other like items shall additionally follow the environmental temperature and RH criteria limits established within their respective sections.

1.7 SUBMITTALS

- A. General: Prepare submittals for the Work of this Section according to the procedures outlined in Section 01300 – Submittals, modified as required herein. These submittals will be considered informational submittals.
- B. For each material that contains VOC's, submit to the Architect five copies of an IAQ Submittal package containing the following information for record purposes. This package shall be submitted separately from the submittals required elsewhere for product review:
 - 1. Description of use of product, including estimated area of exposed surface.
 - 2. Product data.
 - 3. VOC data where applicable:
 - a. Fluid materials: Indicate content in g/L calculated according to 40 CFR 59, Subpart D (EPA method 24).
 - b. Solid materials: Provide VOC emission rates.
 - 4. Material Safety Data Sheet.
- C. For construction procedures required to protect Indoor Air Quality, submit the following information for record purposes:
 - 1. Construction Indoor Air Quality Management Plan.
 - 2. Product data for filtration media used during construction and installed at Substantial Completion, highlighting MERV and other performance data.
 - 3. Construction Documentation: Six photographs at three different occasions during construction along with a brief description for each photo of the SMACNA approach employed, including the following:
 - a. Construction areas in occupied buildings that were isolated from adjacent non-construction areas using temporary walls, plastic sheeting, or other vapor retarding barriers.
 - b. Construction areas that were maintained at a negative air pressure to surrounding construction areas.
 - c. Recirculating air ducts that were temporarily capped and sealed (appropriate filters may be used if nuisance particulates are the only contaminant of concern).
 - d. Supply air systems that were operated with filters in place.
 - e. Protection of on-site stored or installed absorptive materials.
 - 4. Construction Documentation: Six photographs at three different occasions during construction along with a brief description for each photo of the SMACNA approach to duct cleanliness. Show that procedures are being followed to achieve Advanced levels of cleanliness in accordance with SMACNA's "Duct Cleanliness for New Construction Guidelines." Pictures shall illustrate some or all of the following:
 - a. Ductwork is sealed when transported to the construction site.
 - b. Ductwork is stored in clean, dry conditions and kept sealed while stored.
 - c. Construction Manager wipes down interior surfaces of ductwork immediately prior to installation to remove dust.
 - d. Construction Manager seals open ends on completed ductwork and overnight work-in-progress.
 - e. During installation, contractor protects ductwork waiting to be installed with surface wrapping.

5. Construction Documentation: Six photographs, taken at various times during construction, with a brief description of each photo, showing the techniques for protecting building materials (especially gypsum wallboard, wood, porous insulation, paper, and fabric) from mold and moisture damage (e.g., show spacers, show covered materials, show materials stored in protected areas).
 6. Signed statement describing the building air flush-out procedures including the dates when flush-out was begun and completed and statement that filtration media was replaced after flush-out.
- D. Evidence of testing of each substrate to receive mold-sensitive finishes in accordance with ASTM F2170.
- E. The Construction Manager's schedule shall include a period for Flush-out procedures as specified herein.

1.8 QUALITY ASSURANCE

- A. Construction IAQ Management Plan: The Construction Manager shall prepare and implement a plan that complies with SMACNA Guidelines, to address the following issues and other IAQ issues as requested by the Owner:
1. Protection of ventilation system components during construction.
 2. Measures designed to limit the presence of VOC's, dust and other contaminants during construction.
 3. Procedures for depressurizing work areas.
 4. Procedures for drying out construction moisture
 5. Procedures for drying out or otherwise dealing with unanticipated entry of water into new or existing construction.
 6. Cleanup of contaminated components during construction and after construction is complete.
 7. Provision of temporary ventilation and filters as required during construction.
 8. Procedures for improved housekeeping
 9. Scheduling of construction activities to comply with IAQ requirements of this Section.
 10. Plan shall address the method of communication between construction team and building occupants regarding complaints, concerns and predicted changes to IAQ.
- B. Maintain in the Construction Manager's office a complete and up-to-date notebook of MSDS for all products on-site containing VOC's. Upon the request of the Owner, make the notebook available for review.
- C. Pre-testing of construction products to determine VOC emissions:
1. Testing shall conform to the provisions of ASTM D5116-97.
 2. The Construction Manager shall provide pre-testing for the following:
 - a. Product substitutions proposed by the Construction Manager.

PART 2 - PRODUCTS

2.1 PRODUCTS

- A. Throughout the Work, use products, materials which contribute the minimum practicable dust, odors and contaminants to the indoor environment.

- B. Products containing Volatile Organic Compounds (VOC's):
 - 1. Comply with the following criteria for VOC limits for the following field-applied products.
 - a. Adhesives: Refer to Technical Sections which include adhesives, including but not limited to those in Divisions 6 and 9, for specific requirements.
 - b. Sealants: Refer to Section 079200 – JOINT SEALANTS, and other Technical Sections requiring sealants, for specific requirements.
 - c. Paints and Coatings: Refer to Section 099000 – PAINTING AND COATING, for specific requirements.
 - 2. No urea formaldehyde-containing products will be permitted for use in this Project.
 - a. Wood and agrifiber products: Refer to Sections in Division 6 and 12 for products.
 - b. Insulation: Refer to Section 072100 – THERMAL INSULATION, for products.
 - 3. Where VOC limits are not otherwise specified, use products with maximum VOC content of 7% by volume.
 - 4. Comply with requirements of the specifications for all items containing VOC's.
 - 5. All materials containing VOC's shall be installed no less than fourteen days prior to Owner's occupancy of the building.
- C. Indoor Chemical and Pollutant Source Control:
 - 1. Provide temporary walk-off mats to reduce entry of dust, moisture and other contaminants into the building during construction.
 - 2. Refer to Section 124800 – ENTRANCE FLOOR MATS AND FRAMES, for permanent floor grilles to be installed at building entrances. These floor grilles shall be protected from dust, moisture and other contaminants until Substantial Completion.
- D. Mechanical Systems and Controls: Refer to Technical Sections in Division 21, 22, 23 and 26 for mechanical and electrical provisions for maintaining Indoor Air Quality.

PART 3 - EXECUTION

3.1 GENERAL PROCEDURES FOR PROTECTING INDOOR AIR QUALITY

- A. General: Provide physical barriers, ventilation and other controls as specified to reduce potential for odors, dust, and fumes from affecting present and future occupants of the building, and to meet performance criteria specified herein.
- B. Material Transport and Storage:
 - 1. Store construction materials, including ductwork, in clean, dry areas protected from moisture and dust. Refer to Division 2 through 50 Sections for additional on-site storage requirements for individual materials and equipment.
 - 2. No storage of construction materials or debris will be permitted within mechanical rooms.
 - 3. Adsorptive materials shall be protected throughout storage at the site in their original wrapping materials.
 - 4. Keep waste materials that can release dust or odors covered and sealed when on site, and dispose of them promptly.
- C. Installation Sequence: Schedule material installation and construction activities so as to avoid adsorption of VOC's and dust into adsorptive materials.
 - 1. Provide protective cover for adsorptive materials that will be subjected to VOC off-gassing and dust.
 - a. Wrap adsorptive materials in polyethylene or other impermeable material and seal edges with tape.
 - b. Refer to SMACNA Guidelines for minimum requirements.

- c. Protective cover is required for uninstalled materials stored in the construction area, as well as for installed materials.
 2. Containers of VOC-containing fluids shall be kept tightly sealed. When not in use, such containers shall be stored in a location remote from adsorptive materials or occupied areas.
 3. Apply all wet materials such as paints, coatings and products installed with adhesives, allowing them time to offgas before applying adsorptive or "sink" type products such as.
 - a. Acoustical ceiling tiles
 - b. Carpet
 - c. Fabric materials, upholstered products or fabric-wrapped panels for use as tackboards or acoustical purposes.
 4. Permit carpeting to offgas for 48 hours at the plant prior to wrapping in plastic wrappings. Otherwise, before installation, open up carpet rolls and spread carpet out in an offsite location and ventilate in an area protected from weather, sources of moisture or other VOC's.
- D. Regular Cleaning during Construction: Refer to Section 011400 – Work Restrictions, for cleaning provisions. The intent of these documents is to prevent accumulation of contaminant-containing dirt and dust within the building during construction.
 1. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly coated surfaces. Clean interior spaces prior to the start of finish painting and continue cleaning on an as-needed basis until painting is finished.
 2. Use cleaning methods that minimize airborne dust. Recommended methods include:
 - a. Immediate removal of spills, excess applications of cleaning products and accumulated water.
 - b. Increased frequency of cleaning during construction, to maintain surfaces free of dust accumulation.
 - c. Use of wetting agents and sweeping compounds, and of efficient dust collection equipment such as damp mops and HEPA filtered vacuum cleaners.
 - d. Refer to SMACNA Guidelines for additional cleaning recommendations.
- E. Protection from VOC's from Asphalt- and Solvent-Containing Materials:
 1. Sealing of air intakes or ventilation required to prevent waterproofing-generated VOC's from entering HVAC system or occupied areas will be performed under Section 079200 – Joint Sealants.
 2. Sealing of air intakes to prevent roofing-generated VOC's from asphalt or adhesives from entering HVAC system shall be performed under Division 07 – Roofing Sections.
- F. Ventilation:
 1. Supply temporary construction ventilation. Continuously ventilate during installation of materials that emit Volatile Organic Compounds (VOCs) and after installation of those materials for at least 72 hours or until emissions dissipate. Ventilate directly to outside areas; do not ventilate to other enclosed spaces that are occupied by students, staff, or contractors.

3.2 MIXING OF MULTI-COMPONENT PRODUCTS

- A. General: Fluid-applied products furnished in two or more components shall be mixed thoroughly, in precise proportions so that an excess of one component will not remain uncured. The requirements of this section apply to all fluid-applied multi-component products, including but not limited to the following:
 1. Multi-component adhesives.
 2. Multi-component waterproofing and sealant products.

- 3. Multi-component paints and coatings
- 4. Multi-component fluid-applied floorings

B. Requirements:

- 1. All multi-component mixtures shall be brought to the Project Site in factory-sealed and pre-measured containers with precise quantities required for proportional mixing. No bulk materials will be permitted on-site if not packaged in this manner.
- 2. Mix components in strict accordance with manufacturer's written instructions regarding quantities, mixing method and other conditions.
- 3. Each container of each component shall be completely mixed with the entire contents of a corresponding container of the second component.
 - a. No field mixing of partial quantities will be permitted.
 - b. Properly dispose of mixed components remaining unused at the end of a workday.

3.3 CONTROL OF COMBUSTION PRODUCTS

- A. General: Minimize the use of fuel-burning equipment inside and near the building. Where fuel-burning engines are necessary, cycle off equipment when not in use.
- B. Vehicle Exhaust: No vehicles shall be left idling near temporary or permanent air intakes. Motorized vehicles used within the building shall be electrically powered.
- C. Power Equipment: No internal combustion engines shall be operated within the building. Location of engines outside the building shall be remote from permanent air intakes and operable windows of occupied spaces.
- D. Exhaust of Temporary Heating Equipment:
 - 1. No temporary heating equipment that burns kerosene or other liquid fuel will be permitted within the building.
 - 2. Temporary equipment that produces heat by combustion of fuel shall be installed with provisions to ventilate combustion gases to the exterior of the building.
- E. Welding: Welding operations shall be properly ventilated.
- F. Smoking: No smoking will be permitted within the construction site or adjacent areas at any time.

3.4 DUST CONTROL

- A. General: The following provisions do not supersede specific requirements for methods of construction or applicable general conditions set forth elsewhere in the Contract with regard to performance obligations of the Construction Manager.
 - 1. Maintain the construction site, stockpiles, access, detour, and haul roads, staging and parking area used for the Work, free of dust that would cause a hazard or a nuisance to those at the site or adjacent sites. Refer to Section 310000 – EARTHWORK, for additional provisions for control of dust on the site.
 - 2. Provide positive methods and apply dust control materials to minimize raising dust from construction operations, and use damp cloths and wetting agents or sweeping compounds to prevent air-borne dust from dispersing into the atmosphere.
 - 3. Cutting of concrete and masonry products shall be performed using wet saw methods.
 - 4. Wet down dry materials and rubbish to lay dust and prevent blowing dust.
 - 5. Clean interior spaces prior to the start of finish painting and continue cleaning on an as-

INDOOR AIR QUALITY REQUIREMENTS

needed basis until painting is finished.

6. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly-coated surfaces, including paint, coatings, sealants, caulking, adhesives.
- B. Dust Partitions and Coverings:
1. Furnish, erect, and maintain for the duration of the work period, temporary fire-resistant dust-proof coverings and solid partitions as required to prevent the spread of dust beyond the immediate area where work is being performed.
 2. Temporary partitions for dust control shall extend from floor to bottom of structure above, to provide an air-tight barrier. Provide air-tight coverings for openings required for access through partitions.
 3. Cover equipment installed within construction area using canvas, polyethylene and tape, or other materials as recommended by manufacturer of equipment for protection from airborne dust and vapors.
 4. Refer to Section 015000 – Temporary Facilities and Controls, for additional requirements for temporary partitions and related protective measures.
- C. Prevent dust and odors from entering the new HVAC system. Confirm that the HVAC Sub-contractor has sealed all diffusers, return side ductwork and equipment within the Work Area so as to prevent dust from entering. For further requirements, refer to SMACNA Guidelines and DIVISION 23 – Heating, Ventilating and Air Conditioning.
- D. Prevent exterior dust and odors from entering interior space after building is enclosed. Whenever possible, seal window units with plastic as recommended in SMACNA Guidelines.

3.5 WATER DAMAGE

- A. General: The Construction Manager shall be responsible for protecting the Work from moisture, in order to prevent growth of harmful fungus, mold and other biological activity.
- B. Protection of Existing and New Building Construction:
1. Install weatherproof enclosures to protect the Work from exterior sources of moisture in accordance with Section 015000 – Temporary Facilities and Controls.
 2. Remove and replace construction which becomes wet for 24 hours or more, or which shows evidence of biological growth due to the presence of moisture. Porous materials such as insulation and gypsum products that have become wet must be removed and discarded regardless of duration.
- C. Protection of Stored Construction Materials:
1. Take precautions to prevent porous materials such as gypsum board, insulation, ceiling tile, wood and similar products from becoming wet. Such products must be removed and discarded.
 2. Refer to Section 015000 – Temporary Facilities and Controls, for materials and installation of weatherproof enclosures.
 3. Store materials above ground surfaces and provide spacers between ground and protective covering to allow for ventilation
 4. Discard construction material which becomes wet, or which shows evidence of biological growth due to the presence of moisture.
- D. Procedures for drying out wet construction: In the case that an unanticipated event permits the entry of water into new or existing construction, the Construction Manager shall perform

procedures to dry out construction within 24 hours, to a degree that will not support biological growth using restoration drying techniques.

1. Refer to guidelines published by the United States Environmental Protection Agency.
2. Construction that is not adequately dried out, or which shows evidence of biological growth, shall be removed immediately from the construction area and disposed of legally.
3. Wetting by contaminated water and subsequent cleaning and decontamination shall be supervised by a qualified company.

3.6 CLEAN UP

- A. Prior to turning over work area to Owner, conduct final cleaning to remove dust to the minimum practicable level.
- B. Clean ductwork, registers and grilles within the Work Area, and HVAC equipment servicing the Work Area using professional duct cleaning company.
- C. After completion of duct cleaning, vacuum vertical and horizontal surfaces, ledges, trim, tops of light fixtures and other equipment, and other locations where dust has settled. Utilize HEPA filtered vacuum to capture fine dust.
- D. Vacuum all carpeted and fabric-covered surfaces with a high-efficiency particulate arrestor (HEPA) vacuum prior to Substantial Completion.
- E. Do not use solvent-based cleaners in final cleaning of Work Area, unless cleaning occurs at least 14 days prior to Owner's scheduled Active Use of the area.
- F. Coils, air filters and fans in HVAC system shall be cleaned prior to final testing and balancing. Refer to Division 23 – HVAC, for requirements.

3.7 SCHEDULED FLUSH-OUT PROCEDURES AND REQUIREMENTS

- A. General:
 1. Schedule Building Flush-Out prior to testing and balancing of mechanical systems, as outlined in Section 013200 – CONSTRUCTION PROGRESS DOCUMENTATION. Flush-out shall be completed prior to Substantial Completion.
 2. No mechanical system start-up will be permitted until application of major finishes, installation of casework and final cleanup is complete.
 3. Develop and implement an Indoor Air Quality (IAQ) Management Plan for the preoccupancy phase in accordance with flush-out procedures and requirements referenced in this section.
- B. Building Flush-Out: Refer to Division 23 Sections for requirements for filters, static pressure sensors, start-up and operation of mechanical systems.
- C. Procedure: Flush out each space once all major finish materials have been installed on floors, walls, and ceilings. This includes all casework. At that time, each space shall be flushed out separately and occupied once 3,500 ft³ of outdoor air per ft² of floor area of the space has been delivered. The space may then be occupied provided that it is ventilated at a rate of 0.30 cfm/ft² of outside air or the design minimum outside air rate, whichever is greater, a minimum of three hours prior to occupancy and during occupancy, until the total of 14,000 ft³/ft² of outside air has been delivered to the space.

- D. Exterior Conditions for Flush-Out:
 - 1. Remove potential sources of pollution from proximity to air intakes. Pollutant sources include but are not limited to: waste materials, temporary fuel-burning equipment, vehicles, dust-producing activities.
 - 2. Control dust on the building site by spraying exposed soil with water and encouraging growth of permanent grass and other plant materials.
 - 3. If unavoidable pollutant-generating activities occur outside the building during the flush-out period, seal building as recommended in SMACNA Guidelines, and discontinue flush-out until such activities cease.
 - 4. Flush-out shall be completed prior to Substantial Completion.
- E. Equipment Requirements During Flush-Out Period:
 - 1. Temporary MERV 10 filters shall be in place before HVAC system start-up.
 - 2. Windows shall be securely closed.
 - 3. Disable carbon dioxide monitors.
 - 4. Maintain normal room temperature.
 - 5. Monitor filter pressure drop for each HVAC unit that contains filters, and replace filters if needed due to accumulation of particulate matter before the end of the period.
- F. Replace temporary filters with new MERV 13 filters at completion of building flush-out – refer to Division 23 specifications for filter requirements.
- G. Post Flush Out Report: Provide a narrative including the following information:
 - 1. The project's specific flushout procedures.
 - 2. Flush-out schedule, start and finish dates.
 - 3. Zone description of defined areas for flushout.
 - 4. List of air handlers within each zone.
 - 5. Filter media used during and after completion of flushout. (Reference Division 230000 specifications).
 - 6. Flushout period calculations.
 - 7. Hourly trending reports from ATC system.

3.8 INDOOR AIR QUALITY FIELD TESTING

- A. Indoor Air Quality Testing, General:
 - 1. The Owner reserves the right to conduct indoor air quality testing before, during and after construction, in order to quantify the effects of the Construction Manager's Indoor Air Quality Plan and verify that the Indoor Air Quality provisions of the Contract Documents are being met.
 - 2. The Construction Manager shall cooperate with the Owner in scheduling the testing and providing access to the site.

END OF SECTION

SECTION 01 91 12 COMMISSIONING OF BUILDING ENCLOSURE

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This section includes commissioning process requirements for building enclosure systems and assemblies and equipment.
- B. Related Sections:
 - 1. Division 01 Section “General Commissioning Requirements” for general commissioning process requirements.

1.3 DESCRIPTION

- A. Refer to Division 01 Section “General Commissioning Requirements” for the description of commissioning.

1.4 DEFINITIONS

- A. Refer to Division 01 Section “General Commissioning Requirements” for definitions.

1.5 SUBMITTALS

- A. Refer to Division 01 Section “General Commissioning Requirements” for CxA’s role.
- B. Refer to Division 01 Section “Submittal Procedures” for specific requirements. In addition, provide the following as required:
- C. Certificates of readiness
- D. Certificates of completion of installation, prestart, and startup activities
- E. O&M manuals
- F. Test Reports.

1.6 QUALITY ASSURANCE

- A. Test Equipment Calibration Requirements: Contractors will comply with test manufacturer’ calibration procedures and intervals. Recalibrate test instruments immediately after instruments have been repaired resulting from being dropped or damaged. Affix calibration tags to test instruments. Furnish calibration records to CxA upon request.

1.7 COORDINATION

- A. Refer to Division 01 Section “General Commissioning Requirements” for requirements pertaining to coordination during the commissioning process.

Part 2 – PRODUCTS

2.1 TEST EQUIPMENT

- A. All standard testing equipment required to perform startup, initial checkout and functional performance testing shall be provided by the Contractor for the equipment / system being tested. For example, the contractors of Division 4, 7 and 8 shall ultimately be responsible for all standard testing equipment for the Building Assembly systems in Divisions 4, 7 and 8.
- B. Special equipment, tools and instruments (specific to a piece of equipment and only available from vendor) required for testing shall be included in the base bid price to the Owner and left on site.
- C. Proprietary test equipment and software required by any equipment manufacturer for programming and/or start-up, whether specified or not, shall be provided by the manufacturer of the equipment. Manufacturer shall provide the test equipment, demonstrate its use, and assist in the commissioning process as needed. Proprietary test equipment (and software) shall become the property of the Owner upon completion of the commissioning process.
- D. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Specifications. If not otherwise noted, the following minimum requirements apply: Temperature sensors and digital thermometers shall have a certified calibration within the past year to an accuracy of 0.5°F and a resolution of + or - 0.1°F. Pressure sensors shall have an accuracy of + or - 2.0% of the value range being measured (not full range of meter) and have been calibrated within the last year.

PART 3 – EXECUTION

3.1 GENERAL DOCUMENTATION

- A. **Red-lined Drawing:** The contractor will verify all equipment, systems, instrumentation, wiring and components are shown correctly on red-lined drawing. Preliminary red-lined drawings must be made available to the Commissioning Team for use prior to the start of Functional Performance Testing. Changes, as a result of Functional Testing, must be incorporated into the final as-built drawings, which will be created from the red-lined drawings. The contracted party, as defined in the Contract Documents will create the as-built drawings.
- B. **Operation and Maintenance Data:** Contractor will provide a copy of O&M literature within 45 days of each submittal acceptance for use during the commissioning process for all commissioned equipment and systems. The CxA will review the O&M literature once for conformance to project requirements. The CxA will receive a copy of the final approved O&M literature once corrections have been made by the Contractor.
- C. **Demonstration and Training:** Contractor will provide demonstration and training as required by the specifications. A complete training plan and schedule must be submitted by the contractor to the CxA four weeks (4) prior to any training. A training agenda for each training session must be submitted to the CxA one (1) week prior to the training session.

3.2 CONTRACTOR'S RESPONSIBILITIES

- A. Perform tests as required in Divisions 04, 07 and 08. In addition the following test shall be performed by the applicable installing contractor.
- B. Participate in building assembly systems, assemblies, equipment, and component maintenance orientation and inspection as directed by the CxA.
- C. Provide information requested by the CxA for final commissioning documentation.
- D. Include requirements for submittal data, operation and maintenance data, and training in each purchase order or sub-contract written.
- E. Prepare preliminary schedule for building assembly system orientations and inspections, operation and maintenance manual submissions, training sessions, equipment start-up task completion for owner. Distribute preliminary schedule to commissioning team members.
- F. Update schedule as required throughout the construction period.
- G. Assist the CxA in all verification and functional performance tests.
- H. Provide measuring instruments and logging devices to record test data, and provide data acquisition equipment to record data for the complete range of testing for the required test period.
- I. Gather operation and maintenance literature on all equipment, and assemble in binders as required by the specifications. Submit to CxA 45 days after submittal acceptance.
- J. Coordinate with the CxA to provide 48-hour advance notice so that the witnessing of equipment and system start-up and testing can begin.
- K. Participate in, and schedule vendors and contractors to participate in the training sessions.
- L. Provide written notification to the CM/GC and CxA that the following work has been completed in accordance with the contract documents, and that the equipment, systems, and sub-system are operating as required.
- M. The equipment supplier shall document the performance of his equipment.
- N. Provide a complete set of red-lined drawings to the project team.
- O. Equipment Suppliers
 - 1. Provide all requested submittal data, including detailed start-up procedures and specific responsibilities of the Owner, to keep warranties in force.
 - 2. Assist in equipment testing per agreements with contractors.
 - 3. Provide information requested by CxA regarding equipment sequence of operation and testing procedures.
- P. Refer to Division 01 Section "General Commissioning Requirements" for additional Contractor responsibilities.

3.3 CxA'S RESPONSIBILITIES

- A. Refer to Division 01 Section "General Commissioning Requirements" for CxA's Responsibilities.

3.4 TESTING PREPARATION

- A. Certify in writing to the project team that Building Assembly systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.

- B. Certify in writing to the project team that any Building Assembly instrumentation and controls have been completed and calibrated, that they are operating according to the Contract Documents.
- C. Certify in writing that testing procedures have been completed and that testing reports have been submitted, discrepancies corrected, and corrective work approved.
- D. Place systems, subsystems, and equipment into operating mode to be tested if applicable (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).
- E. Inspect and verify the position of each device and interlock identified.
- F. Testing Instrumentation: Install measuring instruments and logging devices to record test data as required by specifications.

3.5 GENERAL TESTING REQUIREMENTS

- A. Provide technicians, instrumentation, and tools to perform required testing.
- B. Tests will be performed using design conditions whenever possible.
- C. Simulated conditions may need to be imposed using an artificial load when it is not practical to test under design conditions. Before simulating conditions, calibrate testing instruments. Provide equipment to simulate loads. Set simulated conditions and document simulated conditions and methods of simulation. After tests, return settings to normal operating conditions.
- D. If tests cannot be completed because of a deficiency outside the scope of the Building Assembly system, document the deficiency and report it to the Owner. After deficiencies are resolved, reschedule tests.
- E. If the testing plan indicates specific seasonal testing, complete appropriate initial performance tests and documentation and schedule seasonal tests.

3.6 BUILDING ASSEMBLY SYSTEMS, SUBSYSTEMS, AND EQUIPMENT TESTING PROCEDURES

- A. **Equipment Testing and Acceptance Procedures:** Testing requirements are specified in individual Division 4, 7 and 8 sections. Provide submittals, test data, inspector record and certifications to the project team.
- B. **Building Assembly System Testing:** Field testing plans and testing requirements are specified in Divisions 4, 7 and 8.
- C. **Building Assembly System Testing:** Provide technicians, instrumentation, tools and equipment to test performance of designated systems and devices.
- D. The work included in the commissioning process involves a complete and thorough evaluation of the operation and performance of all components, systems and sub-systems. The following equipment and systems shall be evaluated:
 - i. Building Envelope
 - a. Exterior Walls, Windows & Doors
 - b. Louvers and vents
 - c. Grilles and sunscreens
 - ii. Roofing
 - a. Roofing systems, including parapet

b. Roofing openings, including skylights, pipe chases, ducts, etc.

3.7 DEFICIENCIES/NON-CONFORMANCE, COST OF RETESTING, FAILURE DUE TO MANUFACTURER DEFECT

A. Refer to Division 01 Section "Commissioning Requirements" for requirements pertaining to deficiencies/non-conformance, cost of retesting, or failure due to manufacturer defect.

3.8 APPROVAL

A. Refer to Division 01 Section "Commissioning Requirements" for approval procedures.

3.9 DEFERRED TESTING

A. Refer to Division 01 Section "Commissioning Requirements" for requirements pertaining to deferred testing.

3.10 OPERATION AND MAINTENANCE MANUALS

A. The Operation and Maintenance Manuals shall conform to Contract Documents requirements as stated in Division 01.

B. Refer to Division 01 Section "Commissioning Requirements" for the AE and CxA roles in the Operation and Maintenance Manual contribution, review and approval process.

3.11 TRAINING OF OWNER PERSONNEL

A. Refer to Division 01 Section "Commissioning Requirements" and individual specification sections for requirements pertaining to training.

END OF SECTION 01 91 12

SECTION 01 91 13
COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The role of the Commissioning Agent will be to coordinate and administer the commissioning process, as defined herein. The project incorporates a Building Envelope commissioning process as well as requirements for mechanical, electrical, plumbing, and technology systems commissioning.
- B. The General Contractor and his subcontractors (mechanical, plumbing, electrical, technology, building envelope, and associated trade subcontractors) shall be the prime contractor responsible for the installation and placing in service of all mechanical, electrical, plumbing, technology, and building envelope equipment and systems in the building. The Owner's Project Manager and the General Contractor shall assist the Commissioning Agent in implementation of the commissioning plan and in maintaining the schedule of commissioning events. The commissioning process will not be a substitute for any work by the General Contractor, or any Sub-Contractor of the General Contractor, to install or place in service any equipment or system in the building.
- C. The Mechanical, Electrical, Plumbing and Building Envelope Contractors, including all associated subcontractors and equipment manufacturers, shall be fully responsible for installation, start-up, testing, adjusting, and balancing, and verification and performance testing of all MEP and building envelope equipment and systems as required by the project specifications. The Mechanical, Electrical, Plumbing and Building Envelope Contractors, including all associated subcontractors and equipment manufacturers, shall be an active participant in the commissioning process as specified herein, as required, and as directed by the Owner's Project Manager, the Commissioning Agent, and the General Contractor.
- D. The commissioning process shall be a team effort to ensure that all mechanical, electrical, plumbing and building envelope equipment and systems have been completely and properly installed and function together correctly to meet the design intent. The commissioning process shall also document system performance parameters for fine tuning of control sequences and operational procedures. The commissioning process shall coordinate system documentation and installation; equipment start-up; building automation system calibration; testing, adjusting, and balancing; and verification and performance testing.

1.02 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary General Conditions and other Division 01 specification sections, apply to work of this Section.
- B. Divisions: 04 (Masonry), 07 (Thermal and Moisture Protection), 08 (Openings), 21 (Fire Protection), 22 (Plumbing), 23 (HVAC), 26 (Electrical), 27 (Communications) and 28 (Electronic Safety and Security).
- C. Specification sections: 01 91 12 Building Enclosure Commissioning, 21 08 00 Fire Suppression Commissioning, 22 08 00 Plumbing Commissioning, 23 08 00 HVAC Commissioning, 26 08 00 Electrical Commissioning, 27 08 00 Communications Commissioning and 28 08 00 Electronic Safety & Security Commissioning

- D. All related specification sections shall be used in conjunction with this section.

1.03 COMMISSIONING TEAM

- A. A representative of each of the following parties shall be designated as a member of the Commissioning Team:
1. Owner or Owner's Representative.
 2. Commissioning Agent (CxA).
 3. Owner's Project Manager.
 4. General Contractor.
 5. Mechanical (HVAC) Contractor.
 6. Building Automation System (BAS) Subcontractor.
 7. Testing, Adjusting and Balancing (TAB) Subcontractor.
 8. Plumbing Contractor (if different than HVAC Contractor).
 9. Fire Protection Contractor.
 10. Electrical Contractor (including communications and security system contractors)
 11. Building Envelope Contractors.
 12. Other subcontractors and equipment manufacturers as required.
- B. Each representative must attend scheduled meetings, in accordance with the Commissioning Agent's schedule.

1.04 SCOPE OF WORK

- A. The work included in the commissioning process shall involve a complete and thorough evaluation of the operation and performance of all equipment and systems installed under this project. Equipment and systems that shall be evaluated include, but are not limited to, the following:
1. HVAC systems:
 2. Plumbing systems:
 3. Fire protections systems
 4. Electrical systems
 5. Building envelope systems
 6. Roofing Systems
- B. Documentation required from the Mechanical, Electrical, Plumbing and Building Envelope Contractors, as part of the commissioning process shall include as appropriate and applicable:
1. Equipment submittals and shop drawings for CxA review.
 2. Progress and status reports, including deficiencies noted.
 3. Manufacturers' suggested pre-functional checklists for CxA's use in developing pre- functional procedures.
 4. Start-up and testing documentation associated with systems being commissioned including but not limited to the following: duct leakage, pipe pressure, electrical testing, flushing / cleaning, etc.
 5. Performance (sign-off) of pre-functional checklists documentation. Including completed manufacturer start-up reports.
 6. Training agenda and material for CxA's review.
 7. Operation and maintenance (O&M) manuals.
- C. Pre-functional Checklists, Tests, and Startup:

1. Pre-functional checklists (PC) are important to ensure that the equipment and systems are hooked up and operational and that functional performance testing may proceed without unnecessary delays. Each piece of equipment receives full pre-functional checkout by the Contractor. No sampling strategies are used by the contractor. In general, the pre-functional testing for a given system must be successfully completed prior to formal functional performance testing or equipment or subsystems of the given system.
 2. Pre-functional checklists are primarily static inspections and procedures to prepare the equipment or system for initial operation (e.g., oil levels OK, fan belt tension, labels affixed, gages in place, sensor calibration, etc.). However, some pre-functional checklist items entail simple testing of the function of a component, a piece of equipment or system (such as measuring the voltage imbalance on a three-phase pump motor of a chiller system). The word "pre-functional" refers to before functional testing. Pre-functional checklists augment and may be combined with the manufacturer's start-up checklist.
 3. Contractors typically already perform some, if not many, of the pre-functional checklist items the commissioning authority will recommend. This project requires that the procedures be documented in writing by the installing technician where detailed in the project MEP specifications. The CxA does not witness most of the pre-functional check listing, except for testing of larger or more critical pieces of equipment and some spot-checking. It is noted that the checklists generated by the CxA do not take the place of manufacturer or contractor required checklists. The CxA, with assistance as required from the installing contractor, will complete checklists that are generated by the CxA.
- D. Commissioning Tests: Detailed testing shall be performed on all installed equipment and systems to ensure that operation and performance conform to contract documents and the design intent. All functional tests shall be witnessed by The Commissioning Agent. The following testing is required as part of the commissioning process:
1. Verification Functional Tests:
 - a. Verification tests shall be comprised of a full range of checks and tests to determine that all components, equipment, systems, and interfaces between systems operate in accordance with contract documents and the design intent. This shall include all operating modes, interlocks, control responses, and specific responses to abnormal or emergency conditions.
 2. Functional Performance Tests:
 - a. Functional performance tests shall determine that the commissioned systems are operating in accordance with the Contract Documents and the design intent.
- 1.05 ROLES AND RESPONSIBILITIES
- A. All Commissioning Team members shall be involved in the commissioning process. Following is a description of the responsibilities of each party:
1. Owner or Owner's Representative:
 - a. Assign maintenance personnel and schedule them to participate in meetings, training sessions, and inspections.
 2. Commissioning Agent:
 - a. Develop the commissioning plan.
 - b. Review submittals for major equipment being commissioned.

- c. Coordinate and administer the commissioning effort, through organization of all meetings, commissioning tests, demonstrations, and assisting with training events, described in the Contract Documents and in the commissioning plan.
 - d. Verify and spot check that pre-functional checklists and initial start-up has been performed and documented by the responsible mechanical, electrical contractors and their subcontractors.
 - e. Observe equipment and system start-up and testing. Ensure the results are documented (including a summary of deficiencies), and manufacturer / contractor start-up forms are incorporated in the O&M manuals.
 - f. Attend the training sessions.
 - g. Prepare detailed verification and functional performance testing procedure data sheets.
 - h. Conduct verification testing.
 - i. Conduct functional performance testing.
 - j. Re-test if performance deficiencies are found, corrected, and additional testing is requested. Only one retest will be performed. If the issue still remains after the re-test the additional cost to re-test will be incurred by the responsible contractor. See section 3.3 below for further details.
 - k. Review O&M manuals.
 - l. Perform functional performance testing to accommodate seasonal tests and incorporate the results into the commissioning report.
 - m. Prepare the final commissioning report.
 - n. Assemble the final project documentation which shall include the Commissioning report.
 - o. Perform 10 month warranty walkthrough
3. Project Manager:
- a. Assist the Commissioning Agent in establishing the commissioning plan and in maintaining the schedule of commissioning events.
 - b. Attend all commissioning coordination meetings scheduled by the Commissioning Agent.
 - c. Keep the Commissioning Agent apprised of the schedule of work so that the Commissioning Agent can update the commissioning plan as the project progresses.
 - d. Direct General, Mechanical, Electrical, Plumbing, Technology, and Building Envelope Contractors, as required to satisfactorily complete the commissioning process.
4. General Contractor:
- a. Attend all commissioning coordination meetings scheduled by the Commissioning Agent.
 - b. Direct the Mechanical, Electrical, Plumbing, Technology, and Building Envelope Contractors, as required to satisfactorily complete the commissioning process.
 - c. Oversee the installation and placing in service of all building equipment and systems.
 - d. Oversee the performance and documentation of the pre-functional checklists by mechanical, electrical, plumbing, technology, and building envelope contractors, and their subcontractors prior to the beginning of commissioning verification and functional testing of the equipment.
 - e. Respond to issues noted in the Commissioning Agent field and summary reports.
5. Mechanical, Electrical, Plumbing, Fire Protection, and Building Envelope Contractors:
- a. Include cost to complete commissioning requirements for mechanical systems in the contract price.
 - b. Attend commissioning coordination meetings at the discretion of the Commissioning Agent.
 - c. Arrange for various subcontractors and equipment manufacturers to attend commissioning coordination meetings scheduled by the Commissioning Agent, as indicated herein and as required.

- d. Furnish or arrange for all labor, materials, and special tools and equipment required for execution of the commissioning process.
 - e. Include requirements for submittal data, O&M data, training, and commissioning in each purchase order or sub-contract written.
 - f. Ensure cooperation and participation of specialty subcontractors such as sheet-metal, piping, refrigeration, water treatment, BAS/ATC, TAB, etc.
 - g. Ensure participation of major equipment manufacturers in appropriate training and testing activities.
 - h. Coordinate and provide pre-functional checklist documentation per Section 01 91 13 and the Commissioning Plan as developed by the Commissioning Agent.
 - i. Assist the Commissioning Agent in performing all verification and functional performance tests.
 - j. Respond to issues noted in the Commissioning Agent field and summary reports.
 - k. Prepare a preliminary schedule for mechanical system orientation and inspections, O&M manual submission, training sessions, pipe and duct system testing, flushing and cleaning, equipment start-up, etc., and task completion for use by the Commissioning Agent. Update schedule as appropriate throughout the construction period.
 - l. Gather O&M data on all equipment, and assemble in binders as required by the specifications. Submit to Commissioning Agent prior to the completion of construction. O & M manuals are to be issued to the project team within 60 days of the submittals being approved.
 - m. Notify the Project Manager a minimum of 10 working days prior to start-up of each specific piece of equipment and system start-up, so that observation and testing can occur.
 - n. Participate in, and schedule subcontractors and manufacturers to participate in all training sessions as set up by the Commissioning Agent.
6. Testing, Adjusting, and Balancing (TAB) Subcontractor:
- a. Include cost for commissioning requirements in the contract price.
 - b. Attend initial commissioning coordination meeting scheduled by the Commissioning Agent, and other commissioning coordination meetings, as requested.
 - c. Submit the TAB procedures to the Commissioning Agent for review and acceptance.
 - d. Attend a TAB review meeting scheduled by the Commissioning Agent. Be prepared to discuss the procedures that shall be followed in testing, adjusting and balancing the HVAC system.
 - e. At the completion of the TAB work, and submittal of final TAB report, notify the Mechanical Contractor and Project Manager.
 - f. Participate in verification of the TAB report, which will consist of repeating any selected measurement contained in the TAB report where required by the Commissioning Agent for verification or diagnostic purposes.
7. Building Automation System (BAS) Subcontractor:
- a. Include cost for commissioning requirements in the contract price.
 - b. Attend initial Commissioning coordination meeting scheduled by the Commissioning Agent, and other commissioning coordination meetings as requested.
 - c. Review design for controllability with respect to selected manufacturers equipment;
 - 1) Verify proper hardware specification exists for functional performance required by specification and sequence of operation.
 - 2) Verify proper safeties and interlocks are included in design.
 - 3) Verify proper sizing of control valves and actuators based on design pressure drops. Verify control valve ability to control coil properly.
 - 4) Verify proper sizing of control dampers.
 - 5) Verify proper selection of sensor ranges.

- 6) Clarify all questions of operation.
- d. Provide the following information to the Commissioning Agent:
 - 1) Narrative description of each control sequence for each piece of equipment controlled.
 - 2) Diagrams showing all control points, sensor locations, point names, actuators, controllers, etc.
 - 3) A list of all control points, including analog inputs, analog outputs, digital inputs, and digital outputs. Include the values of all parameters for each system point. Provide a separate list for each standalone control unit.
 - 4) Hardware operation and maintenance manuals.
 - 5) Integrate installation and programming schedule with construction and commissioning schedules.
 - 6) Provide thorough training to operating personnel on hardware operations and programming, and the application program for the system.
 - 7) Perform pre-functional checklist of controls on equipment requiring control pre-functional checks.
 - 8) Demonstrate system performance to Commissioning Agent including all modes of system operation (e.g., normal occupied, normal unoccupied, abnormal, emergency).
 - 9) Provide control system technician and instrumentation for use during all system verification and functional performance testing.
 - 10) Provide system modifications as required.
 - 11) Provide support and coordination with TAB Trade on all interfaces between the ATC and TAB scopes of work. Provide all devices, such as portable operator's terminals, for TAB use in completing TAB procedures.
 - 12) Additional trend logs may be required to facilitate the commissioning process.
8. Equipment Suppliers and Miscellaneous Contractors:
 - a. Include cost for commissioning requirements in the contract price.
 - b. Attend initial Commissioning coordination meeting scheduled by the Commissioning Agent, and commissioning coordination meetings as requested.
 - c. Provide appropriate O&M manual section(s).
 - d. Participate in appropriate training sessions as scheduled by the Commissioning Agent.
 - e. Demonstrate performance of equipment as applicable.

1.06 DOCUMENTATION

- A. The Commissioning Agent shall oversee and maintain the development of commissioning documentation. The commissioning documentation shall be kept in three ring binders, and organized by system and sub-system where practical. All pages shall be numbered, and a table of contents page(s) shall be provided. The Commissioning documentation shall include, but not be limited to, the following:
 1. A detailed description of the design intent for the project, listing operating parameters, control sequences, occupancy conditions, etc. (provided by the design engineer).
 2. A complete description of how the HVAC, plumbing, and fire protection systems are intended to operate (provided by the design engineer).
 3. Approved test and balance report for the building being commissioned.
 4. All verification and functional performance test checklists/results, organized by system and sub-system.

PART 2 - PRODUCTS

2.01 SPECIAL TOOLS AND/OR PROPRIETARY TEST EQUIPMENT

- A. Special tools, proprietary test equipment, and software required by any equipment manufacturer for programming and/or start-up, whether specified or not, shall be provided by the manufacturer of the equipment. Manufacturer shall provide the test equipment, demonstrate its use, and assist in the commissioning process as needed.

PART 3 - EXECUTION

3.01 GENERAL

- A. A pre-construction meeting of all Commissioning team members shall be held at a time and place designated by the Owner's Project Manager. The purpose shall be to familiarize all parties with the commissioning process, and to ensure that the responsibilities of each party are clearly understood.
 - 1. Two additional "kick-off" meetings will also be held prior to the commissioning functional testing. The second meeting will "kick-off" the pre-functional checklists, initial start-up, and scheduling. The third "kick-off" meeting will be held to discuss and schedule the functional testing, acceptance, training, and turnover.
 - 2. Additional meetings will be scheduled by the Commissioning Agent as needed to facilitate the commissioning process.
- B. The Mechanical, Electrical, and Plumbing Contractors shall complete all phases of work so the systems can be started, tested, balanced, and commissioning procedures undertaken. This includes the complete installation of all equipment, materials, pipe, duct, wire, insulation, controls, etc., per the contract documents and related directives, clarifications, and change orders.
- C. Commissioning procedures may begin prior to completion of a system and/or sub-systems, and shall be coordinated with the Commissioning Agent. Start of commissioning procedures before system completion does not relieve the Mechanical, Electrical, Plumbing, Technology, and Building Envelope Contractors, from completing those systems as per the contract requirements.

3.02 PARTICIPATION IN ACCEPTANCE PROCEDURES

- A. The Mechanical, Electrical, Plumbing, Technology, and Building Envelope Contractors, shall provide skilled technicians to support startup, testing, and debugging all systems within their respective specification sections and divisions. These same technicians shall be made available as necessary to assist the Commissioning Agent in executing the commissioning program. Work schedules, time required for testing, etc., shall be requested by the Commissioning Agent and coordinated by the Mechanical, Electrical, Plumbing, Technology, and Building Envelope Contractors,
- B. System performance problems and discrepancies may require additional technician time, Commissioning Agent time, reconstruction of systems, and/or replacement of system components. The additional technician time shall be made available for subsequent commissioning periods until the required system performance is obtained.

3.03 DEFICIENCY RESOLUTION

- A. In some systems, maladjustments, misapplied equipment, and deficient performance under varying loads will result in additional work being required to re-commission the systems. This work will be completed

under the direction of the Project Manager, with input from the Commissioning Agent and Design Engineer. All Commissioning Team members will have input and the opportunity to discuss the work and resolve problems.

- B. Corrective work shall be completed in a timely fashion to permit timely completion of the commissioning process. Experimentation to render system performance will be permitted. If the Commissioning Agent deems the experimentation work to be ineffective or untimely as it relates to the commissioning process, the Commissioning Agent will notify the Project Manager indicating the nature of the problem and expected steps to be taken.
- C. The cost for the contractor to retest a prefunctional or functional test, if they are responsible for the deficiency, shall be theirs. If they are not responsible, any cost recovery for retesting costs shall be negotiated with the CM/GC.
- D. For a deficiency identified, not related to any prefunctional checklist or start-up fault, the following shall apply: The CxA will direct the retesting of the equipment once at no "charge" to the CM/GC for their time. However, the CxA's and owner's time for a second retest will be charged to the CM/GC, who may choose to recover costs from the responsible contractor or subcontractor. Before retesting occurs, the CM/GC will inspect the deficiency and respond to the CxA that the issue has been addressed.
- E. The time for the CxA and owner to direct any retesting required because a specific prefunctional checklist or start-up test item, reported to have been successfully completed, but determined during functional testing to be faulty, will be back charged to the CM/GC, who may choose to recover costs from the party responsible for misinformation or deficiency.
- F. The contractor shall respond in writing to the CxA and owner at least as often as commissioning meetings are being scheduled concerning the status of each apparent outstanding discrepancy identified during commissioning. Discussion shall cover explanations of any disagreements and proposals for their resolution.
- G. Any required retesting by any contractor shall not be considered a justified reason for a claim of delay or for a time extension by the CM/GC, contractors or subcontractors.

3.04 SEASONAL COMMISSIONING

- A. Seasonal commissioning pertains to testing close to full load conditions during peak heating and peak cooling seasons, as well as part load conditions in the spring and fall. Initial commissioning shall be done as soon as contract work is completed, regardless of season.
- B. Heating equipment shall be tested during heating season. Cooling equipment shall be tested during cooling season with a normal level of building occupancy. Each contractor and supplier shall be responsible to participate in the initial and the alternate peak season tests of the systems as required in order to demonstrate performance.

3.05 OPERATING AND MAINTENANCE (O&M) TRAINING

- A. Training: Comprehensive training of Owner's maintenance personnel shall be performed by the Mechanical, Electrical, Plumbing, Technology, and Building Envelope Contractors, with assistance and input from the Commissioning Agent, and where appropriate, by subcontractors, and equipment manufacturers.

1. Training shall be on-site and/or at other mutually agreed to places. Training shall begin prior to turnover of building to the Owner, and shall continue for a reasonable period of time after turnover.
 2. It is anticipated that training will be provided in multiple sessions as noted in the project specifications. The quantity of sessions will be clarified in various equipment/systems project specifications.
 3. The training shall include hands-on O & M instruction on the installed equipment and systems to be provided by the various MEP contractors or their representatives. The training shall emphasize operating instructions, and preventive maintenance as described in the operation and maintenance (O&M) manuals. The O & M manuals can be reviewed during the training sessions with the MEP representative in greater detail as desired by the Owner. The training period shall include an onsite inspection, explanation, and review of the MEP systems encompassed by the commissioning process and is to be delivered by the MEP contractors.
 4. Training requirements are partially specified in this specification section, and further specified in other specification sections.
- B. The Mechanical, Electrical, Plumbing, Technology, and Building Envelope Contractors, shall be responsible for organizing, arranging, and delivering this instruction in an efficient and effective manner on a schedule agreeable to the Commissioning Agent and the Owner.
- C. The Mechanical, Electrical, Plumbing, Technology, and Building Envelope Contractors, shall provide, well before substantial completion, a proposed agenda and schedule for training for approval by the Commissioning Agent and the Owner.
- D. Training shall include:
1. Use of the printed installation, operation, and maintenance instruction material included in the O&M Manuals.
 2. Include a review of the written O&M instructions emphasizing safe and proper operating requirements, preventative maintenance, special tools needed and spare parts inventory suggestions. The training shall include review of start-up, operation in all modes possible, shutdown, seasonal changeover and any emergency procedures.
 3. Discuss relevant health and safety issues and concerns.
 4. Discuss warranties and guarantees.
 5. Cover common troubleshooting problems and solutions.
 6. Explain information included in the O&M manuals and the location of all plans and manuals in the facility.
 7. Discuss any peculiarities of equipment installation or operation.
 8. Any classroom sessions provided may include the use of overhead projections, slides, video and audio taped material as required by specifications.
- 3.06 START-UP, PRE-FUNCTIONAL CHECKLISTS AND INITIAL CHECKOUT
- A. The following procedures apply to all equipment to be commissioned, according to Section 1.4, Scope of Work. Some systems that are not comprised so much of actual dynamic machinery may have very simplified PCs and startup.
1. General:
 - a. Pre-functional checklists are important to ensure that the equipment and systems are hooked up and operational. It ensures that functional performance testing (in depth system checkout) may proceed without unnecessary delays. Each piece of equipment receives full pre-functional checkout. No sampling strategies are used. The pre- functional testing for a

given system must be successfully completed prior to formal functional performance testing of equipment or subsystems of the given system.

2. Start-up and Initial Checkout Plan:
 - a. The CxA shall assist the commissioning team members responsible for startup of any equipment in developing detailed start up plans as required for all equipment. The primary role of the CxA in this process is to ensure that there is written documentation that each of the manufacturer recommended procedures have been completed. Parties responsible for pre-functional checklists and startup are identified in the commissioning scoping meeting and the commissioning plan.
 - b. Checklists generated by the CxA are provided to the Contractor for informational purposes.
 - c. The Subcontractor responsible for the purchase of the equipment develops the full start up plan by combining (or adding to) the CxA' s checklists with the manufacturer's detailed start up and checkout procedures from the O&M manual and the normally used field checkout sheets.
 - 1) The full start up plan could consist of something as simple as:
 - a) The CxA's pre-functional checklists.
 - b) The manufacturer's standard written start-up procedures copied from the installation manuals with check boxes by each procedure and a signature block added by hand at the end.
 - c) The manufacturer's normally used field checkout sheets.
 - d. The subcontractor submits the full startup plan to the CxA for review and approval as required in the project specifications.
 - e. The CxA reviews and approves the procedures and the format for documenting them, noting any procedures that need to be added.

3.07 DOCUMENTATION, FUNCTIONAL PERFORMANCE TESTING

- A. Documentation: The CxA shall witness and document the results of all functional performance tests using the specific procedural forms developed for that purpose. Prior to testing, these forms are provided to the Project Manager and to the Subs for informational purposes. The CxA will include the filled out forms in the final commissioning report.
- B. Non-Conformance:
 1. The CxA will record the results of the functional test on the procedure or test form. All deficiencies or non-conformance issues shall be noted and reported to the Project Manager on a standard noncompliance form.
 2. Corrections of minor deficiencies identified may be made during the tests at the discretion of the CxA. In such cases the deficiency and resolution will be documented on the procedure form.
 3. Every effort will be made to expedite the testing process and minimize unnecessary delays, while not compromising the integrity of the procedures. However, the CxA will not be pressured into overlooking deficient work or loosening acceptance criteria to satisfy scheduling or cost issues, unless there is an overriding reason to do so at the request of the Owner.
 4. As tests progress and a deficiency is identified, the CxA will discuss the issue with the executing contractor.
 - a. When there is no dispute on the deficiency and the Sub accepts responsibility to correct it:
 - 1) The CxA documents the deficiency and the Subcontractor's response and intentions and they go on to another test or sequence. Subsequently, the Sub corrects the

- deficiency, notifies the Project Manager and Commissioning Agent that the equipment is ready to be retested. The Commissioning Agent then retests the deficient system/component and documents the results.
- 2) This process is repeated until the discrepancy is appropriately resolved. See section 3.3 above with regards to re-testing more than one time and potential cost overruns.
- b. If there is a dispute about a deficiency, regarding whether it is a deficiency or who is responsible:
- 1) The deficiency shall be documented with the Sub's response and a copy given to the Project Manager.
 - 2) Resolutions are made at the lowest management level possible. Other parties are brought into the discussions as needed. Final interpretive authority is with the A/E. Final acceptance authority is with the Owner.
 - 3) The CxA documents the resolution process.
 - 4) Once the interpretation and resolution have been decided, the appropriate party corrects the deficiency, and notifies the Project Manager and the Commissioning Agent. The Commissioning Agent reschedules the test and the test is repeated until satisfactory performance is achieved.
5. The Contractor shall respond in writing to the Commissioning Agent and Project Manager at least as often as commissioning meetings are being scheduled concerning the status of each apparent outstanding discrepancy identified during commissioning. Discussion shall cover explanations of any disagreements, proposals for their resolution, and current status of completion.
6. The Commissioning Agent retains the original discrepancy documentation until the end of the project.

END OF SECTION 01 91 13

SECTION 02 28 20
ASBESTOS REMEDIATION

PART I - GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.
- B. Examine all other Sections of the Specifications for requirements that affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 RELATED WORK UNDER OTHER SECTIONS

- A. Environmental Procedures

1.3 DESCRIPTION OF WORK:


- A. The work includes the complete removal and disposal of all asbestos containing materials (ACM) as indicated in Part 3 of this Section.
- B. The C.M at Risk Contractor shall retain the services of a New Hampshire licensed Asbestos Contractor to perform all required services. The Asbestos Contractor shall include in his scope of work all required services included in Part 3.

1.4 POTENTIAL ASBESTOS HAZARD & DEBRIS

- A. In the performance of the work, workers, supervisory personnel, subcontractors, or consultants may encounter, disturb, or otherwise function in the immediate vicinity of any identified ACM they must take appropriate continuous measures as necessary to protect all building occupants from the potential hazard of exposure to airborne asbestos. Such measures shall include the procedures and methods described herein, and compliance with regulations of applicable federal, state and local agencies.
- B. If the Asbestos Contractor fails to comply with the requirements of the specifications, the Industrial Hygienist may present a written stop of work order. The Asbestos Contractor must immediately and automatically stop all work until authorized in writing by the Industrial Hygienist to commence work. All costs related to delays shall be at the Asbestos Contractor's expense.

1.5 DEFINITIONS

- A. Abatement: Procedures to control fiber release from ACM. Includes encapsulation, enclosure, and removal.

- B. Air Monitoring: The process of measuring the fiber content of a specific volume of air in a stated period of time.
- C. Asbestos: The name given to a number of naturally occurring hydrated mineral silicates that possess a unique crystalline structure are incombustible and are separable into fibers. Asbestos includes Chrysotile, Crocidolite, Amosite, Anthophyllite, and Actinolite.
- D. ACM: Any material containing more than 1% or greater by weight of asbestos of any type or mixture of types. State laws may vary in their definition of asbestos containing material.
- E. Critical Barrier: A solid, asbestos impermeable partition erected so as to constitute a work area closure; the outer perimeter of an asbestos work area, usually erected across corridors or other open spaces to complete containment.
- F. Designer: State of New Hampshire licensed Designer Ammar Dieb, Universal Environmental Consultants (AD-000374)

- G. Enclosure: All herein specified procedures necessary to complete enclosure of all ACM behind airtight, impermeable, permanent barriers.
- H. Friable Asbestos Material: Material that contains more than one percent asbestos by weight and that can be crumbled, pulverized, or reduced to powder by hand pressure when dry.
- I. HEPA Filter: A High Efficiency Particulate Absolute (HEPA) filter capable of trapping and retaining 99.97% of asbestos fibers greater than 0.3 microns in length.
- J. Industrial Hygienist: An industrial hygienist certified in the State of New Hampshire to perform project monitoring and air sampling.
- K. Removal: All herein specified procedures necessary to strip all ACM from the designated areas and to dispose of these materials at an acceptable site.
- L. Respirator: A device designed to protect the wearer from the inhalation of harmful atmospheres.
- M. Visible Emissions: Any emissions containing particulate asbestos material that are visually detectable without the aid of instruments. This does not include condensed uncombined water vapor.
- N. Wet Cleaning: The process of eliminating asbestos contamination from building surfaces and objects by using cloths, mops, or other cleaning tools which have been dampened with water, and by afterwards disposing of these cleaning tools as asbestos contaminated waste.
- O. Work Area: Any area indicated on the Drawings as asbestos abatement areas or as areas containing friable asbestos material.
- P. Worker Decontamination Enclosure System: A decontamination enclosure system for workers, typically consisting of a clean room, a shower room, and an equipment room.

1.6 ASBESTOS CONTRACTOR USE OF PREMISES

- A. Do not unreasonably encumber the site with materials or equipment. Confine stockpiling of materials and location of storage sheds to the areas indicated. If additional storage is necessary, obtain and pay for such storage off site.

1.7 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

- A. Provide a full time Site Supervisor with all appropriate state licenses, experienced in administration and supervision of asbestos abatement projects including Work practices, protective measures for building and personnel, disposal procedures, etc. This person is the Competent Person as required by 29CFR 1926 for the Asbestos Contractor and is the Asbestos Contractor's representative responsible for compliance with all applicable federal, state and local regulations. This person must have completed a course at an EPA Training Center or equivalent certificate course in asbestos abatement procedures, have had a minimum of two years on the job training and meet any additional requirements set forth in 29 CFR 1926 for a Competent Person. The Site Supervisor must be certified by the State of New Hampshire.
- B. Asbestos Contractor shall provide proof of such certification to the Designer not less than 10 working days (Document Submission Date) prior to commencing any Work. The accredited Supervisor must be at the Work site at all times while Work is in progress.

1.8 SPECIAL REPORTS

- A. Except as otherwise indicated, submit special reports directly to the Industrial Hygienist within one day of occurrence requiring special report, with copies to all others affected by the occurrence.
- B. When an event of unusual and significant nature occurs at the site (examples: failure of negative pressure system, rupture of temporary enclosures, unauthorized entry into work areas), prepare and submit a special report listing date and time of event, chain of events, response by Contractor's personnel, evaluation of results, and similar pertinent information. When such events are known or predictable in advance, advise the Industrial Hygienist in advance at earliest possible date.
- C. Prepare and submit special reports of significant accidents, at the site and anywhere else work is in progress related to this project. Record and document data and actions; comply with industry standards. For this purpose, a significant accident is defined to include events where personal injury is sustained, or property loss of substance is sustained, or where the event posed a significant threat of loss.

1.9 NOTIFICATIONS

- A. Secure all permits related to asbestos removal, hauling, and disposition and provide timely notification as may be required by federal, state and local authorities including the Health department. Notify the Regional Office of the United States Environmental Protection Agency (USEPA) in accordance with 40 CFR 61.22 (d) (1) and provide copies of the notification to the Designer and the State Environmental Regulatory Agency not later than the Document Submission Date.

- B. No later than the Document Submission Date, notify the local fire and police department, in writing, of proposed asbestos abatement Work. Advise the fire department of the nature of the asbestos abatement Work, and the necessity that all firefighting personnel who may enter the Work site in the case of fire wear self-contained breathing apparatus. Provide one copy of the notices to the Designer prior to commencing the project.
- C. Submit proof to the Designer that all required permits, site location, and arrangements for transport and disposal of ACM have been obtained.

1.10 PERMIT AND COMPLIANCE

- A. The Asbestos Contractor shall assume full responsibility and liability for compliance with all applicable Federal, State, and local laws, rules, and regulations pertaining to Work practices, protection of Workers, authorized visitors to the site, persons, and property adjacent to the Work.
- B. The Asbestos Contractor shall submit to the Industrial Hygienist the plan for managing the waste including all collection, storage, disposal and decontamination practices/waste disposal.
- C. The Asbestos Contractor must maintain current certificates of training, licenses or registrations pursuant to federal and state regulations for all Work related to this Project, including the removal, handling, transport, and disposal of hazardous and industrial waste.

1.11 SAFETY COMPLIANCE

- A. Comply with laws, ordinances, rules, and regulations of federal, state, regional, and local authorities regarding handling, storing, transporting, and disposing of asbestos waste materials.
- B. Comply with the applicable requirements of the current issue of 29CFR 1926.1101 and 40CFR 61, Subparts A and B.

1.12 PERSONNEL PROTECTION

- A. Prior to commencement of work, workers shall be instructed in and shall be knowledgeable of the hazards of asbestos exposure; use and fitting of respirators; use of showers; entry and exit from work areas, and all aspects of work procedures and protective measures.
- B. All abatement workers shall receive training and shall be accredited as required by 40 CFR 763.90(g). Training and accreditation shall be in accordance with 40 CFR 763, Appendix C to Subpart E. Training shall also be provided to meet the requirements of OSHA Regulations contained in 29 CFR 1926.
- C. Prior to the start of work, the Asbestos Contractor shall provide medical examinations for all employees in accordance with 29CFR 1926.1101 (m). All employees hired by the Asbestos Contractor after start of work shall have medical examinations in accordance with this paragraph before being put to work.

- D. Maintain complete and accurate records of employee's medical examinations, during employment and make records of the required medical examinations available for inspection and copying to: The Assistant Secretary of OSHA, the Director of The National Institute for Occupation Safety and Health (NIOSH), authorized representatives of either of them, and an employee's physician upon the request of the employee or former employee.
- E. Provide personnel exposed to airborne concentrations of asbestos fibers with fire retardant disposable protective whole body clothing, head coverings, gloves, and foot coverings. Provide gloves to protect hands. Make sleeves secure at the wrists and make foot coverings secure at the ankles by the use of tape. Asbestos Contractor shall require and monitor the use of complete protective clothing. A competent person designated by the Asbestos Contractor in accordance with 29CFR 1926.1101 shall periodically examine protective clothing worn by employees in the work area for rips or tears. When rips or tears are detected, they shall be immediately mended or replaced.
- F. Provide goggles to personnel engaged in asbestos operations when the use of a full-face respirator is not required.
- G. Provide all persons with personally issued and marked respiratory equipment approved by NIOSH and OSHA. The appropriate respiratory protection shall be selected according to the most recent New Hampshire regulations.
- H. Once all visible asbestos material has been removed during decontamination, cartridge type respirators will be allowed during the final cleanup provided the measured airborne concentrations do not exceed 0.1 fibers per cubic centimeter. Where respirators with disposable filters are employed, provide sufficient filters for replacement as required by the worker or applicable regulation.
- I. Select respirators from those approved by the Mine Safety and Health Administration (MSHA), the National Institute for Occupational Safety and Health (NIOSH), Department of Health and Human Services. All personal wearing negative pressure respirators shall have respirator fit tests within the last six months and signed statements shall be available.

1.13 CODES AND REGULATIONS

- A. Except to the extent that more explicit or more stringent requirements are written directly into the contract documents, all applicable codes, regulations, and standards have the same force and effect (and are made a part of the contract documents by reference) as if copied directly into the contract documents, or as if published copies are bound herewith.
- B. The Asbestos Contractor shall assume full responsibility and liability for the compliance with all applicable federal, state, and local regulations pertaining to work practices, hauling, disposal, and protection of Workers, visitors to the site, and persons occupying areas adjacent to the site. The Asbestos Contractor is responsible for providing medical examinations and maintaining medical records or personnel as required by the applicable federal, state, and local regulations. The Asbestos Contractor shall hold the Owner, Designer for failure to comply with any applicable Work, hauling, disposal, safety, health or other regulation on the part of himself, his employees, or his subcontractors.

1.14 REFERENCE STANDARDS

- A. Unless otherwise indicated, all referenced standards shall be the latest edition available at the time of bidding. Requirements of this Section shall in no way invalidate the minimum requirements of the referenced standards. Comply with the provisions of the following codes and standards, except as otherwise shown or specified. Where conflict among requirements or with this Section exists, the more stringent requirements shall apply.
- B. U.S. Department of Labor, Occupational Safety and Health Administration, (OSHA) requirements, which govern asbestos abatement work or hauling and disposal of asbestos waste materials.
- C. EPA requirements, which govern asbestos abatement work or hauling and disposal of asbestos waste materials.
- D. New Hampshire Department of Environmental Services (DES)
- E. Regulations for Hazardous Waste Management.

1.15 SUBMITTALS

- A. The Asbestos Contractor must submit one emailed copy of a completed submittal to the Designer no later than the Document Submission Date. No Work can commence until all submittals have been approved. The Asbestos Contractor will be required to provide updates as needed.
- B. Submit all required licenses and certification required under MGLC.149 S 44D and 453 CMR 6.00.
- C. Submit a copy of the written respirator program.
- D. Submit manufacturer's certification that vacuums, ventilation equipment, and other equipment required to contain airborne asbestos fibers conform to ANSI Z9.2. Manufacturer's brochures without certifications are not acceptable.
- E. Submit a detailed plan of the Work procedures to be used in the removal of materials containing asbestos. Such plan shall include location of asbestos control areas, decontamination units, layout of decontamination units, location of access routes to asbestos control areas, interface of trades involved in the construction, sequencing of asbestos related Work, disposal plan, type of wetting agent and asbestos sealer to be used, air monitoring, and a detailed description of the method to be employed in order to control pollution.
- F. Submit a plan for emergency actions.

- G. Submit the name, address, and telephone number of the testing laboratory selected for the personal air monitoring of airborne concentrations of asbestos fibers to meet Federal and State OSHA regulations, including Short Term Exposure Limit sampling (STEL). The laboratory must have satisfactorily completed the NIST Proficiency Analytical Testing (PAT) Program and be licensed by the appropriate state agency. Submit the certification that persons counting the samples have been judged proficient by successful completion of the NIOSH 582 course (or equivalent) or be listed in the AIHA Asbestos Analysts Registry (AAR). All OSHA required air monitoring should be done in accordance with the most current NIOSH 7400 method.
- H. Submit the design of the negative pressure system.
 - 1. Number of negative air machines required and the calculations necessary to determine the number of machines.
 - 2. Description of projected airflow within the Work area and methods required providing adequate airflow in all portions of the Work area.
 - 3. Manufacturer's product data and certifications for the machines to be used.
 - 4. Location of machines in the Work area.
 - 5. Location of pressure differential measurement equipment.
 - 6. Manufacturer's product data on equipment used to monitor pressure differential.
- I. Submit for approval the form of security and safety log, which will be maintained on the project.
- J. Submit written evidence that the landfill to be used for disposal of asbestos is approved for disposal of asbestos by the DES.
- K. Submit proof that training requirements as specified in 29CFR 1926.1101 (k) (3) and by appropriate state agencies has been complied with.
- L. Submit a description of the plans for construction of decontamination enclosure systems and for isolation of the Work areas in compliance with this specification and applicable regulations.
- M. Submit a schedule including Work dates, shift time, number of employees, dates of start and completion of all Work, asbestos abatement, inspection and clearance monitoring, each phase of refinishing, and final inspections). Schedule shall be updated with each partial payment request.
- N. Submit copies of all notifications.
- O. Submit copy of asbestos license.
- P. Submit written evidence that the landfill to be used for disposal of asbestos is approved for disposal of asbestos by the DES and EPA.
- Q. Submit Health and Safety Plan per the requirements of OSHA and other applicable regulations.
- R. Submit once work is complete, all disposal waste shipment records and related documents, closure report for ACM.

1.16 REPORTING

- A. Maintain on site a daily log documenting the dates and time of the following items, as well as other significant events:
 - 1. Minutes of meetings: purpose, attendees, and brief discussion
 - 2. Visitations: authorized and unauthorized
 - 3. Personnel: by name, entering and leaving the Work area
 - 4. Special or unusual events
- B. Documentation with confirmation signature of Industrial Hygienist of the following:
 - 1. Inspection of Work area preparation prior to start of removal and daily thereafter.
 - 2. Removal of waste materials from Work area and transport and disposal at approved site.
- C. Provide two bound copies of this log to the Designer prior to submission of the application for final payment.

1.17 AIR MONITORING

- A. Throughout the entire removal and cleaning operations, air monitoring will be conducted to ensure that the Asbestos Contractor is complying with the EPA and OSHA regulations and any applicable state and local government regulations. The architect will provide an Industrial Hygienist (Universal Environmental Consultants) to take air samples at the job site at no cost to the Asbestos Contractor.
- B. The purpose of the air monitoring will be to detect faults in the Work area isolation such as:
 - 1. Contamination of the building outside of the Work area with airborne asbestos fibers,
 - 2. Failure of filtration or rupture in the negative pressure system,
 - 3. Contamination of the exterior of the building with airborne asbestos fibers.
 - 4. Should any of the above occur the Asbestos Contractor should immediately cease asbestos activities until the fault is corrected! Work shall not recommence until authorized by the Designer.

1.18 AIRBORNE FIBER COUNTS

- A. If any air sample taken outside of the work area exceeds the base line established below, immediately and automatically stop all work. If this air sample was taken inside the building and outside of critical barriers around the work area, immediately erect new critical barriers to isolate the affected area from the balance of the building. Erect Critical Barriers at the next existing structural isolation of the involved space (e.g. wall, ceiling, and floor).
 - 1. Decontaminate the affected area in accordance with the procedures outlined in DECONTAMINATION OF WORK AREA.
 - 2. Respiratory protection shall be worn in affected area.
 - 3. Leave critical barriers in place until completion of work and ensure that the operation of the negative pressure system in the work area results in a flow of air from the balance of the building into the affected area.
 - 4. After certification of visual inspection in the work area, remove critical barriers separating the work area from the affected area. Final air samples will be taken within the entire area as set forth in WORK AREA CLEARANCE.

5. A final inspection after removal of poly shall be completed by the Asbestos Contractor's Supervisor and the Industrial Hygienist.
- B. The following procedure will be used to resolve any disputes regarding fiber types when a project has been stopped due to excessive airborne fiber counts. "Airborne Fibers" referred to above include all fibers regardless of composition as counted in the NIOSH 7400 Procedure. If work has stopped due to high airborne fiber counts, air samples will be secured in the same area by the Industrial Hygienist for analysis by electron microscopy. "Airborne Fibers" counted in samples analyzed by Scanning or Transmission Electron microscopy shall be only asbestos fibers, but of any diameter and length. Subsequent to analysis by electron microscopy the number of "Airborne Fibers" shall be determined by multiplying the number of fibers, regardless of composition, counted by the NIOSH 7400 procedure by a number equal to asbestos fibers counted divided by all fibers counted in the electron microscopy analysis.
- C. If Electron microscopy is used to arrive at the basis for determining "Airborne Fiber" counts in accordance with the above paragraph, and if the average of airborne asbestos fibers in all samples taken outside the work area exceeds the base line, then the cost of such analysis will be borne by the Asbestos Contractor, at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Plastic Sheet: 9-mil minimum thickness, unless otherwise specified, in sizes to minimize the frequency of joints.
- B. Tape: Capable of sealing joints of adjacent sheets of plastic and for attachment of plastic sheet to finished or unfinished surfaces of dissimilar materials and capable of adhering under dry and wet conditions, including use of amended water. Provide tape, which minimizes damage to surface, finishes.
- C. Cleaning Materials: Use materials recommended by manufacturer of surface to be cleaned. Use cleaning materials only on surfaces recommended by the cleaning material manufacturer.
- D. Impermeable Containers: Suitable to receive and retain any asbestos containing or contaminated materials until disposal at an approved site. Containers must be both air and watertight.
- E. Provide metal or fiber drums with tightly fitting lids and double thickness 6 mil plastic bags capable of being sealed, and sized to fit within the drums.

2.02 EQUIPMENT

- A. Supply the required number of asbestos air filtration units to the site in accordance with these specifications. Each unit shall include the following:

1. Cabinet: Constructed of steel or other durable materials able to withstand damage from rough handling and transportation. Cabinet shall be factory sealed to prevent asbestos containing dust from being released during use, transport, or maintenance. Access to and replacement of all air filters shall be from intake end. Unit shall be mounted on casters or wheels.
2. Fans: Rate capacity of fan according to useable air moving capacity under actual operating conditions. Use centrifugal type fan.
3. HEPA Filters: The final filter shall be the HEPA type. The filter media (folded into closely pleated panels) must be completely sealed on all edges with a structurally rigid frame. A continuous rubber gasket shall be located between the filter and the filter housing to form a tight seal.
4. Each filter shall be individually tested and certified by the manufacturer to have an efficiency of not less than 99.97 percent when challenged with 0.3 μ m dioctylphthalate (DOP) particles. Testing shall be in accordance with Military Standard Number 282 and Army Instruction Manual I36-300-I75A. Each filter shall bear a UL 586 label to indicate ability to perform under specified conditions. Each filter shall be marked with the name of the manufacturer, serial number, airflow rating, efficiency and resistance.
5. Prefilters: Prefilters, which protect the final filter by removing the larger particles, are required to prolong the operating life of the HEPA filter. Two stages of prefiltration are required. The first stage prefilter shall be a low efficiency type (e.g., for particles 10 μ m and larger). The second stage (or intermediate) filter shall have a medium efficiency (e.g., effective for particles down to 5 μ m). Prefilters and intermediate filters shall be installed either on or in the intake grid of the unit and held in place with special housings or clamps.
6. Instrumentation: Each unit shall be equipped with a Magnehelic gauge or manometer to measure the pressure drop across filters and indicate when filters have become loaded and need to be changed. A table indicating the useable air handling capacity for various static pressure readings on the Magnehelic gauge shall be affixed near the gauge for reference, or the Magnehelic reading indicating at what point the filters should be changed, noting Cubic Feet per Minute (CFM) air delivery at that point. Provide units equipped with an elapsed time meter to show the total accumulated hours of operation.
7. Safety and Warning Devices: The unit shall have an electrical (or mechanical) lockout to prevent fan from operating without a HEPA filter. Units shall be equipped with automatic shutdown system to stop fan in the event of a major rupture in the HEPA filter or blocked air discharge. Indicator lights are required to indicate normal operation, too high a pressure drop across the filters (i.e., filter overloading), and too low of a pressure drop (i.e., major rupture in HEPA filter or obstructed discharge).
8. Electrical Components: Provide electrical components, which are approved by the National Electrical Manufacturers Association (NEMA), and Underwriter's Laboratories (UL). Each unit shall be equipped with overload protection sized for the equipment. The motor, fan, fan housing, and cabinet shall be grounded.

2.03 DANGER SIGNS AND LABELS

- A. Display danger signs at each location where airborne concentrations of asbestos fibers may be in excess of 0.01 fibers/cc. Post signs at such a distance from such a location so that an employee may read the signs and take necessary protective steps before entering the area marked by the signs.

- B. The sign shall also contain a pictorial representation of possible danger or hazard, such as a skull and cross bone, or other suitable warning as approved by the Industrial Hygienist. Sign shall meet the requirements of 29CFR 1926.200. A sample of the signs to be used shall be submitted to the Industrial Hygienist for approval prior to beginning work area preparation.
- C. Affix danger labels to all raw materials, mixtures, scrap, waste, debris, and other products containing asbestos fibers, or to their containers.

2.04 PERSONNEL DECONTAMINATION UNIT

- A. Prior to any asbestos abatement work, including placement of plastic on walls that will contact or disturb asbestos containing surfaces, or removal of light fixtures or any items on asbestos containing surfaces, construct a Personnel Decontamination Unit consisting of a serial arrangement of connected rooms or spaces, Changing Room, Shower Room, and Equipment Room.
- B. Build suitable framing or use existing rooms, with the Industrial Hygienist written approval, connected with framed in tunnels if necessary; line with 6 mil plastic; seal with tape at all lap joints in the plastic for all enclosures and decontamination enclosure system rooms. Decontamination units and access tunnels constructed outside shall be constructed with tops made of 5/8" plywood, or approved equal. In all cases, access between contaminated and uncontaminated rooms or areas shall be through an airlock. In all cases, access between any two rooms within the decontamination enclosure systems shall be through a curtained doorway.
- C. Provide a changing (clean) room for the purpose of changing into protective clothing. Construct using polyethylene sheeting, at least 6-mil in thickness, to provide an airtight seal between the Clean Room and the rest of the building. Locate so that access to work area from Clean Room is through Shower Room. Separate Clean Room from the building by a sheet polyethylene flapped doorway.
- D. Require workers to remove all street clothes in this room, dress in clean disposable coveralls, and don respiratory protection equipment. Do not allow asbestos contaminated items to enter this room. Require workers to enter this room either from outside the structure dressed in street clothes, or naked from the showers.
- E. An existing room may be utilized as the changing room if it is suitably located and of a configuration whereby workmen may enter the Clean Room directly from the Shower Room. Protect all surfaces of room with sheet plastic. Authorization for this shall be obtained from the Industrial Hygienist in writing prior to start of construction.
 - 1. Maintain floor of changing room dry and clean at all times. Do not allow overflow water from shower to wet floor in Changing Room.
 - 2. Damp wipe all surfaces twice after each shift change with a disinfectant solution.
 - 3. Provide a continuously adequate supply of disposable bath towels.
 - 4. Provide posted information for all emergency phone numbers and procedures.
 - 5. Provide 1 storage locker per employee.
 - 6. Provide all other components indicated on the Contract drawings.
- F. Provide a completely water tight operational shower to be used for transit by cleanly dressed workers heading for the work area from the changing room, or for showering by workers headed out of the Work Area after undressing in the Equipment Room.

- G. Construct room by providing a shower pan and 2 shower walls in a configuration that will cause water running down walls to drip into pan. Install a freely draining wooden floor in shower pan at elevation of top of pan.
 - 1. Separate this room from the rest of the building with airtight walls fabricated of 6-mil polyethylene.
 - 2. Separate this room from the Clean and Equipment Rooms with airtight walls fabricated of 6-mil polyethylene.
 - 3. Provide showerhead and controls.
 - 4. Provide temporary extensions of existing hot and cold water and drainage, as necessary for a complete and operable shower.
 - 5. Provide a soap dish and a continuously adequate supply of soap and maintain in sanitary condition.
 - 6. Arrange so that water from showering does not splash into the Clean or Equipment Rooms.
 - 7. Arrange water shut off and drain pump operation controls so that a single individual can shower without assistance from either inside or outside of the work area.
 - 8. Provide flexible hose shower head.
 - 9. Pump wastewater to drain and provide 20 micron and 5-micron wastewater filters in line to drain or waste water storage. Locate filter hose inside shower unit so that water lost during filter changes is caught by shower pan and pumped to exterior filtering system.
- H. Provide equipment room for contaminated area; work equipment, footwear and additional contaminated work clothing are to be left here. This is a change and transit area for workers. Separate this room from the work area by a 6-mil polyethylene flap doorway.
 - 1. Separate this room from the rest of the building with airtight walls fabricated of 6-mil polyethylene.
 - 2. Separate this room from the Shower Room and work area with airtight walls fabricated of 6-mil polyethylene.
- I. Separate work area from the equipment Room by polyethylene barriers. If the airborne asbestos level in the work area is expected to be high, add an intermediate cleaning space between the Equipment room and the work area. Damp wipe clean all surfaces after each shift change.

2.05 EQUIPMENT DECONTAMINATION UNITS

- A. In areas with only one access, it may be impossible to utilize a separate Equipment Decontamination Unit. In this case, all equipment and waste materials will exit through the Personnel Decontamination Chambers.
- B. When two accesses to the work area are available, provide an Equipment Decontamination Unit consisting of a serial arrangement of rooms, Clean Room, Holding Room, Wash Room for removal of equipment and material from work area. Do not allow personnel to enter or exit work area through Equipment Decontamination Unit.
- C. Provide an enclosed shower unit located in work area just outside Wash Room as an equipment, bag and container cleaning station.

- D. Provide Wash Room for cleaning of bagged or containered asbestos containing waste materials passed from the work area. Construct Wash Room of 2 by 4 inch (minimum) wood framing and polyethylene sheeting, at least 6-mil in thickness and located so that packaged materials, after being wiped clean can be passed to the Holding Room. Separate this room from the work area by flaps of 6-mil polyethylene sheeting, or rigid self-closing doors.
- E. Provide Holding Room as a drop location for bagged ACM passed from the Wash Room. Construct Holding Room of 2 by 4 inch (minimum) wood framing and polyethylene sheeting, at least 6-mil in thickness and located so that bagged materials cannot be passed from the Wash Room through the Holding Room to the Clean Room.
- F. Provide Clean Room to isolate the Holding Room from the building exterior. Construct Clean Room of 2 by 4 inch (minimum) wood framing and polyethylene sheeting, at least 6-mil in thickness and locate to provide access to the Holding Room from the building exterior. Separate this room from the exterior by flaps of 6 mil polyethylene sheeting, or rigid self-closing doors.

2.06 DANGER SIGNS AND LABELS

- A. Provide and display danger signs at each location where airborne concentrations of asbestos fibers may be in excess of 0.01 fibers/cc. Post signs at such a distance from such a location so that an employee may read the signs and take necessary protective steps before entering the area marked by the signs. Post signs at all approaches to Work areas or areas containing excessive concentrations of airborne asbestos fibers.
- B. The sign shall also contain a pictorial representation of possible danger or hazard, such as a skull and cross bone, or other suitable warning as approved by the Designer. Sign shall meet the requirements of 29CFR 1926.1101 (k) (7).
- C. A sample of the signs to be used shall be submitted to the Designer for approval prior to beginning Work area preparation.

PART 3 - EXECUTION

3.01 SCOPE OF WORK:

It is anticipated that the asbestos abatement project will be performed in several phases. It is the Asbestos Contractor's responsibility to comply with the phasing schedule prepared by the Architect and shall comply with the commencement and completion dates allocated. Changing, decreasing and increasing of phases, size, location and scope of work shall not constitute compensation by the Owner or any of his representatives.

The project monitor(s) will record on a daily basis all quantities removed. The Asbestos Contractor will be required to do the same. Both the Asbestos Contractor and the monitor must sign all daily logs. No work will continue until all logs are signed daily to the satisfaction of the Designer and Monitor. At the completion of the total project, should quantities removed were found to be less than the listed below, the Asbestos Contractor will be required to issue a credit to the owner based on unit prices listed in the Unit Price Section or will be paid at the unit prices should quantities removed were found to be greater than the listed below.

Location	Type of ACM	Approximate Quantities
1966 Wing:		
	9"x 9" Vinyl Floor Tiles and Mastic	80,000 SF
	Ceramic Wall Tiles, Glue and Adhesive	36,000 SF
	Ceramic Floor Tiles, Glue and Paper	42,000 SF
	Window Sill	1,200 LF
	Counter Tops	50 Total
	Lab Drying Racks	10 Total
	Lab Hume Hoods	4 Total
	Sinks	35 Total
	Blackboards	131 Total
	Interior Windows	360 Total
	Interior Doors	400 Total
	Light Fixtures, Thermostats; etc.	1,800 Total
Auditorium	Electrical Wires	150 LF
Kitchen Area	Walk-in Freezers	4 Total
Exterior	Old Windows	12 Total
	Old Caulking/Aluminum Trim	Refer to Drawings
CTC Wing:		
	Interior Windows	20 Total
	Interior Doors	45 Total
Site	Transite Pipe	1,000 LF

Specific Notes:

1. It's the Asbestos Contractor's responsibility to inspect the site and confirm condition prior to the submission of his/her bid package. It is also the Asbestos Contractor's responsibility to review the demolition drawings, notes and phasing configurations. The Asbestos Contractor must include in his/her bid the entire scope of work listed above. Means and methods of removal will be at the discretion of the Asbestos Contractor with prior approval by the onsite monitor and designer.
2. Perform all required demolition, disconnection and retain the services of electricians and plumbers if needed to perform the work at no additional cost to the owner.
3. Remove and dispose as ACM of all types/layers of flooring materials, including but not limited to multiple layers of vinyl floor tiles, linoleum, carpet, resilient baseboard, stair treads, transition strips, leveling compound, cementious leveler, paper and mastic under all above items. Removal must be done which leave substrate smooth (in similar condition to that which existed prior to Mastic application). Use of Chemicals will be permitted. Once all mastic has been removed, the Asbestos Contractor shall shot blast the concrete floors. Should wood flooring is present the Asbestos Contractor shall remove the wood flooring. The Asbestos Contractor will be required to disconnect services (gas, water, etc.) and remove and dispose of fixed objects to access to ACM. Should ACM found underneath objects not previously removed, the Asbestos Contractor will be required to perform abatement at no additional cost to the owner for re-mobilization. Quantities listed above are for flooring surfaces. The Asbestos Contractor shall remove all layers at no additional cost to the owner.
4. Remove and dispose as ACM of ceramic wall and floor tiles and related glue. Remove fixed items such as panels to access the ACM.
5. Remove and dispose as ACM of window sills.

6. Remove and dispose as ACM of counter tops.
7. Remove and dispose as ACM of lab drying racks.
8. Remove and dispose as ACM of fume hoods/transite panels.
9. Disconnect, remove and dispose as ACM of sinks.
10. Remove and dispose as ACM of transite chalkboards, blackboards, chalkboard, tack board, marker board, display boards, Cementitious wood fiberboard including frame, wood strapping fasteners and ACM glue daub and metal framed chalkboard found behind the wooden chalkboard.
11. Remove and properly dispose of interior windows, doors and doors with windows including but not limited to windows, doors, glass, glass blocks, transom, caulking and all related attachments. Caulking was found to contain asbestos and assumed to contain >1ppm of PCB's.
12. Remove and dispose as ACM of electrical wires. Retain the services of a licensed electrician to disconnect the wires.
13. Disconnect, remove and properly dispose of the freezers.
14. Remove and properly dispose of all old windows, old caulking /aluminum trim, including but not limited to screens, windows, doors, panels, glass, glass blocks, multiple layer of frames, sash, casings, sills, louvers, unit vents grille, shims, fasteners, anchors, sealant, flashing, etc. Wire-brush all adjacent surfaces to insure the complete removal of caulking. Framing and glazing caulking was found to contain asbestos and found to contain <50ppm of PCB's. Refer to drawings. The Contractor shall perform a thorough inspection to determine scope.
15. Remove and dispose as ACM of transite and ACM insulated pipe and debris that might be found during excavation/demolition. The Site/Demolition Contractor will perform excavation as needed to expose the pipe. The Asbestos Contractor will be required to perform additional excavation (if needed) to remove the ACM.
16. Disconnect, remove and properly dispose of light fixtures. Ballasts assumed to contain PCB's and tubes assumed to contain mercury. Retain the services of a licensed electrician.

3.02 JOB CONDITIONS

- A. Do not commence asbestos abatement work until:
 1. Arrangements have been made for disposal of waste at an acceptable site. Submittal shall be made no later than the Document Submission Date.
 2. Arrangements have been made for containing and disposal of wastewater resulting from wet stripping or filtering through a 5-micron filter.
 3. Pre-clean all areas prior to performing the work.
- B. All materials resulting from abatement work, except as specified otherwise shall become the property of the Asbestos Contractor and shall be disposed of as specified herein.

3.03 INSPECTION AND PREPARATION

- A. Examine the areas and conditions under which asbestos will be abated and notify the Industrial Hygienist in writing of conditions detrimental to the proper and timely completion of the work.
- B. Before any work commences, post danger signs in and around the Work Area to comply with 29CFR 1926.1101 (k) (l) as required by federal and state regulations, and as specified herein.

3.04 WORK PROCEDURE

- A. Perform asbestos related work in accordance with 29CFR 1926.1101 and as specified herein. Use wet removal procedures. Personnel shall wear and utilize protective clothing and equipment as specified herein. Personnel of other trades not engaged in the removal and demolition of asbestos shall not be exposed at any time to airborne concentrations of asbestos unless all the personnel protection provisions of this specification are complied with by the trade personnel. Provide and post, in the Equipment Room and the Clean Room, the decontamination and work procedures to be followed by workers, as described hereinafter.
- B. Each worker and authorized visitor shall, upon entering the job site, remove street clothes in the Clean Change Room and put on a respirator and clean protective clothing before entering the equipment room or the work area. All workers shall remove gross contamination before leaving the work area. All clothing (coveralls, head covers, boots, etc.) shall be removed and properly disposed of before leaving equipment room. With the exception of bathing suites and respirators, the workers shall proceed to the Shower Room. Under the shower, respirators shall be removed and cleaned. Cleaned respirators shall be placed in suitable clean plastic bags and carried by employees to Clean Room. Soap, towels, etc., shall be furnished by the Asbestos Contractor. The Asbestos Contractor shall maintain proper sanitary conditions. The Asbestos Contractor's designated competent person shall insure that these practices are being adhered to.
- C. Following showering and drying off, each worker and authorized visitor shall dispose of towels as contaminated waste, and proceed directly to the Clean Change Room and dress in clean clothes at the end of each day's work, or before eating, smoking, or drinking. Before re-entering the work area from the Clean Change Room, each worker and authorized visitor shall put on the applicable respirator and shall dress in clean protective clothing. Contaminated work footwear shall be stored in the equipment room when not in use in the work area. Upon completion of asbestos abatement, dispose of footwear as contaminated waste.
- D. Contaminated work footwear shall be stored in the equipment room when not in use in the work area. Upon completion of asbestos abatement, dispose of footwear as contaminated waste or double bag for use at next site.
- E. Workers removing waste containers from the Equipment Decontamination Enclosure shall enter the holding area from outside wearing a respirator and dressed in clean coveralls. No worker shall use this system as a means to leave or enter the washroom or the work area.
- F. Workers shall be fully protected with respirators and protective clothing immediately prior to the first disturbance of asbestos containing or contaminated materials and until final cleanup is completed. This includes the removal of any equipment in contact with ACM such as lights, HVAC grills, etc.

3.05 PREPARATION OF THE WORK AREA

- A. Seal off the work area by sealing large openings such as open doors, elevator doors, and passageways with a critical barrier. The critical barrier shall constitute the outermost boundary of the asbestos abatement project work area. Plastic sheeting on open framing is not a suitable critical barrier. Critical barriers may be erected of a suitable solid construction material such as plywood, sheet-rock, gypsum board, or other related materials.
- B. Prior to any asbestos abatement work, clean the proposed work areas using HEPA filtered vacuum equipment and wet cleaning methods as appropriate. Methods that raise dust, such as dry sweeping or vacuuming with equipment not equipped with HEPA filters will not be permitted. Dispose of all cloths, which are used for cleaning as contaminated waste.
- C. Place all tools, scaffolding, staging, etc. necessary for the work in the area to be isolated prior to erection of plastic sheeting temporary enclosure.
- D. Shut down electric power. Provide temporary power and lighting and ensure safe installation of temporary power sources and equipment per applicable electrical code requirements. Provide 24 volt safety lighting and provide ground-fault interrupter circuits as power source for lights and electrical equipment.
- E. Seal off all openings, including but not limited to corridors, doorways, windows, skylights, ducts, grills, diffusers, and any other penetrations of the work areas, with 6-mil plastic sheeting and sealed with tape.
- F. Prior to any abatement activities seal all floor and ceiling openings or penetrations that have not already been sealed. This includes penetrations through ceiling and floor slabs, both empty holes and holes accommodating items such as cables, pipes, ducts, conduit, etc.; and expansion joints in floors and wall and floor slab assemblies.
- G. Use combination fire stop foam and fire stop sealant equivalent to Dow Corning Fire Stop Foam and Dow Corning Fire Stop Sealant. Material shall be applied in accordance with manufacturer's recommendations.
- H. Maintain emergency and fire exits from the work areas, or establish alternative exits satisfactory to the local fire officials. Coordinate work with local fire and police departments, and Industrial Hygienist.
- I. Shut down and isolate heating, cooling, ventilating air systems in the contaminated areas to prevent contamination and fiber dispersal to other areas of the structure. During the work, seal vents within the work area with solid barriers, such as plywood and tape and plastic sheeting, or as indicated on the drawings.
- J. Remove all HVAC system filters. Pack disposable filters in sealable double 6 mil plastic bags for burial in the approved waste disposal site; replace with new filters after final cleanup. Wet clean permanent filters; reinstall after final cleanup.

- K. Before work is begun, clean all items, which can be removed without disrupting the asbestos material. Pre-clean movable furniture, [carpeting, clocks, speakers, books, and other objects] within the proposed areas using HEPA filtered vacuum equipment and/or wet cleaning methods as appropriate; remove such objects from work areas to a temporary location as directed by the Industrial Hygienist.
- L. Pre-clean non-removable furniture, book shelving, equipment, heat fans, fire alarms, pipes, ductwork, wires and conduits, lockers, skylights, speakers, and other fixed objects within the proposed work areas, using HEPA filtered vacuum equipment and wet cleaning methods as appropriate prior to abatement activities, and enclose with minimum 6 mil plastic sheeting sealed with tape.
- M. Remove and clean all ceiling mounted objects, such as lights, HVAC grills, etc. and other items not previously sealed off, that interfere with asbestos abatement. Use localized water spraying or HEPA filtered vacuum equipment during fixture removal to reduce fiber dispersal.

3.06 MAINTENANCE OF ENCLOSURE SYSTEMS

- A. Ensure that barriers and plastic linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately upon discovery. Visually inspect enclosures at the beginning of each work period.
- B. Use smoke methods to test effectiveness of barriers when directed by the Industrial Hygienist.

3.07 CONTROL ACCESS:

- A. Permit access to the work area only through the Decontamination Unit. All other means of access shall be closed off, warning signs displayed on the clean side of the sealed access.
- B. Large openings such as open doorways and passageways shall be sealed as a critical barrier. The critical barrier shall constitute the outmost boundary of the asbestos abatement work area.
- C. Plastic sheeting on open framing is not a suitable critical barrier. All cracks, seams, and openings in critical barriers shall be caulked or otherwise sealed, so as to prevent the movement of asbestos fibers out.

3.08 ISOLATION OF WORK AREA:

- A. Completely separate the work area from other portions of the building, and the outside by sheet plastic barriers at least 6 mil in thickness, or by sealing with duct tape.
- B. Individually seal all ventilation openings (supply and exhaust), lighting fixtures, clocks, doorways, windows, convectors and speakers, and other openings into the work area with duct tape alone or with polyethylene sheeting at least 6-mil in thickness, taped securely in place with duct tape. Maintain seal until all work including work area decontamination is completed. All lighting fixtures shall have had power shut off.

- C. Provide sheet plastic barriers at least 6 mil in thickness as required to completely seal openings from the work area into adjacent areas. Seal the perimeter of all sheet plastic barriers with duct tape.

3.09 COVERING OF FLOOR AND WALL SURFACES

- A. Clean all contaminated furniture, equipment, and or supplies with a HEPA filtered vacuum cleaner or by wet cleaning prior to being moved or covered. All equipment, furniture, etc. in work area is to be deemed contaminated unless specifically declared as uncontaminated on the Drawings or in writing by the Industrial Hygienist. Clean all surfaces in work area with a HEPA filtered vacuum or by wet wiping prior to the installation of any sheet plastic.
- B. Cover floor of work area with 2 individual layers of clear polyethylene sheeting, each at least 6 mil in thickness, turned up walls at least 12 inches. Form sharp right angle-bend at junction of floor and wall so that there is no radius, which could be stepped on causing the wall attachment to be pulled loose. Duct tape all seams in floor covering. Locate seams in top layer six feet from, or at right angles to, seams in bottom layer. Install sheeting so that top layer can be removed independently of bottom layer.
- C. Remove all general construction items such as cabinets, casework, doors and window trim, moldings, ceilings, trim, etc., which cover the surface of the work as required to prevent interference with the work. Clean, decontaminate and reinstall, unless otherwise indicated, all such materials, upon completion of all removal work with materials, finishes, and workmanship to match existing installations before start of work.
- D. Cover all walls in work area with two (2) layers of polyethylene sheeting, at least 6-mil in thickness, mechanically supported and sealed with duct tape. Tape all joints including the joining with the floor covering with duct tape or as otherwise indicated on the Contract documents or in writing by the Industrial Hygienist. There shall be no seams in the plastic sheet at wall to floor joints.
- E. If the enclosure barrier is breached in any manner that could allow the passage of asbestos debris or airborne fibers, then add affected area to the work area, enclose it as required by this section and decontaminate it as specified herein.

3.10 NEGATIVE PRESSURE

- A. Establish negative pressure in the work area by installation of High Efficiency Particulate Air (HEPA) filter air-purifying devices. Comply with ANSI Z9.2, Local Exhaust Ventilation Requirements. Maintain system in operation 24 hours per day until decontamination of the work area is completed and area has been certified clean by air monitoring tests and visual inspections. Discharge of asbestos fibers to the outside of the building will not be permitted.
- B. Size negative air pressure system(s) to provide a minimum of one air change every 15 minutes for the area under negative pressure. Locate the exhaust unit(s) so that makeup air enters the work area primarily through the decontamination unit and traverses the work area as much as possible. The intent is to provide the air change specified in each work area (room), not just the specified negative pressure. Place the end of the unit or its exhaust duct through an opening in the plastic barrier or wall covering. Seal the plastic around the unit or duct with tape.

- C. The system shall maintain an air pressure differential of minus 0.02 inch of water. Test the negative pressure system prior to any abatement actions to insure that the 0.02-inch differential is present. The Industrial Hygienist may require the use of ventilation smoke tubes to check the system performance.

3.11 REMOVAL OF ASBESTOS CONTAINING MATERIALS

- A. Thoroughly wet ACM to be removed prior to stripping to reduce fiber dispersal into the air. Accomplish wetting by a fine spray (mist) of amended water or removal Encapsulant. Saturate material sufficiently to wet to the substrate without causing excess dripping. Allow time for water or removal Encapsulant to penetrate material thoroughly. If a removal Encapsulant is used, apply in strict accordance with manufacturer's written instructions.
- B. Mist work area continuously with amended water whenever necessary to reduce airborne fiber levels.
- C. Remove saturated ACM in small sections from all areas. Do not allow material to dry out. As it is removed, simultaneously pack material while still wet into disposal bags. Twist neck of bags, bend over and seal with minimum three wraps of duct tape. Clean outside and move to wash down station adjacent to material decontamination unit.
- D. For the removal of pipe and joint insulation, the density of asbestos containing pipe covering seldom allows the material to be removed in a completely wet state. However, every attempt should be made to keep the insulation material as wet as possible to prevent release of asbestos fibers.
- E. Cut the cloth covering on the pipe insulation along the top seam to allow wetting of the asbestos insulation. Do not allow the pipe insulation to fall to the ground or adjacent surfaces. Wet the insulation material and immediately place in a double 6 mil, minimum thickness labeled plastic bag.
- F. In certain areas, asbestos pipe insulation will be removed with glove-bags (with prior approval by the Industrial Hygienist).
 - 1. Seal all critical barriers.
 - 2. Pre-clean if necessary and place one layer of polyethylene under the pipe to be removed.
 - 3. Negative air machines with HEPA filtration will be used in the area.
 - 4. Glove bags will be smoke tested.
 - 5. Place necessary tools into pouch located inside glove-bag. This will usually include: bone saw, utility knife, rags, scrub brush, wire cutters, tin snips and pre-wetted cloth.
 - 6. Place one strip of duct tape along the edge of the open top slit of glove-bag for reinforcement.
 - 7. Place the glove bag around section of pipe to be worked on and staple top together through reinforcing duct tape. Next, duct tape the ends of glove-bag to pipe itself, where previously covered with plastic or duct tape.
 - 8. Place additional layers of tape along the top of the glove-bag to seal the staple holes and to securely support the bag on the pipe.
 - 9. Fill each bag with 2 inches of water to thoroughly wet the removed insulation.
 - 10. Attach vacuum hose through port in bag and tape tightly to prevent leakage.
 - 11. Insert spray nozzle into bag and tape tightly to prevent leakage.

12. One person places his hands into the long-sleeved gloves while the second person directs garden sprayer at the work.
13. Use bone saw, if required, to cut insulation at each end of the section to be removed. A bone saw is a serrated heavy gauge wire with ring-type handles at each end. Throughout this process, spray amended water or removal Encapsulant on the cutting area to keep dust to a minimum.
14. Remove insulation using putty knives or other tools. Place pieces in bottom of bag without dropping.
15. Using nylon scrub brush, rags, and water scrub and wipe down the exposed pipe.
16. Wipe down the inside of the bag with the rags. Remove the water nozzle and tape shut.
17. Encapsulate the exposed ends and cover any exposed ends of pipe insulation with the re-wettable clothe. This shall be done prior to removing the bag.
18. Place the cleaned tools either into the next glove bag or put into the glove and pulled out. Twist the glove, tape at least twice and cut through the tape. The tools can be dropped into a bucket of water to clean them.
19. Twist the bag several times and turn on HEPA vacuum to remove the air. Tape the twist several times.
20. Slip a 6-mil disposal bag under the glove-bag and while running the vacuum sufficiently to collapse the bag, cut the glove-bag off.
21. Encapsulate all exposed pipe and elbows to lock down any remaining fibers.
22. Remove disposable suits and place these into bag with waste.
23. Collapse the disposal bag with a HEPA vacuum, twist top of bag, seal with at least 3 wraps of duct tape, bend over and seal again with at least 3 wraps of duct tape.

3.12 DECONTAMINATION OF WORK AREA

- A. Maintain premises and public properties free from accumulation of waste, debris, and rubbish, caused by operations. Remove visible accumulations of asbestos material and debris. Wet clean all surfaces within the work area.
- B. Remove the plastic sheets from walls and floors only. Take proper care in folding up plastic sheeting to minimize dispersal of residual asbestos containing debris.
- C. Leave the windows, doors, and HVAC vents sealed. Maintain HEPA filtered negative air pressure systems, air filtration and decontamination enclosure systems in service.
- D. Remove all debris from floor of work area. This includes all trash, scraps of lumber, pipes, etc. and all visible asbestos debris. The asbestos debris is primarily deteriorated pipe insulation that has fallen to the ground. Dispose of all debris removed as asbestos contaminated waste. HEPA vacuum the entire floor.
- E. Clean all surfaces in the work area and any other contaminated areas with water and with HEPA filtered vacuum equipment. After cleaning the work area, wait 24 hours to allow for settlement of dust, and again wet clean and clean with HEPA filtered vacuum equipment all surfaces in the work area. After completion of the second cleaning operation, perform a complete visual inspection of the work area to ensure that the work area is free of visible asbestos debris. The negative pressure system may be shut down only after clean air has been achieved.
- F. Include sealed drums and all equipment used in the work area in the cleanup and remove from work areas, via the equipment decontamination enclosure system, at an appropriate time in the clean sequence.

- G. Conduct cleaning and disposal operations to comply with applicable ordinances and antipollution laws. Do not burn or bury rubbish and waste materials on job site. Do not dispose of volatile wastes in storm or sanitary drains. Do not dispose of wastes into streams or waterways.
- H. Store volatile wastes in covered metal containers during work hours and remove from premises at end of workday. Prevent accumulation of wastes, which create hazardous conditions. Provide adequate ventilation during use of volatile or noxious substances.
- I. If the Industrial Hygienist, within 24 hours after the second cleaning, finds visible accumulations of asbestos debris in the work area, repeat the wet cleaning until the work area is in compliance, at no additional expense to the Owner.
- J. Remove the first layer of plastic sheet from walls and floors only. Take proper care in folding up plastic sheeting to minimize dispersal of residual asbestos containing debris.
- K. Leave the windows, doors, and HVAC vents sealed. Maintain HEPA filtered negative air pressure systems, air filtration and decontamination enclosure systems in service.
- L. Following the final visual inspection by the IH, after the removal of asbestos-containing materials and decontamination of work areas, and while space enclosures systems remain in place, seal all surfaces from which asbestos-containing material have been removed to assure immobilization of any remaining fibers. Use a colored sealant so that complete coverage may be ensured by a visible inspection by the IH to verify that asbestos-containing material has been adequately removed. Apply sealer in accordance with manufacturer's recommendations using airless spray equipment.
- M. Clearance air samples will be taken by the IH using aggressive air sampling. Analysis will be made using Phase Contrast Microscopy or Transmission Electron Microscopy.
- N. Clean and decontaminate of all access routes used to transport ACM debris.

3.13 WORK AREA CLEARANCE

- A. The work is complete when the work area is visually clean and airborne fiber levels have been reduced to the level specified below. When this has occurred, the Asbestos Contractor will notify the Industrial Hygienist that the area is ready for clearance.
- B. The number and volume of air samples taken and analytical methods used by the Industrial Hygienist will be in accordance with applicable regulations.
- C. The Owner will pay for the initial testing required for clearance. Should the initial testing fail, the Asbestos Contractor will reimburse the Owner for the cost of all additional testing based on \$90.00 per hour for Industrial Hygienist, \$30.00 per each PCM.

3.14 DISPOSAL OF ACM AND ASBESTOS CONTAMINATED WASTE

- A. To prevent exceeding available storage capacity on site, remove sealed and labeled containers of asbestos waste and dispose of such containers at an authorized disposal site in accordance with the requirements of disposal authority.
- B. Comply with 29 CFR 1926.1101.

- C. Seal all asbestos and asbestos contaminated waste material with double thickness 6-mil, sealable plastic bags. Label the bags; transport and dispose of all in accordance with the applicable OSHA and EPA regulations. At the conclusion of the job, place all polyethylene material, tape, cleaning material and clothing in the plastic lined drum. Seal, correctly label, and dispose of as asbestos waste material.
- D. Transport the bags to the approved waste disposal site. Asbestos Contractor shall obtain trip tickets at the landfill to document disposal of asbestos containing materials. A form shall be signed, not initialed, by all parties. Copies of all trip tickets shall be submitted to the Industrial Hygienist.
- E. If a rental vehicle is used to transport asbestos waste, Asbestos Contractor shall provide to the vehicle's owner a written statement as to the intended use of the vehicle. A copy of such notice, signed by the vehicle owner, shall be provided to the Industrial Hygienist prior to transporting materials in the vehicle. Two layers of 6-mil plastic sheet shall be placed on the floor and walls of the rental vehicle prior to loading any containers of asbestos waste.
- F. Consider wastewater from showers and sinks to be contaminated waste and dispose of in accordance with this Section, unless water has been filtered through a 5 micron filter.

3.15 DISPOSAL OF NON-CONTAMINATED WASTE

- A. Remove from the site all non-contaminated debris and rubbish resulting from demolition operations. Transport materials removed from demolished areas and dispose of off site in a legal manner.
- B. During progress of work, clean site and public properties, and dispose of waste materials, debris, and rubbish. Provide on-site containers for collection of waste materials, debris, and rubbish. Remove waste materials, debris, and rubbish from site and legally dispose of at public or private dumping areas off Owner's property.

3.16 FINAL CLEAN UP

- A. Employ experienced workers or professional cleaners for final cleaning. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials, from exposed to view interior and exterior finished surfaces. Polish surfaces so designated.

3.17 ALTERNATE CONTAINMENT SYSTEM

- A. In lieu of the containment system previously described consisting of a decontamination enclosure system utilizing curtained doorway, and a negative air system to exhaust sufficient air to achieve one air change every 15 minutes, the following system will be allowed:

- B. Construct a decontamination unit consisting of a totally enclosed Equipment Room, Shower Room, Air Locks, and Clean Room as described above except that instead of curtained doorways between rooms, doorways shall be solid core rigid wooden or fiberglass doors. Door at entrance into Clean Room from the uncontaminated area shall contain a HEPA filter. This doorway shall have gasketed seals around the HEPA filter and the edges of the door to provide a tight seal. HEPA filter shall be mounted in the door securely using a mechanical fastening system. Each door shall be equipped with a self-closing mechanism.
- C. Negative pressure units as described previously shall be utilized to create a pressure differential of 0.02 inches of water between the work area and the outside uncontaminated area. Only the required air volume to create the negative pressure shall be exhausted through the HEPA filter unit outside the work area. Additional HEPA filter units shall be located within the work area to provide for air circulation.

END OF SECTION

SECTION 024119

DEMOLITION

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.
- B. Examine all other Sections of the Specifications for requirements that affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 DESCRIPTION OF WORK

A. Work Included:

- 1. Demolition and complete removal of buildings, and structures and as required for new work. Refer to the Drawings for additional requirements.
- 2. Removal and legal disposal of demolished materials off site. Except those items specifically designated to be relocated, reused, or turned over to the facility, all existing removed materials, items, trash and debris shall become property of the Contractor and shall be completely removed from the site and legally disposed of at her/his expense. Salvage value belongs to the Contractor. On-site sale of materials is not permitted.
- 3. Maintenance, watering and care of trees designated to remain by a certified arborist during the construction period.
- 4. Demolition and removal work shall properly prepare for alteration work and new construction to be provided under the Contract.
- 5. Scheduling and sequencing operations without interrupt utilities serving occupied areas. If interruption is required, obtain written permission from the utility company and the Owner. Provide temporary services as necessary to serve occupied and usable facilities when permanent utilities must be interrupted, or schedule interruption when the least amount of inconvenience will result.

B. Related Work:

- 1. Section 011400 – WORK RESTRICTIONS:
 - a. Maintenance of access, cleaning during construction, dust and noise control.
- 2. Section 017400 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL:
 - a. Waste management and recycling.
- 3. Division 21 - FIRE PROTECTION:
 - a. Disconnecting, capping and otherwise making inactive existing mechanical services to building. Removal and disposal of such materials shall be then done under this Section 024119 - DEMOLITION.
- 4. Division 22 - PLUMBING:

- a. Disconnecting, capping and otherwise making inactive existing mechanical services to building. Removal and disposal of such materials shall be then done under this Section 024119 - DEMOLITION.
5. Division 23 - HEATING, VENTILATING AND AIR CONDITIONING:
 - a. Disconnecting, capping and otherwise making inactive existing mechanical services to building. Removal and disposal of such materials shall be then done under this Section 024119 - DEMOLITION.
6. Division 26 - ELECTRICAL WORK:
 - a. Disconnecting, capping and otherwise making inactive existing electrical services to building. Removal and disposal of such materials shall be then done under this Section 024119 - DEMOLITION.
7. Section 312000 - EARTH MOVING:
 - a. Excavating and removal of existing pavement, sub-surface building and utility structures and lines, appurtenances, and other elements indicated on the Drawings.
8. Section 311000 SITE CLEARING
9. Section 329300 PLANTS
10. Refer to Boring and Test Pit Reports for additional information relating to subsurface conditions.

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Detach items from existing construction and deliver them to the Owner ready for reuse, at a location designated by the Owner. Protect from weather until accepted by Owner.
- C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated. Protect from weather until reinstallation.
- D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 MATERIALS OWNERSHIP

- A. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques, antiques, and other items of interest or value to Owner that may be encountered during demolition remain property of the Owner as applicable. Carefully remove each item or object in a manner to prevent damage and deliver promptly to a location acceptable to the Owner.

1.5 SUBMITTALS

- A. Schedule of Demolition Activities: Indicate the following:
 1. Detailed sequence of demolition and removal work, with early and late starting and finishing dates for each activity. Ensure Owner's on-site operations are uninterrupted if applicable.
 2. Interruption of utility services. Indicate how long utility services will be interrupted.
 3. Coordination for shutoff, capping, and continuation of utility services.
 4. Means of protection for items to remain and items in path of waste removal from building.

- B. Inventory: After demolition is complete, submit a list of items that have been removed and salvaged, and turned over the Owner.
- C. Predemolition Videotapes: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Comply with Division 01. Submit before Work begins.
- D. Landfill Records: Provide trip tickets (receipts) indicating receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.
 - 1. Comply with submittal requirements in Section 017400 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.

1.6 QUALITY ASSURANCE

- A. Examination of Existing Conditions: The Contractor shall examine the Contract Drawings for demolition and removal requirements and provisions for new work. Verify all existing conditions and dimensions before commencing work. The Contractor shall visit the site and examine the existing conditions as he finds them and shall inform herself/himself of the character, extent and type of demolition and removal work to be performed. Submit any questions regarding the extent and character of the demolition and removal work in the manner and within the time period established for receipt of such questions during the bidding period.
- B. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.
- C. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.
- D. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- E. Standards: Comply with ANSI A10.6 and NFPA 241.
- F. Predemolition Conference: Conduct conference at Project site to comply with requirements in Section 011000 - GENERAL REQUIREMENTS, Project Meetings. Review methods and procedures related to demolition including, but not limited to, the following:
 - 1. Inspect and discuss condition of construction to be demolished.
 - 2. Review structural load limitations of existing structure.
 - 3. Review and finalize demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Review requirements of work performed by other trades that rely on substrates exposed by demolition operations.
 - 5. Review areas where existing construction is to remain and requires protection.

PART 2 - PRODUCTS

2.1 SALVAGING

- A. Salvaged for Reinstallation: Materials designated in the field by the Owner to be salvaged and reinstalled shall be carefully removed and stored at a location acceptable to the Architect and Owner. Materials to be salvaged include, but are not limited to the following:
 - 1. Lockers.
- B. Salvaged for Storage: Materials indicated on the Drawings or designated in the field by the Owner to be salvaged and stored shall be carefully removed and delivered to the Owner at locations determined by Owner. Materials to be salvaged include, but are not limited to the following:
 - 1. TBD.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped.
- B. Survey existing conditions and correlate with requirements indicated to determine extent of demolition required.
- C. Inventory and record the condition of items to be removed and salvaged.
- D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.
- E. Engage a professional engineer registered in the state that the project is located to survey condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during demolition operations.
- F. Survey of Existing Conditions: Record existing conditions by use of preconstruction videotapes.
 - 1. Before demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.
- G. Perform surveys as the Work progresses to detect hazards resulting from demolition activities.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be demolished.
 - 1. Arrange to shut off indicated utilities with utility companies and Owner.

2. If services/systems are required to be removed, relocated, or abandoned, before proceeding with demolition provide temporary services/systems that bypass area of demolition and that maintain continuity of services/systems to other parts of building.
3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing. Where entire wall is to be removed, existing services/systems may be removed with removal of the wall.
4. Prior to commencing cutting work in existing surfaces, take all precautionary measures to assure that mechanical and electrical services to the particular area have been made inactive. Coordinate with Fire Protection, Plumbing, HVAC, and Electrical subcontractors. Only licensed tradesmen of that particular trade shall disconnect and cap existing mechanical and electrical items that are to be removed, abandoned and/or relocated.
5. If, during the process of cutting work, existing utility lines are encountered which are not indicated on the Drawings, regardless of their condition, immediately report such items to the Architect. Do not proceed with work in such areas until instructions are issued by the Architect. Continue work in other areas.

3.3 PREPARATION

- A. Site Access and Temporary Controls: Conduct demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 1. Comply with requirements for access and protection specified in Section 011000 - GENERAL REQUIREMENTS, Temporary Facilities and Controls.
 2. Maintain adequate passage to and from all exits at all times. Before any work is done which significantly alters access or egress patterns, consult with the Architect and obtain approval of code required egress. Under no condition block or interfere with the free flow of people at legally required exits, or in any way alter the required condition of such exits.
- B. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
 1. Strengthen or add new supports when required during progress of demolition.
 2. Remove temporary shoring, bracing and structural supports when no longer required.
 3. Post warning signs and place barricades as applicable during placement and removal of temporary shoring.
- C. Conduct demolition operations to prevent injury to people and damage to adjacent buildings and facilities to remain. Ensure safe passage of people around demolition area(s).
 1. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction. Provide temporary barricades as required to limit access to demolition areas.
 2. Protect existing site improvements, appurtenances, and landscaping to remain.
- D. Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with demolition operations.

3.4 DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction including but not limited to the entire existing building and ancillary buildings including building foundations as indicated on drawings. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Proceed with demolition systematically, from higher to lower level. Complete demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 2. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
 3. Maintain adequate ventilation when using cutting torches.
 4. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 5. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 6. Locate demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 7. Dispose of demolished items and materials promptly. Comply with requirements in Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DEMOLITION.
 8. Existing furnishings and equipment: Except for items indicated to be salvaged, the Owner intends to remove all loose furnishings and equipment from the building prior to the start of demolition. All items, other than salvaged items, that remain in the building after the scheduled start date for demolition shall be removed and properly disposed of by the Contractor.
- B. Below-Grade Construction: Demolish foundation walls and other below-grade construction as follows:
1. Remove existing foundation walls to not less than two feet below final surface grade or as required for landscaping, site/civil or utility work, whichever is deeper.
 2. Slabs which extend below 2 feet shall be broken-up in-place.
- C. Filling Below-Grade Areas: Completely fill below-grade areas and voids resulting from demolition of buildings and pavements with soil materials according to requirements specified in Section 312000, EARTHWORK.
- D. Removed and Salvaged Items:
1. Clean salvaged items.
 2. Pack or crate items after cleaning. Identify contents of containers.
 3. Store items in a secure area until delivery to Owner.
 4. Transport items to storage area designated by the Owner.
 5. Protect items from damage during transport and storage.
- E. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 3. Protect items from damage during transport and storage.

4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- F. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.
- G. Items for Re-use and Preservation of Existing Surfaces to Remain:
 1. The Contractor shall inspect closely each item specifically designated to be relocated, re-used, or turned over to the Owner prior to its removal, and immediately report damages and defects to the Architect and the Owner. The Contractor shall be responsible for any subsequent damage to the same other than latent defects not readily apparent from close inspection, and shall bear responsibility for its repair or same replacement as directed by the Architect, to the satisfaction of the Owner.
 2. Unless special surface preparation is specified under other Specification Sections, leave existing surfaces that are to remain in a condition suitable to receive new materials and/or finishes.

3.5 PROTECTION OF PUBLIC AND PROPERTY

- A. Provide all measures required by federal, state and municipal laws, regulations, and ordinances for the protection of surrounding property, the public, workmen, and Owner's employees during all demolition and removal operations. Measures are to be taken, but not limited to installation of sidewalks, sheds, barricades, fences, warning lights and signs, trash chutes and temporary lighting.
- B. Protect all walks, roads, streets, curbs, pavements, trees and plantings, on and off premises, and bear all costs for correcting such damage as directed by the Architect, and to the satisfaction of the Owner. Refer to Division 32 for additional requirements.
- C. Demolition shall be performed in such a manner that will insure the safety of adjacent property. Protect adjacent property from damage and protect persons occupying adjacent property from injuries which might occur from falling debris or other cause and so as not to cause interference with the use of other portions of the building, of adjacent buildings or the free access and safe passage to and from the same.
- D. Every precaution shall be taken to protect against movement or settlement of the building, of adjacent buildings, sidewalks, roads, streets, curbs and pavements. Provide and place at the Contractor's own expense, all necessary bracing and shoring in connection with demolition and removal work.
- E. Remove portions of structures with care by using tools and methods that will not transfer heavy shocks to existing and adjacent building structures, both internal and external of the particular work area.
- F. Provide and maintain in proper condition, suitable fire resistive dust barriers around areas where interior demolition and removal work is in progress. Dust barriers shall prevent the dust migration to adjacent areas. Remove dust barriers upon completion of major demolition and removal in the particular work area.

3.6 DISCOVERY OF HAZARDOUS MATERIALS

- A. If hazardous materials, such as chemicals, asbestos-containing materials, or other hazardous materials are discovered during the course of the work, cease work in affected area only and immediately notify the Architect and the Owner of such discovery. Do not proceed with work in such areas until instructions are issued by the Architect. Continue work in other areas.
- B. If unmarked containers are discovered during the course of the work, cease work in the affected area only and immediately notify the Architect and the Owner of such discovery. Do not proceed with work in such areas until instructions are issued by the Architect. Take immediate precautions to prohibit endangering the containers integrity. Continue work in other areas.

3.7 CUTTING

- A. Perform all cutting of existing surfaces in a manner which will ensure a minimal difference between the cut area and new materials when patched. Use extreme care when cutting existing surfaces containing concealed utility lines which are indicated to remain and bear full responsibility for repairing or replacement of all such utilities that are accidentally damaged.
- B. Provide a flush saw cut edge where pavement, curb and concrete removals abut new construction work or existing surfaces to remain undisturbed.

3.8 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Comply with requirements of Section 017400 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL and the following.
 - 1. Do not allow demolished materials to accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- B. Burning: Do not burn demolished materials.

3.9 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition operations. Premises shall be left in a clean condition and ready to accept alteration work and new construction.

END OF SECTION